



RE:SOURCE

THE 10TH INTERNATIONAL CONFERENCE ON THE HISTORIES
OF MEDIA ART, SCIENCE AND TECHNOLOGY

13-16 SEPTEMBER 2023 VENICE, ITALY

PROCEEDINGS



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RE:SOURCE
the 10th International Conference on the Histories of Media Art, Science and Technology.
Proceedings

The 10th International Conference on the Histories of Media Art, Science and Technology - RE:SOURCE -celebrates Media Art Histories and the role that its main agents have had in the multiple developments of art, science and technology with a focus on the past 60 years.

The title 'RE:SOURCE' refers to a sub theme specifically introduced in the MAH Venice edition of the conference series. This theme will be centred on the climate crisis and questions of ecological sustainability considered in all their ramifications analysed through the lenses of Media Art (History).

The main historical theme of the conference series – the histories of Media, Art, Science and Technology – will form the core of the event. This will be integrated by a number of sub themes including the following:

- Track 1: "Memory. How to create future memories: documentation, preservation and new technologies" (media art conservation, preservation, documentation, archival research, role of researchers in curatorial practice).
- Track 2: "Climate Actions, Environment and Public Humanities" (public media art that addresses climate emergency and social topics).
- Track 3: "Pioneers of Media art" (media art history pioneers past and present, artists, curators, new technologies).
- Track 4: "Media art history outside and inside the museum" (curation, museology, cinema, games, media arts museums); re-enacting of exhibitions, new technologies and curatorial practice.

KEYNOTE SPEAKERS

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RE:SOURCE

The 10th International Conference on the Histories of Media Art, Science and Technology
13 - 16 September 2023 - Venice, Italy.

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The international conference series, which was developed in 2004, Menaggio, Italy has been held in several international venues around the globe including Banff 2005, Berlin 2007, Melbourne 2009, Liverpool 2011, Riga 2013, Montreal 2015, Krems/Vienna 2017, Aalborg 2019, stream during CIHA 2022 in Sao Paulo, and Venice 2023. The conference series aims to engage the growing community of scholars from a range of disciplines including art history, contemporary art practice, art theory, history of science, history of technology, media studies, image science, visual studies, philosophy, cultural studies, anthropology, architecture theory, sound studies, computer science among others to develop and share new research and scholarship in the intersecting fields of the histories of media art, science and technology.

More info about the conference series at mediaarthistory.org

The International Network supporting this conference is based on:

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Editorial Note

In preparing the proceedings of *RE:SOURCE 2023*, we have encountered some minor variations in the formatting and presentation of contributions. We would like to briefly address these differences for clarity.

First, readers may notice slight discrepancies between the titles of papers and their corresponding abstracts. This is due to adjustments made by the authors during the final stages of submission, reflecting either expanded focus or refined arguments. We have opted to include both versions to preserve the full scope of each contribution.

Second, the academic formatting across papers may appear somewhat inconsistent. This stems from the diverse submission guidelines followed by participants from different disciplines and institutions. Rather than imposing a uniform format, we have chosen to honour these disciplinary distinctions, which contribute to the richness and diversity of the conference proceedings.

We trust that these differences do not detract from the academic quality of the contributions, but instead reflect the broad range of perspectives and methodologies presented at the conference.

We hope that this collection provides valuable insights and stimulates further discussion in the field.

Sincerely,

Francesca Franco and Andrés Burbano

Editors of the Proceedings of RE:SOURCE 2023

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FULL PAPERS

MEMORY

Curating the future through the CYENS Art:Tech archive approach:

*-disciplinary creators of New Media Art as archivists

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Abstract

This paper considers how artists, scientists and technologists may contribute to the institutional archiving of NMA projects, and subsequently their potential contribution to the contextualisation, preservation, and dissemination of the genre. Since such works inherently carry multiple conceptual, technical, technological, and disciplinary layers, we explore whether all actors involved in their production should be actively included in formulating an all-encompassing archival resource. To achieve this, we explore relevant literature from inside and outside the art canon, looking at the broader AST & NMA ecosystems, including established international NMA initiatives. Additionally, we argue that an archive's structure, content, and indexing have the potential to serve multiple disciplines and purposes and provide incentives for the short- and long-term involvement of various actors.

This paper presents the current development of a new archival resource, the CYENS Art:Tech Archive. As this archive will host AST projects that have been developed and/or presented at the CYENS Centre of Excellence, we intend to include artists and other AST creators both in the archive's development and the archiving process. A participatory action research approach is employed to identify the creative, technical, and archival process of individual contributors in such projects, but also understand their needs and extend of possible contributions to such an archive. Additionally, the paper explores how these AST & NMA authors view the potential of having access to an open archival framework that aspires to address and contribute to both creative and scientific networks. Drawing examples from various contexts, lessons learned are operationalised to inform a novel archival resource aiming towards reflexivity, longevity, and dynamic knowledge dissemination of its assets, highlighting the importance of artists, scientists, and other *-disciplinary authors as contributors in the archival praxis.

CCS Concepts

- **Applied computing ~Arts and humanities ~Media arts**
- **Applied computing ~Education ~Digital libraries and archives**
- **Human-centered computing ~Collaborative and social computing ~Collaborative and social computing theory, concepts and paradigms ~Computer supported cooperative work**

Keywords

New media art; Art, science & technology; Archiving; Artist-centred digital archiving.

1. Introduction

Exchanges of creativity and innovative experimentation have been seeding the broad Art, Science, and Technology (AST) field and the New Media Art (NMA) genre, with their characteristics, effects, and affinities keeping pace with the exponential shifts in scientific knowledge and technology development. These exchanges have also presented challenges in documentation, preservation, and dissemination of such projects, leading to their critical underrepresentation both in art-canonical and other types of institutions [1]. Relevantly, the measurable results of the broader AST paradigm are not yet clear as there is a lack of systematic evidence collection, due to institutional communication and evaluation practices [2,3]. However, digital archives have been argued to be effective "survival mechanisms" and may serve as the most effective safe-keepers and disseminators of NMA works and AST synergies.

This paper examines the role of artists, scientists, and technologists in the archiving of NMA and AST projects and their contribution to contextualizing, preserving, and disseminating them. The main observation driving these inquiries is that digital archives have become essential safe keepers and disseminators of AST activities, transforming from passive repositories of facts [4] into flexible, "living" environments capable of adapting to changeable records [5]. Importantly, new hierarchies are developing, with artists, transdisciplinary practitioners, archivists, and institutions renegotiating their contributors' roles [6,7]. The overall research which contextualizes this paper, is an ongoing PhD thesis that aims to establish the basis for a first-of-its-kind in Cyprus, open and reflexive archive of current and upcoming AST projects, contextualizing and disseminating the activities hosted under the "Digital Creativity in Arts & Culture" strategic application area of the CYENS Centre of Excellence. The formation of the CYENS Art:Tech Archive aims to serve two distinct purposes: (a) to become the first archive focusing on the AST and NMA activities in Cyprus, and (b) to contribute to international efforts in documenting and distributing AST and NMA effectively. To achieve its overall goals, it is necessary to: (a) elaborate on the needs and challenges that NMA & AST projects carry, like obsolescence and complexity (b) discuss the current NMA & AST ecosystems, (c) discuss the roles of artists and other AST creators in the archival praxis, and (d) consider the current

international efforts for promoting collaborative and interoperable archival systems.

The importance of involving artists and other contributors in AST activities, from structuring the framework to acting as active contributors to their assets, in most aspects of archiving is emphasized and discussed in this paper. A brief overview of digitally archiving NMA & AST activities and the importance of postcustodial archival practices in such efforts will be presented. The dynamic of artists, scientists and other *disciplinary authors of NMA and AST projects participating in the archival praxis will be examined through relevant literature, contextualizing the arguments and approaches adopted to inform the CYENS Art:Tech Archive's methodologies. Following, a short overview of CYENS Centre of Excellence, its AST and NMA related activities, and the strategies tested through this research will be presented.

2. Digital archiving in the AST and NMA ecosystem

The intersection of art, science, and technology has seeded a new ecosystem of AST & NMA, with festivals, conferences, funding schemes, academia, and industry playing a significant role in its growth. These institutions have established trading zones between disciplines and cultures [8], promoting transdisciplinary practices with a flexible methodological structure. Arguably, the most comprehensive set of information and developments of the AST field are available online through digital archives, such as the Archive of Digital Art (ADA) and the Ars Electronica Archive, which are used as case studies in the broader scope of this research. Such resources have been pivotal in recording AST developments in the last 50 years [5,1].

These, and other archives and institutions are producing extensive databases open to the public, as well as documentation methods and taxonomic and retrieval mechanisms to better serve NMA and AST expressions. Nevertheless, they are equally affected by this ecosystem's challenges: tech obsolescence, the evolving sociopolitical, cultural and technological contexts, authorship and copyright issues, shifting aesthetic parameters, and information infrastructures, need to be approached with new strategies [9, 10, 11, 12, 13]. Navigating the ecosystems of cultural, philosophical, social, and scientific aspects remains challenging, while medium obsolescence, complex stakeholder structures, and insufficient institutional mechanisms hinder the field's historicization, impact, and longevity [6]. It is becoming increasingly important to optimize existing documentation methods and resources for NMA & AST and develop more reflexive practices to ensure their preservation for future generations and their effective dissemination.

The same technological shifts that make the documentation of NMA & AST challenging, have also affected how archival resources are conceived, realized, and used; perhaps most importantly though, they have changed the way archives can be reimagined.

2.1. Postcustodial archival practices

Digitality and connectivity have transformed not only the types of documents being archived, but archival practices themselves. AST and NMA archives are shifting from static and introvert archival systems to dynamic and accessible resources [4, 5], developing novel capabilities for the preservation, cultivation and diffusion of artistic expressions, and scientific and theoretical knowledge. Digital technologies

opened new routes for compositing, classifying, analyzing, and distributing information via digital archives, allowing for vast amounts of information to become accessible to researchers, scholars, and members of the public, while also enabling their statistical analysis [14]. Additionally, novel taxonomic and classification systems emerged, allowing flexible and changeable readings of datasets and narratives [15]. These capabilities signify a significant theoretical shift in the archival discipline, from traditional custodial practices to postcustodial approaches.

Traditional archives were understood as custodial structures, with the archivist/custodian passively guarding the truth and value of each asset and safeguarding the linear progression of custody and provenance [16, 17]. They were used as a vehicle of its owner's ideologies, connecting the subject with the broader landscape, be it socio-political, cultural, economic, or other [18]. Preserving documentation as unchangeable and static, archives would store their assets in a specific location, inaccessible and protected to maintain their crystallized form [14, 19, 20]. Prioritizing physical integrity over the accessibility and usability of these assets resulted in inflexible, difficult to access archives that were less adept to change.

Postcustodial paradigms brought an important shift in archival practices pertaining ontological and philosophical changes [18, 21, 22]. Gerald F. Ham coined the term postcustodial in 1980 to challenge Jenkinson's formalization of custodianship; recognizing the effects of digitization and the overwhelming volume of records entering the archival sphere, he suggested that the archivist's role shifts from that of a passive receiver to one of a "proactive appraiser and manager of records" (p.22)[23]. Jenkinson's definition of the authoritative custodian as a safekeeper of unchangeability (1922) dissolves in multi-stakeholder and non-localized expression of the postcustodial archive [24]. Arguably, the archivist's role is transformed to that of a regulator and auditor of documentation systems in Bearman's (1991) view [25]. The postcustodial shift ultimately emphasizes the importance of multistakeholder contribution and interoperability, to ensure that archives remain open, accessible, and responsive to users' needs and interests [26].

The digitally driven applications of postcustodial approaches adhere to and greatly inform the contemporary conservation paradigm shift relating to AST & NMA, requiring an extensive negotiation between artist and conservator, as suggested by Muñoz Viñas (2005) [27]. Relevantly, while stressing the importance of archival materials for preserving cultural expression, Moore (2007) suggests that archives and archivists are understood as nodes in an organic network formulating an ecosystem [28]. In his view, records are the organic inhabitants of an artificial archival ecosystem, while archivists, record creators, and researchers exist separately as custodians, influencing dynamically its propagation and consumption [2, 28]. Besides meeting the field's needs for substantive, and enduring preservation approaches, digital archives can serve as multidimensional platforms for communication, revealing interconnections and affinities, and enabling collaborations and transdisciplinary knowledge creation amongst stakeholders. Documenting AST & NMA activities in the digital domain can deepen our understanding of their interrelationships. As Wiebel frames it, they can produce a "transdisciplinary mapping of competencies [...] taking place in the fields of art" (2011)[29]. Such multi-stakeholder and non-localized archival ecosystems are indeed possible and can facilitate more participatory and collaborative documentation.

2.2. The role of the artist in postcustodial practices

The roles of archivists, users, and other stakeholders involved in the archival apparatus seem to be increasingly overlapping. Postcustodial paradigms opened various gateways to the artists' involvement in the archive; what is described as the archive fever [20] or archive "impulse" [30] overtook academics and artists alike in a theoretical socio-historic reasoning spree. Artists are blurring the lines between artwork and its documentation, incorporating documentation into their creative process [31], and establishing new canons concerning the articulation of archives.

Artists also play a crucial role by participating in documentation and meaning-making practices. Collaboration is anyhow an integral part of AST & NMA production, which involves a wide range of contributors, methodological frameworks, contributing thus to historical approaches to preservation and historicization [30]. Giannachi (2016) mentions that several institutions are inviting artists to participate in the archiving process and, respectively, requesting archivists to use curatorial approaches to disseminate archived material through community workshops, collaborative capacity building activities and knowledge production [7]. Such approaches are more evident in the museum context, as museums are increasingly adopting documentation protocols that prioritize the contributions of artists. Important institutional schemes and alliances like the Variable Media Initiative (VMA), Matters in Media Art resource, and the Whitney's Media Preservation Initiative have developed such protocols. The VMA is one of the oldest and most influential media art documentation protocols, utilizing the Variable Media Questionnaire (VMQ) as a central tool to document the artists' point of view and decision-making processes [32]. Through this approach, the artists are viewed as key archivists, while the focus falls on the content rather than the work's materiality and aesthetic attributes [33]. Similarly, Matters in Media Art (MMA) – a result of collaborative efforts between esteemed museums – provides methodologies and templates for documentation of time-based media artworks, with artist-focused interview and information collection protocols which contribute to registering the perspectives and opinions of artists on how to approach documentation needs [34, 35]. The latest methodology comes from the Whitney's Media Preservation Initiative (MPI), having updated, and expanded the museum's documentation templates to address time-based artworks [36]. Amongst the developed templates, the Digital Art Questionnaire and Identity Report templates request the artwork's info from the artists, covering production history, preservation and fabrication, display and experiential details, object summary and description.

Understanding artists' personal documentation and workflow practices can greatly inform institutional archival infrastructures. Artists often put their personal archives in multiple uses: they activate them as a partial or full preservation strategy for past work and to inform the creation of new artworks [37, 38], as well as for pursuing career opportunities, completing funding applications, and document processes from previous projects that can be reused [38]. Case study research, such as Dekker's investigation of the participatory game *Uncle Roy All Around You* by Blast Theory, provide insights into these practices [33]. Artists' documentation strategies are crucial for proper recreation and re-presentation of their work, starting from the early stages, as Dekker points out (2014), a view that aligns with Delve & Anderson's (2014) opinion that preserving issues

should be addressed from the moment an artwork is commissioned [39]. Post (2017) explored several archival practices of artists, identifying key strategies such as maintaining private and official documents, digital assets, and even objects relevant to the artwork's research and development [38]. Often, artists kept documentation for restaging an artwork and preserve digital files of production software in both physical and digital formats. An important observation is that often, the photographic and video documentation of the artists' work, as maintained in their digital archiving system, outlives the actual artwork [38].

Lozano-Hemmer's detailed account of his own archiving practice mentions processes similar to the ones observed by Post. Stressing the importance of source code, installation and driver instructions, and storage of software on various formats, Lozano-Hemmer proposes the creation of a manual for each work detailing key concepts and the piece's workings, including detailed set-up procedures, maintenance instructions, and a preservation and materiality section [40]. He also notes that neither the technical components of his work nor the institutions' handling and documentation practices and expertise are to be fully trusted. Despite this, he emphasizes the importance of trusting conservators and developing a long-term dialogue with them. Notably, Lozano-Hemmer's process shows similarities to preservation methodologies and protocols developed for the museum context, like the aforementioned museum-born methodologies, and Tate's acquisition and preservation protocols [41], stressing the value of extending these practices into the broader digital archiving ecosystem. Another notable approach towards employing artists' personal archiving is that of indirectly caring for archives 'in the wild' [38], as it is recognized that most of these informal documentation practices rarely enter institutional infrastructures [42].

To apply postcustodial models, including artists' contributions, it is crucial to create a reciprocal relationship between institutional and artists' personal documentation practices, increase access to such models, and invest in building knowledge among artists on these methodologies [43]. This approach is also recommended for different social contexts and communities' experiences, such as social minorities and marginalized groups [44] and can contribute to more inclusive and effective archival systems.

Respectively, it is argued that not only artists, but also technologists, scientists, and programmers involved in producing AST works could significantly contribute to their longevity by becoming more involved in archival preservation efforts [33]. Scientists, technologists, and programmers inherently contribute various materials to discipline-specific archives, including scientific data, metadata, and other documentation. In today's age of high data power and scientific documentation, archival practices are vital for efficient storage and retrieval [15,45]. Scientists and technologists are assigned highly regulated roles as record producers, as their findings are validated in the academic economy through strict workflows of documentation [46]. Scientific disciplines, including computation, technology, engineering, and mathematics, as well as humanities disciplines like cultural heritage, literature, history, and arts, are developing sustainable data-sharing platforms and preservation methodologies [47, 48, 49]. They are also establishing data standards and protocols for scientific data management, such as the FAIR data principles [50]. However, these contributions and their methodological affinities across disciplines and contexts have not been extensively explored in the AST archiving context or effectively included in

transdisciplinary archival efforts. By incorporating such archival paradigms into AST archiving, preservation and dissemination efforts can be significantly boosted, revealing connections between disciplines, principles, and ecosystems, leading to more diverse audiences sharing significant scientific and technological research.

2.3. Seeding interoperable functions through collaborative approaches

Including NMA & AST creators as active archivists may serve a final, but significant node of archiving, that of interoperability. Interoperable practices facilitate information transfer between different contexts through technical activities, semantic mapping, and cross-institutional meaning-making processes [51]. These practices have practical and theoretical benefits in the archival context, spanning from technical activities to cross-institutional meaning-making processes [26]. For the purposes of digital archiving of NMA & AST, interoperability is an essential flex that has the potential to greatly contribute to the contextualization and historicization of the field. The International Liverpool Declaration of 2019, signed by over 500 scholars and artists from 40 countries, highlighted the necessity to establish a stable international platform of interoperable NMA & AST archives. Since then, the leading institutions/archives in the field have intensely pursued much-needed policy, synergetic, and interoperability-driven transformations, much of it driven through the ISEA Summit of New Media Art Archiving [52].

To some extent, postcustodial approaches with some elements of participatory and interoperable functions have been applied by the case study archives of this research: the ADA and Ars Electronica. Specifically, internal interoperability has been applied through shallow participatory archiving techniques [26], granting selected access to individual and community representatives, and allowing them to place tags, annotations or even additional materials for metadata and records. This shallow interoperability can propagate at later stages and inform grander schemes that may allow archives to host interoperable functions between them.

Bearman's postcustodial archiving model suggests that the creators of records, such as the authors of AST & NMA projects, are the sole owners and remain responsible for their maintenance and updating [25, 43]. Hosting institutions and responsible archivists facilitate these activities by establishing policies and implementing technical infrastructures, while ensuring that all requirements of contextualization, preservation, access, and curation are effectively addressed [43]. This approach will be thoroughly examined throughout the interview phase of this research. Through postcustodial approaches, artists and other contributors can participate in collaborative archival practice models, contributing to the preservation and dissemination of NMA & AST [43]. As archival longevity is reconciled between individual and institutional responsibility, a clearer picture of the problem can emerge.

3. Towards the CYENS Art:Tech archive

Postcustodial paradigms, the recorded dynamic of involving artists and other AST & NMA authors in archival practices, and the developing documentation approaches of AST & NMA institutions and digital archives, are crucial references and waypoints for any novel archival resource. These observations are fundamental for the development of the CYENS Art:Tech

Archive, which aims to fill a significant gap in documentation of AST & NMA activities in Cyprus.

A hyperlocal gaze at Cyprus reveals a vibrant NMA & AST scene which is however unexplored. Very few of such artworks have been acquired or documented by any institution able to contextualize, safeguard, or care for them. Despite not being a cultural institution, the CYENS Centre of Excellence, a research and innovation center focusing on interactive media, smart systems, and emerging technologies, hosts art & technology residencies, exhibitions, talks, workshops, and the first-of-its-kind Art & Technology festival for the past three years[54]. Having hosted numerous artists, technologists, and researchers, it is also organically forming the first institutional documentation of AST synergies and NMA expressions in the country. This research aims to design the CYENS Art:Tech as a new archival resource that will become the first openly accessible archive focusing on the AST & NMA activities in Cyprus, contributing to their preservation, as well as their dissemination across various disciplinary fields.

Creating a novel, openly accessible AST-focused archive in the Cypriot context offers many possibilities. Informed by the postcustodial paradigms and inspired by the legacy and leitmotifs of significant AST & NMA institutions and archives, the primary goal is to create a reflexive framework: one that promotes communication, interconnections, interoperable functions, asset longevity, collaborations, and transdisciplinary knowledge exchange. These aims can equally begin to be informed technically by broadly used existing protocols and paradigms, like the FAIR data principles [50], and the Europeana platform [55]. Importantly though, as a developing archival resource, it can more easily assimilate the lessons learned from various ecosystems and expand beyond them, contributing thus actively to the developing international efforts to document and distribute AST and NMA. Since the CYENS Art:Tech archive is being designed almost simultaneously as the artworks and projects it will host, observations and recommendations, as well as documentation strategies and methodologies of existing institutions and archives can be tested afresh and extended, without having to deal with dated or pre-existing logs. Equally, each creator whose artworks have been documented in the CYENS Centre of Excellence context has complex work processes and unique perspectives on archiving and representation which need to be considered.

3.1. Including AST creators in the theoretical formation of the CYENS Art:Tech archive

Involving NMA & AST creators in the ideation and contextualization of the CYENS Art:Tech archive, is considered an integral part of formulating its theoretical framework. To achieve this, a participatory action research methodology [53, 55] is employed, in order to include both archive experts -from the case study archives of this research-, and artists / scientists / *-disciplinary authors, whom have already worked at CYENS. This approach aligns with the research's ethos and aims, as it allows key stakeholders' involvement in developing a tool that primarily investigates them, while facilitating iterations in the framework concept based on their contributions. Additionally, this methodology can contribute to professional research while addressing practical needs or problems [55].

The project is ongoing and part of a PhD thesis. The methodology involves conducting semi-structured interviews

and focus groups with artists and creators who have been hosted through residencies at the CYENS Centre of Excellence, and for which the center has already collected data and witnessed inter/multi/trans-disciplinary activations; 16 such artist in residency (AiR) have already been held and seven more are expected to be completed by February 2024. The aim is to explore all layers of their creative process, including project iterations, literature and research, but also highlighting collaborative aspects and contributions from other technicians and experts. During their residencies, these creators collaborated and in fact co-authored with scientists, technologists, technicians, and other *-disciplinary contributors. Such collaborations organically developed in the residency workplace, encouraged and mediated by the CYENS Centre of Excellence AiR facilitators, or established by the artists themselves. The semi-structured interviews and focus groups with artists will gather information on their artmaking process, personal archiving practices, opinions, and experiences on documenting and disseminating their work. The interviews will also identify other contributors and their involvement in each AST project development. In cases where such scientists or technologists significantly contributed their research or professional expertise, they will be subsequently contacted, activating a second round of semi-structured interviews. The initial analysis of interviews will guide a series of focus groups to discuss NMA & AST creators' artmaking, disciplinary connections, involvement in the archive's formation, documentation, and motivations for their archival presence. The questionnaires and focus group workplan are designed considering existing institutional documentation methodologies that emerged from the literature review phase and the methodologies observed in the ADA and Ars Electronica archives.

Engaging with artists and other AST creators can provide unique insights into the real-world environments where AST thrives and is communicated to stakeholders, industry, and audiences. Understanding how they approach, realize and communicate their projects, as well as how they view their longevity in a depth of time, can help chart in more detail the complex AST & NMA processes. These elements can inform the structure of a reflexive archival structure that encourages creators to maintain active roles as archival contributors, trace *-disciplinary connections and encourage them to further explore interdisciplinary affinities of their work.

4. Concluding remarks

Digital archiving has several rapidly developing areas, that can and will redefine the contextualization, longevity, and dissemination of any field. As argued, digital archiving for NMA & AST opens possibilities for preserving the multiple and definitive aspects of an artwork or project that would otherwise be lost in the effort of conserving a final artefact in a frozen state. Representing all involved stakeholders, qualia, technical and practical narratives, and even reveal interconnections of such artworks in the broader ecosystem's context is a notable challenge, which is however worth to be traced. Relevantly, as Hoth (2019) stresses, the transdisciplinarity of NMA and the broader AST field demand that such works should not be limited to art-canonical historicization, but rather be open to various negotiating perspectives [6].

Throughout the development of the CYENS Art:Tech archive, we aim to address the challenges and the lessons learned from existing archiving institutions and operationalize the

knowledge from the discussed literature by actively including artists and other AST contributors in all aspects of formulating this developing archive. We argue that the opportunities and relevant challenges of the evolving NMA & AST archiving field can be approached from a postcustodial perspective and by including artists in different aspects of archival resources. The role of artists, scientists and other *-disciplinary NMA & AST creators has been discussed as pivotal throughout this paper, as they can further inform such resources' structures but also become active and long-term contributors to them. Relevantly, we suggest that existing and new archives should consider adopting more reflexive practices, creating resources that resemble Moore's (2007) artificial archival ecosystem [28]. Such an approach would allow the involvement of diverse creators/contributors to AST projects significantly, thus allowing a multi-layered documentation of each archived work. Opening the archive to such contributors respectively fosters a diversity of disciplinary contributions and viewpoints, delineating the archive as an active resource of exchanges, flexible to change and open to its contributor's recurring involvement. Including AST creators in a reflexive archival ecosystem also has the potential to assist in effective preservation and dissemination, tracing disciplinary knowledge relationships in NMA & AST results, and eventually reaching more diverse audiences. Issues of interoperability can be equally addressed through the archive-as-ecosystem metaphor, which explores how records are formulated, transacted, and balanced between the different actors, with equitable balance becoming a possibility by collaborative interactions that minimize hierarchies [12].

Both the longevity and the dynamic transdisciplinary readings of AST can be enabled by digitality, allowing archives to forge new canons and evolve to multi-dimensional platforms, fostering continual communication and furthering collaborations, connections, and knowledge production amongst its stakeholders. Importantly, the involvement of all the stakeholders in the formation and maintenance of the archival assets can greatly assist the daunting task of media-dependent and contextually heavy records, as well as for the development of the methodologies for comprising and activating such archives. To unwrap this complex web of the AST & NMA universe, we attempt to inform the CYENS Art:Tech archive's framework by perhaps the most essential nodes of this ecosystem – the creators of New Media Art & Art, Science and Technology synergies.

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Available, Augmented, Algorithmized.

On Shifts of the Pictorial in Contemporary Medial Settings

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Abstract

Morphing, fast, sometimes shrill, sometimes surprisingly haunting: in terms of media history, mixed reality formats and GPT can be seen as marking, if not a radical change, at least a decisive paradigmatic moment. Virtual, but above all augmented reality formats (once again) fundamentally question what can be understood by an image and what can generally be associated with imagery. While the mixed reality forms in art particularly address the issue of how images are sensually and materially shaped and what shifts they initiate with regard to our perception and experience, the implementation of artificial intelligence (or machine learning) brings new processes and practices into the field. And it is precisely on those practices and processes that this article takes a sharpened look.

Drawing on the work of contemporary artist Pascal Sender (*1988, Switzerland), who, as an educated painter and self-taught programmer, engages with online collective processes, augmented reality layering, and AI image generation, the paper focuses on the question of what readjustments are occurring with regard to modes of production, circulation, and reception of the pictorial against the backdrop of the current techno-medial condensations outlined above.

The article highlights three moments of shifts that - according to the central consideration - can currently be recorded with regard to the picture: shareability, spatialisation and the promptisation of the pictorial. The paper is thus literally interested in a re-sourcing and asks which sources, which links, which trajectories and stabilization mechanisms accompany the picture, its forms of production and reception. How can reference structures be dealt with when no reference chains are made visible at all (OpenAI)? How to deal with black boxing processes that shift references into latency? What ethical, political, but also aesthetic implications arise from this?

Keywords

Augmented Reality, Digital Art, Artificial Intelligence, the Pictorial, Pictorial Milieu, Machine Learning, Image Science

1. Introduction

Seemingly infinite image circulations, new screen regimes and mixed realities: in our current here-and-now, the visual once again seems to be undergoing transformations that radiate out in different directions. This is noticeable in new modes of reception

(e.g. when we look at things primarily on the smartphone via social media), expanded production processes (through the involvement of machine learning systems) and also in changed legibilities of the pictorial. What images are for, what they evoke and create is also currently being transformed in a clearly perceptible way. A general reflection of visual processes has always especially taken place in the so-called fine arts. Here, visual spaces were and are created, logics are tested, stabilised and discarded, and new ways of dealing with things are established. The Swiss artist Pascal Sender, on whose work this article focuses, is also concerned with current media transformations and upheavals. Based on the approaches and situations that Sender's works and series of works create, the article deals with the question of which shifts with regard to the visual can be traced both currently and in perspective. Against this background, the text presents three different moments, all of which characterise current transformations. Thus, in the second part of the article, the shareability of the pictorial will first be examined, based on the observation that even everyday methods of communication, which mostly use such media forms as for example screenshots, are primarily dependent on the visual and, in the course of this, shift both the respective habitus as well as parameters of the aesthetic. Here, a series by Pascal Sender will be brought into the foreground, which continuously works with 'ephemeral' images of the digital and repetitises but at the same time reverses its logics. In the third part, the spatialisation of the pictorial will be addressed by discussing the format of augmented reality and its elements of sculpture and space creation (as well as generation). Here, the spotlight will be on a work by Sender that not only creates an augmented reality, but also allows entire pictorial environments to emerge that explicitly transfer the viewers into the image. Finally, in the last and fourth part, before the considerations will be brought together again in the conclusion, the current developments of so-called artificial intelligence will be taken up, linked to the idea that the visual is currently undergoing an enormous change insofar as it is experiencing a promptisation - i.e. a generation on the basis of linguistic 'commands' and thus implies completely new forms of linkages and modes of circulation.¹

2. Shareability of the Pictorial

When we talk about pictures, this, on the one hand, gives the impression of being taken for granted, because everyone will

¹ In this paper, the terms 'picture' and 'image' are used without further differentiation. Knowing that the terms may have different connotations, it is important to point out the problem of differentiating between the two in the present

context, since the terms are intertwined, especially with regard to digital artifacts. On this, see for example Stoeckl 2019.

certainly have an idea of what a picture is: Photographs in an album or on a smartphone, illustrations in magazines or - be it painted, drawn or printed pictures - in a minimalist or a lush frame. The imagination can also go further and we start to think for example of labels of consum goods, satellite images or the inexhaustible source of what is included when we think of moving images and start with film. This associative list is both completely self-evident and over-bordering, for it is clear that the list can be continued in any direction. In other words, as ubiquitous and self-evident as the concept of the image may seem to us, it is also multifaceted and complex - in terms of media history, aesthetics, epistemology or politics. The complexity of the question of the image has become a marked discursive field over the course of the last 20 years, not least through the founding of the so-called image sciences², and is now - against the background of current media-technical developments - unfolding further debates and directions of thought. What this image studies oriented 'preface' is intended to make clear, then, is first and foremost the understanding of the image as a phenomenon that also undergoes a wealth of transformations from a media-historical perspective - whether in the question of its mobility (as a wall fresco, wood or transportable canvas, or as a digital image³), on its respective status and functionality (such as representation, authentication, etc.), or on its temporal dimension (whether as an ephemeral flyer or an oil painting designed to last for centuries, or the like). Consequently, when this article speaks of contemporary shifts, it is clear at the same time - equally in terms of cultural history - we are dealing with transformations that are, on the one hand, new or unique insofar as the concrete ways and forms of the respective metamorphoses change (i.e. there are partly other issues that arise at this point), but on the other hand a repeatability or circularity can also be noted, because the image has repeatedly undergone transformations and aesthetic-ontological upheavals (whether with the implementation of technical reproducibility, the invention of photography or the emergence of the moving image). So what does this article mean when it speaks of a shift in regard to the circulation of the pictorial? As already indicated, this is not a first-time change, if we think, for example, of the detachment from a fixed wall or leaflets, but now there is a decisive change insofar as the concrete technical settings and thus also the reference points (functionality) as well as the temporal relations (instantaneity) have been reorganised.

The works of Pascal Sender, for instance, can be read as a media-symptomatic result of all these developments. In his oeuvre, we can point to very different forms, all of which not only react to the digital, but also sound out its boundaries and transitional moments. In 2020, for example, Sender developed a series of face filters that, on the one hand, connect to the social media trend that has been gaining presence since around 2018, but, on the other hand, also takes the very logics and aesthetics that work in particular with the factor of cutiness to the point of absurdity. Thus, Sender's face filter "Facedance" works in a way in which the person's face either disappears completely or shows itself as a muscular structure without skin, or else starts dancing through the image as a plucked grilled chicken (Sender 2020).

With regard to our question concerning the image, this work highlights that its medial characteristics differ from its cultural-historical 'predecessors' in a decisive way. If one understands the filter-images as selfies and thus places them in a line with the long tradition of self-portraits, then even here some clear differentiations become apparent. On the one hand, there is the techno-medial as well as aesthetic logic of the image, for different layers overlap here, as the face receives a pictorial augmentation in real time that reacts to the form and the movement. What goes hand in hand with this form of augmentation (and we will come to this medial point in the third part of the article) is at the same time a whole register of logics and characteristics. These include the following moments: First of all, the aspect of instantaneity can be mentioned, because - at least on the level of 'use' - the image is created at the very moment the filter (or the corresponding app) is activated. Even further - this image logic is inevitably dependent on the image experience happening in the here and now. And if this is supposed to be captured, then another aspect comes directly into play, which is particularly in focus here: the shareability and circulation of the image.

In his monograph "The Digital Condition", published in 2017, Felix Stalder talks about various parameters that describe this 'digital' culture. Among them, the aspect of community is particularly important. This can be seen, for example, in the fact that people join together in forums and repeatedly give rise to new 'communities' on different levels, even if the question of what distinguishes these communities (namely a frequently emerging transitory and fleeting nature as well as the crucial question of what power of action these communities, which mostly take place almost exclusively online, can entail, and whether this can be understood as a political relevance at all) remains not entirely insignificant. The current shift of the pictorial can also be summarised under the keyword of communitisation, because the produced images only acquire their status as images when they are chased through various social media channels and messengers - that is, when they are shared with a community. At this level, another moment becomes visible, namely the shift in the demarcation between the private and the public. However, this does not merely function in a reversing or simply differently proportioned way, but allows the two areas to become a complex fold in which the two levels interlock in a way that does not afford a binary division. Rather, the question of the respective staging strategies that function in both directions becomes relevant here.

Pascal Sender also addresses this division between public and private in another series of images, which the artist understands as a visual diary and which in turn operates precisely with the logics of the ephemeral nature of image production, screenshotting and sharing. The series was created between 2018 and 2022 and comprises a corpus of around 700 digitally existing images and around 40 images that have also been realised in an analogue form. In order to cope with the daily flood of digital images, but also with the omnipresence of the visual stimuli experienced every day, Sender began to create a visual diary of his visual impressions of each day. In other words, photographs that the artist had taken in the course of a

² In the course of this, special mention should be made of the approach of the so-called Image Act (see Bredekamp 2017).

³ See here Faulstich 2015.

day (mostly *en passant*), as well as screenshots from different platforms or private messages, which in the end also appear in the form of chat windows as visual images, found their way into the respective picture. Working with the technique of digital collage, Sender then put the pictures together on his smartphone and made some changes. Just as some people scribble on the pages of their diaries, Sender also blurred some parts of the picture, sometimes covering them up or adding new shapes. In this way, a total of over 700 pictures were created in the course of the development period, most of which, however, remain as private entries on the smartphone or in the cloud. Those that have actually achieved a different status were subjected to a further process of transfer from the digital to the analogue. Thus, the images were printed in large format on canvas fabric, but not only left in the form, but also further processed with more 'classical' painterly means, namely oil and acrylic colour, ink or transparency agents. In this way, the digital images were realised as huge vertical formats reminiscent of enlarged smartphones, which basically both repeat and subvert the logics of the digital image at the same moment. Translated into analogue, the images were initially deprived of their mobility and shareability, but at the same time - through this very act of deprivation - they were able to escape their quasi-existence in the shallows of the digital image archives.

With regard to the shift discussed here, we can thus state that the shareability of the pictorial has become a decisive momentum of pictorial trajectories but also of pictorial aesthetics, for the way it circulates (with simultaneous overproduction leading to an immeasurable overabundance of 'dead data') has inscribed itself in the image formats as well as the image contents. While the popularity of voice messages may be on the rise again, it is currently undisputed that the dominant bulk of all communication is visual - be it sharing a city location, responding to the announcement of an engagement with a heart emoji or sharing one's mood with the playful use of a face filter. The contents, the codes, the self-evidence of the pictorial have thus shifted in a way that inevitably confronts us with the question of what we are basically talking about when we refer to an image and which new practices, but also techniques, aesthetics and possibilities for action have been added or possibly also broken away with it.

3. Spatialisation of the Pictorial

What distinguishes the outlined diary series by Pascal Sender is the fact that another aspect, not yet mentioned but not insignificant, is added here, for the images transferred into the analogue are provided by Sender with an augmented reality layer, which adds another digital sphere to the printed and further painterly-analogue processed image. In other words, the works from the Visual Diary series not only mark and initiate a shift with regard to the practices of photographing, collecting, collaging and permanent placement of the digital ephemeral, but also lead us directly to another point that preoccupies current discourses on the pictorial. This brings us to another paradigmatic shift that this text focuses on: the spatialisation of the pictorial. The work "Airdrop" (2021) - also from the Visual Diary series - initially appears as a high-formal image that is

distantly reminiscent of a smartphone screen. Text or word fragments can be found on it, hints of icons as well as an eye-catching, covered face, centrally placed in the picture. Various technical elements scurry around the face and cross the picture at the same time. We can see heavily overpainted approaches of connections, grids and reliefs, which make the picture appear as a plurisubjective as well as multimaterial collage. If we look at the work again through a smartphone or tablet screen, using the app specially created by Sender, the image immediately begins to move. It becomes three-dimensional and lets its elements emerge architecturally from the picture plane. But one of the decisive components seems to occur when the smartphone is pointed at a face, for it is immediately inserted into the image. The face of the respective person thus instantaneously becomes a (immediately central) part of the image and marks more strongly that the bodily involvement does not only dwell on a symbolic or sensorimotor level, but concerns the primary visual level: the face becomes the image. It is 'pulled out' of the environment and by being added to the picture. In doing so one thing in particular happens, namely a spatialisation of the pictorial. The image thus absorbs the environment and at the same time generates a completely new pictorial milieu.⁴ Consequently, a not insignificant shift happens at this point, also from an ontological point of view, because through the inclusion of the environment and the simultaneous stepping out, the augmented reality image described acquires sculptural qualities, or even more - it becomes sculpture, so to speak. This work thus marks a very specific relationship between the body, the environment and the image, which has no fixed stability and also does not need one, but continually transforms and updates itself and also its milieu. Following Erich Hoerl, we would call this point a new technological condition (Hoerl 2015), a situation in which the image is not only a visual object, and it is even more than (speaking with Michel Serres 1972) a quasi-object, but a hybrid phenomenon that combines several modes of existence and generates an activation of a whole series of ontological as well as aesthetic states.

4. The promptisation of the pictorial

The fact that the so-called artificial intelligence changes many processes has been and continues to be an established topos by scientists as well as science fiction authors. But what such a change can look like in concrete and pragmatic terms has become clear since the publication of Open AI at the end of 2022. However, the current changes and questions do not only concern the large-scale narratives about the meaning and agency of humans, but to a special degree a very concrete area: the relationship between (verbal) language and image production (as well as reception) and the respective chains of reference. For what programmes such as Dall-e or Stable Diffusion make possible is the generation of visual content either by taking another image template and then transforming it with linguistic information or by generating images solely on the basis of so-called prompts - i.e. keywords that specify both the concrete motifs and elements in the image as well as modes of representation, styles, colours, etc. The result of this process is the generation of visual content.

⁴ The term of the pictorial milieu was already implemented by the author in the lecture at the conference "Bildsituationen" (Hamburg, 2022). On the concept of milieu, see, for example, Deleuze/Guattari 1987 and Simondon 2016.

The work "Insideout" by Pascal Sender is essentially based on a double prompt procedure and thereby stages the possibilities of distributed creation. The "Insideout" work initially goes back to a livestream in 2017, during which Sender received instructions from a total of 220 viewers via the chat function during a 1.5-hour session as to what he should put on the picture. These requests were then painted instantaneously. During the process, very different wishes came together, such as human figures, animals or fictional characters with entirely different, sometimes completely scurrile actions, creating a kind of a surreal scenario: A kingkong Santa climbing a skyscraper, a giraffe with a medical badge standing to the right, a little octopus swimming with a green umbrella (see Figure 2). So, what we can see here is a kind of human chain of prompts, that means that it is a sort of a precursor of the picture generating process that takes place (like when we use Stable Diffusion or Dall-e and so on). This work therefore addresses the topic of an intended decentralization and distribution of authorship. The livestream took place in 2017, and 2023 Sender decided to transform this picture once again. By using prompts like "comic style, digital drawing of a man in a leopard bikini, surrounded by animals like pink octopus etc." Sender initiated a kind of a collaborative process, where he let the picture transform by AI but by steady interrupting or diffracting the process by new prompts. And as soon as that collaboratively created picture (executed as an 'analogue' object in the form of an aluminium print) is viewed through Sender's app, the transformation or transformation concatenation performed by the AI appears as an augmented reality layer. In other words, Sender combines Augmented Reality and Artificial Intelligence (or, to be more precise - Machine Learning) in "Insideout", creating the possibility of making the process of morphing contourable as a fluid visual interweaving. As the Figure 3 fragmentarily shows, the elements 'seen' by the AI in the image, with the inclusion of the corresponding prompts, are interpreted in its own way and transformed into a different form. In doing so, however, it is particularly noticeable that the reading of the visual elements operates with certain body images and, ultimately, body normations. For instance, long hair is primarily read as 'female' by the AI, and so are creoles in the ears. In addition, the prompts specification 'Man' produces a concatenation of images that makes use of a very specific image of masculinity and visualizes correspondingly well-trained, muscular, young, shiny bodies. Consequently, sexualized attributes in particular can be found on this level, but also overall markers with regard to gender, race, class, age, etc. That is, here we see a tremendous specter of visual transformations, which leads us incessantly to the question of sources. What exactly does the machine see here, and what images does it access? Where do all the black box 'templates' come from, and what stereotypes does it inevitably produce?

In her book "Unthought: The Power of the Cognitive Nonconscious," N. Katherine Hayles talks about unconscious cognitive assemblages. There she writes that we are in „a period of increasing complexity, sociality, and interconnections between technical nonconscious systems" (Hayles 2017: 215). Thus, we are concerned with „well-defined interfaces and communication circuits between sensors, actuators, processors,

storage media, and distribution networks, and which include human, biological, technical, and material components" (ibid. 2). Consequently, to approach artificial intelligence products means to be aware of the assemblage-like nature described by Hayles and to work with it.

Subsumably spoken, the currently present relation between verbal language and visuality leads to an enormous shift with regard to how we create images, how we receive them and what can be understood by an image at all, since the field of visual products entails a serious disproportionality, which at least according to the previous skills of the human being (i.e. if one does not start from human-technical assemblages) cannot be handled and require other understandings and conditions. In other words, what images are capable of in the first place changes in a massive way. Because just as with the advent of photography and the moving image there has been a serious rethinking of what can be expected from images at all, this horizon of expectation - in the epistemological, political, and aesthetic sense - has been transformed in the most extreme way. First and foremost, it is crucial that not only our visual habits undergo a change, but at the same time the processuality of what results in visual products at all becomes increasingly clear, because these are fed - in a strikingly old-fashioned way - from a "fundus" of previously generated products that are algorithmically stabilized.⁵ But the fact that exactly this process is black boxed and no longer allows for direct referentiality - seen in this way quite in contrast to what Bruno Latour implemented with the notion of circulating reference (Latour 1999), in which every transformation step, every moment of information-becoming is reversible in both directions - is a significant change that will probably lead us to completely new questions and ways of handling.

5. Conclusion

New Visuality is setting in - this is the brief, yet far-reaching thesis with which the present article dealt. Against the background of the current media condensations, which are becoming apparent in a very specific way, especially at the level of image production and reception, the paper explored the consideration that our understanding of the pictorial is currently undergoing an enormous paradigmatic turn. This shift concerns both the everyday use of images, because it marks the visual as the dominant mode of interaction and communication (with all the advantages but also exclusions that it produces), and also the level of how images come about and at the same time how they are sensually perceived (concerning both the media setting and its effects). Starting from this, the paper drew three different moments of shift: the shareability of the pictorial, the spatialisation of the pictorial, and the prompting of the pictorial. By drawing on the wide-ranging oeuvre of the Swiss artist Pascal Sender, these different moments were each traced on the basis of a concrete artistic work or series of images - first "Visual Diary," then "Airdrop" and finally "Insideout." In the course of this, it became clear that the omnipresence of visual content (and at the same time its necessity in everyday life), the development of expanded image formats such as augmented reality, and the

⁵ See here for example Crogan 2020.

current progress of so-called artificial intelligence require new ways of handling and, not least, raise the question of how this new visuality - with what effects and conditions - can take place. How will our image competencies have to look like and what exactly will image mean at all, if all the outlined upheavals are actually to be taken seriously in terms of media history but also media aesthetics?

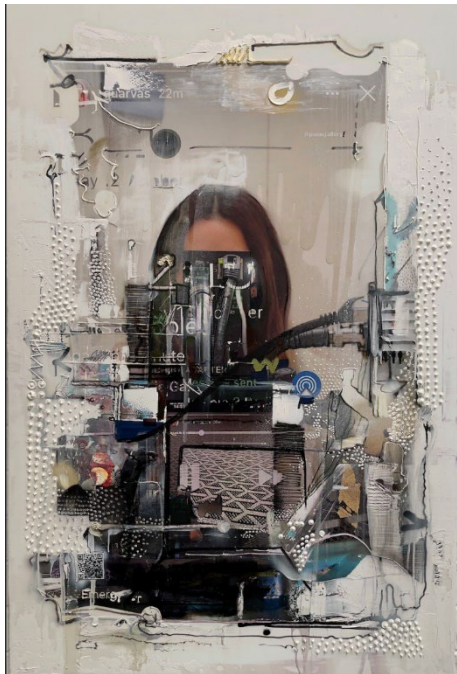


Figure 1: Pascal Sender, "Airdrop", 2021.



Figure 2: Pascal Sender: "Insideout", 2017.



Figure 3: Pascal Sender: "Insideout", 2017/2023 (detail).

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Media Art and Surveillance Technology, a history of hybridization

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Abstract

In the context of the 21st century, especially following various conflicts and the consequences of the 9/11 attacks, control systems in both physical and virtual spaces have been strengthened. Additionally, since the pandemic, paradigm shifts related to the power strategies of the big tech companies have accelerated.

Critical media art concerning control, which has its roots in the late 1960s and 1970s, has experienced the consequences of all these changes. Well-known video artists like Nauman or Graham show a special interest in confronting and offering their personal perspectives on the real consequences, methodologies, and new uses of technological tracking and surveillance systems. Pioneers of net art denounce the technification of tracking and its impact on privacy. Figures like Muntadas and Julia Sher are prominent examples of artists who clearly describe the ambivalence of the network.

Despite some renowned artists such as Trevor Paglen or Paolo Cirio successfully exhibiting their pieces with great critical and public acclaim, we are interested in analysing whether, among other factors, the control exerted over tools and dissemination systems hinders the exhibition of works that present strong critical content about the imposed methodologies and attitudes adopted by individuals.

Keywords

Media art, control, surveillance, hybridization, technology

1. Introduction

During the early 21st century, a profound transformation of the internet and communications began, redefining the understanding of the preceding two decades. The space of knowledge exchange, open to scientific, educational, or artistic experiences, began to provide signs of its true purpose for which it had been designed and developed by those in power: to control any type of information and content. The consequences of various armed conflicts and the 9/11 attacks marked an irreversible process towards the progressive fortification of both physical and virtual spaces. The internet transformed into a new business model based on monetization: massive data is extracted, capturing and exploiting users' attention. The big tech companies have managed to impose their rules in the digital space, especially since the pandemic. The attention economy has gradually prevailed, as Wu asserts, "in an era of unprecedented individualism" [1]. The generation and distribution of information in digital media have shaped the new business model of the digital industry based on algorithms and AI.

The remnants of The Panopticon proposed in the 18th century by Jeremy Bentham [2], revisited by Michel Foucault in

the 1970s [3], are reconfigured and expanded from physical to real space in a more subtle and efficient manner than the architectural surveillance model proposed by the British philosopher and jurist. This serves as a pillar for the existing technological registration systems today.

Our study attempts to explore through the analysis of paradigmatic examples how critical media art regarding surveillance technologies developed since the second half of the 20th century succeeds in transforming control tools and technologies into new instruments and languages of creation. Moreover, in such a complex panorama as the present one, we are interested in understanding the state of the question regarding new proposals on the subject.

2. Critique of Technological Control in Media Art

At the beginning of the 21st century, the Internet ceased to be the agora of integration, communication, and development of concepts associated with freedoms. The massive use of registration and surveillance technologies increasingly had a significant impact by private initiatives. The convergence of digital technologies in the smartphone and the widespread use of it have managed to dissociate a significant portion of the criticism regarding its use by large corporations.

Throughout these decades, many philosophers, sociologists, or historians have reflected a critical view of the evolution and ubiquity of surveillance, and how many governments manage to stay in power thanks to the support of the multinational corporations. We cannot cover them all, but it is worth noting that in recent years, texts like *The Age of Surveillance Capitalism* [4] or *Atlas of Anomalous AI* [5] have been able to reflect the paradigm shift openly. Both texts openly denounce how algorithms and AI are generated and used to maintain this system. Others like Gert Lovink focus their latest texts on analyzing -seeking possible ways out- regarding the incidence of the standardization of platforms [6][7].

The proliferation of all these factors has generated a very specific context that hinders the production and dissemination of criticisms from media art. The control of tools and transmission systems hinders the visibility of highly critical pieces about the surveillance society. Despite this, relevant multidisciplinary creators such as Hito Steyerl, Trevor Paglen, or Paolo Cirio emphasize in their proposals the individual and collective consequences in the face of the lack of ethics regarding generalized control mediated through technology. The impact of AI, deep learning, or the proliferation of biometrics are some of the aspects that their works have in common.

2.1. Critical Background in Video Art

The current position of media art in relation to control is not novel. Since the 1970s, there has been a special interest on the part of creators to confront and offer their personal views on the real consequences, methodologies, and new uses of technified recording and tracking systems. This interest follows the participatory experiences from the late 1960s and early 1970s, propelled by the commercialization of Sony's Portapak in 1965. This event encouraged video artists and activists to generate alternative content [8][9][10]. Many of the significant videographic pieces from this period exemplify how they integrate and invite the viewer to be a participant, aiming to raise awareness about the hidden possibilities offered by video surveillance from an aware and innovative artistic perspective.

In the artistic practices of this period, we highlight two distinct lines of work: one closer to critical subjectivity and another more aligned with new self-perceptions of the individual. Both will continue in the digital research trends of the first decade of the 21st century:

1. A broad group consisting of works that encourage reflection on self-observation in general and the creative possibilities of technological surveillance in particular.
2. Pieces that demonstrate a certain level of awareness and criticism of the panoptic use of technologies. This message was reinforced in the subsequent decades as a form of response to the increase in security measures based on the promotion of fear as a tool for citizen subordination.

One of the early proposals that addresses technological observation initiated by the advent of video in everyday life is *Wype Cycle*. Created by Frank Gillette and Ira Schneider in 1969, exhibited at the Howard Wise Gallery in New York as part of the exhibition *TV as a Creative Medium* [11]. It consists of nine monitors arranged in a grid and a camera, radically breaking conventional communicative schemes. The disappearance of unidirectionality of the message had a profound impact on the media art community. Each visitor is confronted with their own image captured by the hidden camera in the center of the frame. The recording constantly feeds back into the installation and is viewed alongside the images from two video tapes. One plays a collage of images, and the other plays a television program. The content is manipulated in four complex temporal cycles by both artists.

From our perspective as citizens of the 21st century, we can only understand this in context: viewers were being exposed to television overload for the first time and were becoming aware that they were the real target of a recording. The artistic intentionality initially provokes some surprise, which transforms into critical reflection on the manipulative possibilities of the medium.

Other artists like Bruce Nauman and Dan Graham created significant precedents between 1969 and 1970 by using the live-feedback system, which involves live feedback that allows real-time dissemination of images captured by a camera. Both started integrating this system into installations related to subject observation, space, technological surveillance, and privacy [12].

Bruce Nauman is considered one of the first artists to address the implications of video surveillance in *Video Surveillance Piece Public Room, Private Room* (1969-1970). The installation consists of two identical rooms, one private and one public, each

containing a monitor on the floor and a video camera, arranged on two opposing walls. The monitor in each room displays the image captured by the camera in the adjoining space. This peculiar situation reveals to the visitor that their image, seen from behind, is in the other room. Each individual automatically transforms from a passive observer to an active participant and the primary target of a real control situation.

As in several proposals by Nauman from this period, the apparent simplicity of these works reinforces the discursive quality of the installation. Distraction elements are avoided to focus the individual on the debate about the relationship between surveillance cameras, monitors, the observer-observed, and the circuit formed by all these elements [13]. His proposals have a profound impact and evoke a strange claustrophobic sensation and spatial distortion that blend initial active responses with subsequent reflections on the threat of exposing the territory of intimacy [14]. Nothing and no one can escape the vigilant gazes revealed by technology.

Dan Graham, on the other hand, ascribes an educational and didactic function to art. He labels his works as learning processes and investigates the functions of traditional architectural elements and telecommunication systems, relating them to human behaviour from a speculative perspective. He studies the relationship between the public and the private, the spectator and the artist, and objectivity and subjectivity. He manipulates perception, creating temporal disjunctions that combine projections, closed-circuit videos, and mirrors, immersing the spectator in the artwork. *Present Continuous Past(s)* (1974) is the piece that initiates a series of ten works under the generic title of *Time Delay Room*. In these works, individuals become objects of perception through the mirrors covering the rooms, using each element as a metaphor and encouraging reflection on the space-time binomial [15] [16]. The contradictory impressions produced by the self-contemplation of the piece's objective captivate the viewer in a loop of externally controlled feedback, a proposal that breaks with the traditional view in art.



Fig. 1: Dan Graham, *Present Continuous Past(s)*, 1974

The piece was transformed by Graham six times, resulting in different versions based on the same basic scheme, progressively incorporating different areas of participation. In all of them, the same effect occurred: the viewer was trapped in a constant state of observation under a special external control that generates an interesting concept of belonging to a group of controlled individuals. Both in this work and in others like *Yesterday/Today* (1975) or *Video Piece for Two Glass Buildings* (1977), focused on confronting architecture, space, and time, the viewer learns to identify the media related to

surveillance and can contemplate the psychological effects it has on individuals. Exploring this situation is a process of social learning in which communication between different levels of observation and behaviour generates a representation of intersubjective intimacy. This manipulation of time had already been used by Peter Campus in *Anamnesis* (1973), a pioneering work in which the viewer saw their image duplicated with a three-second delay.

After these early experiences of self-analysis, more critically inclined positions emerged in line with the social protests and events against the prevailing order at that time. More combative artists like Peter Weibel opted for different, more direct strategies in closed-circuit video installations. Observing *Observation: Uncertainty* (1973) and *The Guard as Bandit* (1978) fuse the extension of two transversal concepts: surveillance beyond organizations - as defended in Foucault's work - and the adaptation mechanisms of control societies described by Deleuze. In the first piece, Weibel installs three cameras oriented at the vertices of a triangle. The three are connected to respective monitors placed in front of them, in such a way that they always present the viewer - positioned in the central part - with their back. The viewer always observes this peculiar point of view. In the second piece, developed in the central hall of a Viennese bank, a camera monitors what happens in front of the bank's camera. A monitor broadcasts live to the monitored clients an image intended to raise awareness of constant and hidden surveillance to which they are subjected in a public space of total security. Appearance and privacy are exposed to potential manipulation by electronic means. The work is inevitably connected with proposals by more contemporary artists like Jill Magid.

2.1.1. New Experiences, New Perspectives.

These systems become an updated and technified version of the disciplinary devices described by Foucault in *Discipline and Punish*, published in 1975. However, they achieve a more pragmatic impact regarding population control. The proliferation of these devices during the 1980s, especially in the United States and the United Kingdom, expands the spectrum of suspicion and empowers, on a small scale, anyone who manages to implement them.

Creators and activists have become familiar with and have succeeded in promoting more elaborate works from a technological standpoint. It is not surprising, therefore, that from media art, more subtle criticisms emerge regarding how society comes to accept the interference of video surveillance as part of daily routine. A quite representative example is the work of the artist Mako Idemitsu. Both in *Hideo, It's me Mama* (1983) and in the trilogy *Big Mother* (1983-1984), she shows the complexity of family relationships. In *Hideo*, a young man living far from his parents is constantly surveyed by his mother through a CCTV system that presides over the main room of the family house. Through irony and sarcasm, a peculiar view of family affections in Japanese culture of those years, saturated by the media, is presented. The video combines satire with fierce criticism, as the mother protagonist can observe and comment in real time on her son's activities through a monitor but cannot communicate with him. The climax of this distant relationship is reached in the scene where the protagonist - completely ignoring her husband - caresses the transmitted image on the screen of her

son, in a representation of subjective veneration similar to what occurs in current social networks.

Idemitsu reflects the interest of numerous creators of that period in closed-circuit television (CCTV) systems, which progressively improved, miniaturized, and became more affordable. These aspects allowed video surveillance to become a privileged and constant display of power, appropriated by both artists and ordinary citizens [17]. Again, this demonstrates the evolution and amplified use of new technologies adopting, as some essayists emphasize, military surveillance tactics in areas that had traditionally been reserved for the development of policing functions [18].



Figure 1: Mako Idemitsu, Hideo, *It's me Mama*, 1983

A daring and revealing project of the time, in our opinion, is the impactful videographic project *Der Riese* by Michael Klier [19]. The work is composed of images recorded with security cameras located in public and private spaces. The shots create a visual collage that invites the viewer to make a completely subjective interpretation of what might happen in a Western city under a robotic gaze. The fluid rhythm and the sensation of possible dangers or unexpected actions underlie the innovative editing of shots that combine silence, ambient noise, or classical music (Mahler, Wagner, Rachmaninoff...). All this generates a special aseptic and distant atmosphere that encourages reflection on perception and representation technologies described by Virilio in *The Machine of Vision*. For Virilio, this work inaugurates a new era characterized by the total disappearance of visual subjectivity. This transformation generates a dehumanized, mechanical, and omnipresent gaze. The operative images that constitute it, as affirmed by Haroun Farocki, are part of the surveillance techniques and strategies that sustain them, in which any trace of confrontation disappears [20]. Klier, in reality, does not show the evolution of a city but exposes the essence of the technologies that observe us.



Figure 2: Michael Klier, *Der Riese*, 1983

The progressive improvement and accessibility of this technology by citizens expand the Orwellian dystopian vision to all social levels. Indiscriminate recording through video cameras evolves and transitions to mobile devices in the 21st century, decontextualizing and amplifying any type of event.

2.2. Pioneering Cases in Net Art on Control, Privacy and Censorship

Pioneers of net art also denounce technified recording and its impact on privacy. Muntadas and Julia Sher are some of the artists who describe with greater clarity the ambivalence of the network, combining communication with censorship. Both advocate for critique and collective action, as defended by various intellectuals [21][22][23]. Both creators publicly display the possible control strategies offered by the internet, using mechanisms of disorientation and surprise on the viewer.

One of the most attractive installations is Muntadas' *The File Room* (1994-1998), presented at the Randolph Street Gallery in Chicago in 1994 [24][25]. It examines the abundant history of censorship and introduces a new dimension to his work: the participation of visitor-collaborators both in the exhibition space and online, in a documentary project with critical nuances about the transmission and capture of data through computer networks. In this way, the Internet - the tool created to support the US Defense System - transforms from the gallery into a public instrument for discussing control and state surveillance against its citizens. Subsequently, it was transformed into an online version that added cases and documents on censorship. It is an example of the creative and experimental potential of the network, of hybridisation, and of fostering collaboration between creators and computer technicians.

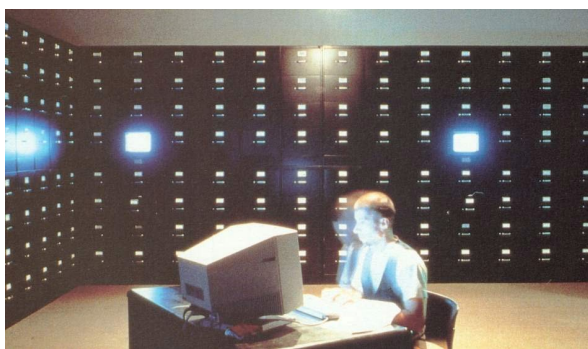


Figure 3: Muntadas, *The File Room* (1994-1998)

In the case of *Welcome to Security Land* (1995), Julia Scher also advocates for critique and collective action. Disguised as a police officer on the project's main page, she invites users to participate in different sections of a fictitious building. In each space, disconnected questions are posed, and constant action from the users is sought. Messages sent by users are constantly manipulated or diverted to other pages, using a methodology similar to spam and digital deep fakes.

The discourse of both artists reflects a context in which the citizenry justifies, as Lyon defends, the role of new technologies in the service of power. Databases, individual identification systems, and video surveillance proliferate, but few groups in the 1990s openly resist the electronic surveillance methods that affect the entire population in both public and private spheres. As in previous videographic works, it is necessary to understand the context to uncover the process of appropriation, experimentation, and creation of new artistic codes.

3. Pioneering Cases in Net Art on Control, Privacy and Censorship

Although many of the most critical pieces on control and surveillance from the heyday of net art would be impossible to reproduce today due to legal and sometimes ethical issues, and especially due to visibility compared to other digital creations, we should remember the impact and repercussions of proposals like *The Transborder Immigrant Tool* developed by Electronic Disturbance Theater 2.0/b.a.n.g. lab in 2007 in academic, political, and creative environments [26]. The transdisciplinary project aimed to help cross-border immigrants by providing coordinates via basic mobile phones using GPS, experimental poetry files, and indicating locations where they could find water reserves through the Californian desert.

Clearly, critical works exposing control and denouncing global siliconization, as asserted by Éric Sadin [27], continue to be created. These works largely focus on the significant shift that occurred as citizens became consumers subjected to market rules. These consumers or clients submit to the digital panopticon, a system that, for Han, constitutes the society of transparency, where everything is communicated, transmitted, and above all, surveilled [28]. In the current hyperconnected social structure, a false idea of freedom constantly feeds Big Data, from which predictions about any individual or group activity are achieved [29].

Critical pieces against power have not disappeared. As mentioned earlier, renowned artists continue to successfully exhibit their critical works (Lozano-Hemmer, Cirio, Paglen, Steyerl). However, it is a fact that the impetus of big tech companies, which have imposed rules and methodologies related to User Experience (UX) and User Interface (UI), makes it difficult to disseminate alternative critical pieces about the established system. Self-censorship, media homogenization, or sponsorship by art centres and galleries [30], along with precarization [31], are some of the problems faced by current digital creators. Some of them choose to adopt and reinvent activist tactics, as seen in the works of Mario Santamaría or Joana Moll.

In his tours (*Itinerari*, *Internet Tour*, *Virtual Tour*) [32], the post-digital creator Mario Santamaría revisits and updates strategies similar to those developed by *Surveillance Camera Players* (SCP) decades ago. In each adapted walk in different contexts - in-person or virtual - he unmasks, among other aspects, metaphorical terms like cloud or artificial intelligence,

showing real physical infrastructures - many of them unknown - including data centres or submarine cabling. He also highlights the problems - economic, ethical, or ecological - that arise from them.

Joana Moll, an artist and researcher, has explored the effects of post-capitalist narratives [33] throughout her career. Among other topics, she has explored the expansion of control systems (The Texas Border (2010), The Virtual Watchers (2016)), the impact of technology on ecosystems (Co2gle (2014), Defoooooooooooooooooooooreest (2016)), the effects of Deep learning (Algorithms Allowed (2017)), as well as the empathic tactics of big tech (Ultimate Solvers (2020)).



Fig. 4: Mario Santamaria, *Internet Tour*, 2021

The proposals of Santamaria and Moll are a good example of how highly critical pieces are present in art centres, known to experts but unknown to the general public. Although they represent aspects of the reality of hyperconnected society the discourse of both artists reflects a context in which the citizenry justifies, as Lyon defends, the role of new technologies in the service of power. Databases, individual identification systems, and video surveillance proliferate, but few groups in the 1990s openly resist the electronic surveillance methods that affect the entire population in both public and private spheres. As in previous videographic works, it is necessary to understand the context to uncover the process of appropriation, experimentation, and creation of new artistic codes.

4. Conclusions

Automation, hyper connection, and accelerationism are factors that influence the possibilities of development and evolution of new media art. Critical awareness has not disappeared among creators, but paradigms have changed radically. The digital panopticon has standardized tools and processes in recent years, and instilled marketing strategies that hide or blur the potential of critical proposals against the system imposed by major corporations.

Although the objectives are increasingly clear in this changing scenario, which has exponentially increased during the forced digitization in the course of the pandemic, users systematically ignore critical voices about the fate of their data. They submit to the rules imposed by large multinational companies focused on the profitable business of data control and, therefore, our privacy, to prevail over the competition in an uncertain and complex context.

For this reason, it is important to review and disseminate the essence and development context of these works. The academic

community must promote and lead this analysis, dissemination, and debate to prevent private companies from appropriating - as has already happened in other areas - functions with significant cultural and social value. Understanding the origin of the pieces, their processes, how technological hybridization was carried out, or how they evolved and progressively adapted to different spaces or devices can only broaden our knowledge of the history of media art and its relationship with technology, and the viewers' attitudes towards them. Delving into this study could lead to the recognition of lesser-known works and authors today. In this way, we would expand the references of many current digital authors, and we could regain the collaboration and interest of the public in highly critical pieces.

One might wonder if today it would be possible to propose one of the most exhaustive exhibitions on creation and control, which was inaugurated a month after the 9/11 attacks: CTRL [SPACE] rhetorics of surveillance from Bentham to Big Brother at ZKM (Levin, 2002).

Although it may seem paradoxical today, collaboration between creators, scientists, and artists is more necessary than ever. This joint and transversal collaboration should promote understanding and assimilation of the effects of paradigm shifts. But, above all, it should enhance imagination and generate new languages and narratives in which experimentation and innovation play a fundamental role.

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Images

Fig. 1 https://www.newmedia-art.org/vignettesoeu/GRAHAM-PRESENTCONTI-1974-8_2.JPG

Fig. 2 <https://www.moma.org/collection/works/120567>

Fig.3

<https://www.moma.org/media/W1siZiIsIjE1MTU2NyJdLFsicCIslmNvb3ZlcnQlLCItcXVhbGl0eSA5MCAtemVzaXplIDIwMDB4MjAwMFx1MDAzZSJdXQ.jpg?sha=3f6eeea2eaca0641>

Fig. 4. <https://internetour.com/>

Collecting and Preserving Media Art in Portugal

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Abstract

This research maps the practice of media art collection in Portugal and the corresponding preservation methods put in place. There are many artists and institutions that contribute to the visibility of Media Art in Portugal, although information related to collecting and preserving this typology is still significantly scarce.

The following research combines bibliographic and data survey, under critical analysis. The importance of this research relies on the contribution with relevant data that can instigate future investigations, as well as pitch in the current discussion related to the production and preservation of the cultural heritage problematic.

Concerning the collections' nature and their current conditions, an online survey was carried out with the following institutions: Museu da Bienal de Cerveira, Museu de Arte Contemporânea de Serralves, Centro de Arte Oliva, Coleção de Arte Contemporânea do Estado and Museu Nacional de Arte Contemporânea do Chiado, through the form of an on-line survey.

This investigation also analyses preservation strategies for Media Art that are being implemented currently, followed by a glossary of concepts related to Media Art, since incoherence in concept definition and divergency in preservation strategies was detected through the collected data.

Keywords

Media Art, Preservation, Portuguese Collections, Media Art Conservation Plan

1. Introduction

1.1. Aim of the Investigation

This investigation has Media Art in Portugal as its object of study and is oriented according to general and specific goals. Regarding the most general ones, it involves compiling scattered information related to the practice of collecting Media Art in Portugal and contributing to the knowledge of the history of collections, since there is a lack of studies carried out in this area. The specific goals are directly related to the field of Conservation and Restoration, with the aim of understanding which preservation practices are being implemented by national institutions that collect Media Art and what is the consequent state of conservation of those collections. The following investigation also covers an analysis of Media Art preservation strategies and a glossary of the most important concepts in the field, in order to establish a starting point to the creation of a discussion about a conservation plan tailored for Media Art.

2. Ascertain Data

2.1. Definitions

During the investigation, there were long periods of debate

about the nomenclature and definition of this typology. Although both “New Media Art” and “Media Art” are considered broad terms that do not clarify the characteristics and aesthetics associated with this extremely hybrid medium [1], the decision to use the term “Media Art” prevailed. The dissection, discussion and creation of a definition of Media Art for this investigation is a crucial task, given the divergence of opinions on this artistic expression. Therefore, in order to guarantee cohesion in the data to be collected for research, the definition by which the research will be guided involves a fusion of the definitions of Oliver Grau [2] and Geert Lovink [3]: Media Art is a category in a multi and interdisciplinary universe, where artistic creation is combined with research and techno- scientific development, establishing a bridge between the contemporary sociocultural context, digital and analog methods and art history. Media Art artists work in different and complex areas such as time-based installation art, telepresence art, genetic/bio/eco art, robotics, nanotechnology, online and offline art, generative art, space art, artificial life, interactive art, augmented reality, or virtual reality. As a reflection of the exploration of new technologies, several new developments have emerged in terms of transcultural and transdisciplinary manifestations by artists [4]. In Lovink's definition, the transitory nature of Media Art is reinforced, describing it as a hybrid art form and a cloud of multidisciplinary micro-practices, produced by a community not necessarily composed of the traditional artist concession, but rather of researchers, scientists and activists who do not produce art but who instead test and explore artistic means of the future for the benefit of future generations [5].

After defining the concept of Media Art, it was also important to establish the concept of institution. This established concept was based on the latest the definition of a museum by ICOM in 2022 [6] where *A museum is a non-profit, permanent institution in service of a society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to public, accessible and inclusive, museums foster diversity and sustainability. They operate and communicate ethically, professionally and with the participation of communities, offering varied experiences for education, enjoyment, reflection and knowledge sharing.* The research excluded any independent galleries, artist's private collections or other cultural institutions/spaces that contribute to the creation, exhibition and conservation of Media Art. Although the integration of these other spaces in the investigation would be more enriching, that would be incompatible with the period of time that the research allowed. Furthermore, museums have more resources to collect diverse heritage and are usually places where conservation strategies are investigated, created and implemented more efficiently.

2.2. Preservation Issues and Strategies

Media Art officially joined the art world at the end of the 90's,

making its exhibition and collection by galleries and museums more frequent. However, most works that are object oriented, such as digital prints, photography and sculpture, are within the reach of museums to collect them, since interactive time-based digital works of art, composed of a material and immaterial component, do not facilitate the process of acquisition and preservation [7]. In other words, institutions are more easily prepared to collect and display objects that use digital technologies to be produced, rather than those in which technology acts as a medium: the first refers to objects that in material terms are considered traditional, such as digital prints, photography or sculpture; the second refers to works that are produced, stored and displayed in digital formats, and that use the infinite possibilities of this same medium [8]. Over time the acquisition of less object-oriented works has become more common, but simultaneously a problem for conservators, since the instability inherent to this typology comes from the fact that only through continuous human intervention can it be possible to prolong the existence of objects. Regardless of the type of medium, objects of this nature will always be subjected to deterioration processes resulting from the interaction with the surrounding environment, whether it be a biological, chemical or physical process, or even a combination of all these factors [9].

Media Art preservation proposals are not consensual and are mostly applied on a case-by-case basis, with no guidelines that can be used if necessary. However, depending on the type of work we are faced with, one of four options is available: the acquisition and conservation of spare parts, migration, emulation or reconstruction.

3. Sampling Criteria

The starting point to define the Universe [10] of this investigation was the list of institutions and museums that belong to the Portuguese Contemporary Art Network. Institutions belonging to this network collect or exhibit works produced from the 1960's up to the present, thus simplifying the process of pre-selecting institutions that may have Media Art works in their collections. This network was created in 2021 and integrates 66 institutions spread across Continental Portugal and Autonomous Regions (6 in Alentejo, 3 in Algarve, 16 in the Lisbon Metropolitan Area, 14 in the Central Region, 24 in the North, 2 in the Autonomous Region of Madeira and 1 in the Autonomous Region of the Azores). It is a platform for promoting contemporary art in Portugal which aims to bring together territorially dispersed institutions and combine synergies between exhibition spaces, collectors, programmers, curators and visual artists [11].

A sample is the selection and identification of individuals or target group for data collection [12], and there three criteria for defining the Target Universe and consequently the sample. Firstly, and already mentioned, the sample is made up of institutions that aim to collect works produced from the 1960s up to the present, whether exclusively made up of foreign or national artists, or both. Secondly, the sample must be made up of Portuguese institutions based in the national territory, which have a collection under their permanent care, either by acquisition from the institution itself or by deposit from other entities or individuals. This way, institutions that function only

as spaces for exhibition or cultural promotion, whether on a regular basis or not, are excluded from the sample; Finally, the last criteria involves the periodicity of display of the collection to the public and, to be part of the sample, the display of the collection would have to be permanent or regular, with regular being understood to be more than 1 time per year, over a period of more than 3 months. This way, private collectors or artists' collections that are in the private sphere were excluded from the sample, as were galleries that sell works of art.

By applying the criteria defined above to the list of institutions that make up the RPAC, the Target Universe defined in the investigation consisted of 19 institutions.

After direct contact with each institution to clarify some data and a screening of the target universe, the inquired universe came down to five institutions: the Museu da Bienal de Cerveira, the Museu de Arte Contemporânea de Serralves, the Centro de Arte Oliva, the

State Contemporary Art Collection and the Chiado National Museum of Contemporary Art.

4. The survey

The survey was made available via email through a link that gave access to a *Google Forms* formulary, consisting of 8 multiple answer questions, 5 short answer questions and 4 long answer questions, always with the possibility of adding information if none of the multiple choice options fitted the characteristics of the collection, thus creating a flexible inquiry that would allow obtaining the maximum amount of useful information without restrictions. The survey was divided in 4 blocks, and first one consisted of the presentation of the research project and its goals, and the definition of Media Art by which the research was carried out. In this survey, the best ethical practices in research were observed, asking the respondent for consent to process the data, after exposing the relevant information, such as: safeguarding data protection and anonymity in the processing of responses, the possibility to give up and contact the person responsible for the investigation. The second block of questions was related to the nature of the collection: identification of the institution, identification of the percentage of Media Art works that made up the collection and which were the most relevant decades (the 60s, 70s, 80s, 90s of the 20th century and since the beginning of the 21st century to date) and, finally, frequency and average duration of exhibitions with works of Media Art. The third block of questions was related to the state and conservation practices of the Collection, where it was asked to identify: the existence and percentage of works in the collection with exclusive equipment, this being understood as any type of hardware essential to the reproduction of the image-object; the number of works with equipment considered obsolete, which for this reason, prevented them from being exhibited, and the correspondent percentage; if applicable, a description of the conservation actions carried out by the institution was requested; a description of the preservation measures implemented in the museum; whether or not the Media Art works in the collection have an exclusive storage space; and finally, if there is a Conservator-Restorer technician experienced in the Media Art typology permanently in the museum and, if not, how they proceed. The survey ended with a single question related to the continuity of collaboration in the investigation,

where the respondent could signal availability to provide more information about the Media Art collection through the interview format, in case it was necessary to clarify or complement any of the collected data.¹

5. Collected Data

The method for analyzing the results consisted of categorical content analysis, and since the goal of the study was to obtain a global analysis, the individualized responses given by the institutions will not be disclosed. This global analysis made it possible to understand trends and establish separation by categories. The first category is related to Collection Nature and the second is related to State and Conservation Practices of the Collection.

Regarding Collection Nature, it is possible to observe from the outset that, in most cases, Media Art works correspond to less than a tenth of the collection of each the surveyed institution. In a global view, on average, 5.58% of the works in the respondents' collections fall into the Media Art category. The values presented do not exceed 10%, and the lowest value is 0.6%.

The collection of data on the nature of each collection allowed us to understand that the institutions' Media Art collection mainly focuses on the 1990s and the beginning of the 21st century until today. Of the 5 institutions surveyed, only two have Media Art works dating from the 1980s, three dated from the 1970s and only one dating from the 1960s.

When asked which decades were most representative in the collection, in percentage terms, the answers were disparate, with only one of the institutions able to quantify it, stating that 40% of the collection corresponds to the 90s and the remaining 60% corresponds to the beginning from the 21st century to the present. One of the institutions did not respond, justifying that considering the characteristics and constitution of the collection, it is not possible to quantify it. The remaining three institutions did not present a quantification of the percentage of the collection, but indicated which decades were most representative.

Within the scope of the analysis of the State and Conservation Practices of the Collection, the first question is related to the frequency of Media Art exhibitions annually, using multiple choice, in which the answers obtained were: one of the institutions constantly holds exhibitions, another institution holds two three exhibitions per year; the remaining three institutions responded "another option", justifying that holding exhibitions encompasses several works from the collection and that for this reason it is difficult to determine a precise answer to this question. This information leads to the conclusion that, since these are not institutions dedicated exclusively to the Media Art collection, but rather national institutions with representative collections of contemporary art, their exhibitions are mostly mixed regarding the display of different types of works.

Following the previous question, it was important to understand the average duration, in months, of exhibitions containing this typology.

Two of the institutions surveyed state that, on average, exhibitions last 3 months, two others responded from 4 to 8 months and, finally, one of the institutions did not respond. The institution that refrained from responding was one of those that in the previous response stated that it was not possible to determine a possible answer regarding the frequency of Media Art works in exhibitions, which could be related to the lack of internal data regarding the management of the collection.

Regarding the existence of exclusive equipment and its obsolescence, the responses obtained were mostly affirmative, with only one of the institutions saying that it does not have works with these characteristics. Of the four institutions that stated that they had works with exclusive equipment, two responded that these works correspond to 1% of the Media Art collection, one responded that they correspond to 2% of the Media Art collection and the remaining institution did not provide data to answer this question. It is important to highlight that both institutions that answered "1%" in this question correspond to those that at the beginning of the survey stated that their Media Art collection was 3% and 10% compared to the global collection. The institution that responded 2%, claimed to have 8% of Media Art works, meaning that 1/4 of the Media Art collection has exclusive equipment.

In response to the question "Are there works in the collection with equipment considered obsolete that no longer allows them to be displayed?", of the five respondents, only one responded affirmatively, and the remaining four responded "No". Finally, in response to the question "Are there works in the collection that are considered lost/irrecoverable because they are composed of obsolete equipment?" and what is the percentage, all the institutions surveyed gave a negative answer. In other words, all institutions allegedly have works in their collections with exclusive but fully functioning equipment.

When questioning the institutions regarding the conservation actions that had already been carried out on Media works, only one clearly stated that any type of intervention had never been carried out, and the institution does not have specific and implemented preservation measures to this typology. However, one of the four institutions that responded affirmatively to this question, despite stating that any conservation actions were carried out on works of Media Art that make up the collection, in the following question, "Are there preservation measures, such as migrations, emulations or regular check-ups of the works, implemented in the institution or museum?", responds positively and specifically with "Migration of content to digital". This inconsistency in the answers given can converge into two hypotheses: either the museum has a defined content migration/digitization plan but has not yet had the opportunity to implement it, or the institution does not consider content migration/digitization as a conservation action. Therefore, given that content migration is considered as a preventive conservation action in the field of Media Art, and as in the response to the last question of the survey the institution states that preventive conservation is the responsibility of the technicians at the institution, it is considered that conservation actions are in fact carried out on works of Media Art that make up the collection. The remaining three institutions claim to have already carried out migrations, archive copies, digitization and replacement of equipment parts. In parallel, all these institutions

¹ The survey can be accessed via this link:
https://docs.google.com/forms/d/e/1FAIpQLSfqy1u6LQ0C0tEdXJLOf6x3wVbWfwi1uAyGz_3E-294CSDWGg/viewform?usp=sharing;

claim to have preservation measures implemented, with migration, digitization, production of backups and archive copies being common in all responses, and one of the institutions even references the control of environmental conditions, with appropriate temperature and humidity values.

When asked about the storage of Media Art works, the answers given by institutions can be divided into three types of storage. The first corresponds to institutions that have an exclusive storage space for the typology, which makes a total of three. The second, which only one of the institutions claims to have, is equivalent to having an exclusive storage space for Media Art works within a reserve shared with other types. And finally, one of the institutions does not have exclusive storage space for its Media Art collection.

Finally, the last question that made up the survey focused on the presence of a member of the museum team who specialized in the area of Media Art conservation. More than half of the institutions (3/5) surveyed claim to have at least one person specialized in the area of preservation of this type, while the remaining (2/5) do not have specialized technicians. However, the 5 institutions claim to use external conservation services when necessary, even when there are specialized technicians employed in the institution.

6. Discussion of Results

In this study, the aim was to use a clear and incisive questionnaire to provide a starting point for analyzing Media Art collections across the country. Firstly, it is curious that in all the collections of the interviewed institutions there is a significant representation of works from the last decade of the 20th century to the present, which could not only be related to the gradual legitimization of Media Art works in the art market, but it can also be associated with the growing artistic production in this field, a result of the digital revolution and the information age. However, the percentage of Media Art works that make up institutions' collections is still insignificant, revealing that both the art market, and the Portuguese institutions, have had difficulty expanding beyond the traditional work of art, even when dealing with institutions that consider themselves collectors of contemporary art.

Helena Barranha considers that the representation of Media Art in institutional collections, especially public ones, is practically non-existent, since museums are interested in works that are inscribed as object-matter [13]. Hence the representation of Media Art in the collections is mostly in video format, instead of artistic practices such as net art, which are very difficult to acquire, conserve and disseminate by the main Portuguese contemporary art museums, which can lead to parts of the most recent art history remaining unworked at an institutional level [14]. Although new, media are gradually being incorporated into contemporary art and, above all, into our daily lives, as a result of democratization and ease of access to technological tools, it is necessary to understand that museums may not be prepared to accommodate all the mass artistic production that the new millennium can generate.

From the sample of institutions surveyed, the institutions that demonstrate a greater number of Media Art works incorporated into their collections are also those that have preservation strategies implemented, as well as having a

technician specialized in the area for conservation interventions, concluding that there is a relationship between a greater number of works and implemented strategies.

From the outset, the lack of education and specialization training of professionals in this area is pointed out, since Media Art conservators-restorers still belong to a somewhat distant reality. Although some of the institutions surveyed have a qualified technician, they all claim to use external conservation services when necessary.

Two of the institutions surveyed voluntarily mention their close work with artists in the processes of preserving works. One mentions the integration of the artist at the time of decision-making, when asked about what preservation measures were implemented in the museum, responding that they were currently migrating works to digital files and conserving them on a server, all in agreement with the artists and under international conservation criteria for the area. The other institution also mentions the artist as an integral part of the team when making a decision to preserve the work.

When two of the institutions make a point of highlighting this collaborative process with the artists, it can demonstrate that there is care in preserving the narrative and interactivity associated with the work, going beyond the preservation of just the message and the material component. Although the artist's confrontation with the preservation of his work is a delicate situation, given that he may understand it as a living entity and not as a museum object, it is important to highlight that the artist is the key player in creating creative solutions in preservation of their own works and in defining guides for their evolution and combating obsolescence.

Regarding the issue of display time in exhibitions and storage, both are intrinsically linked and considered relevant as they are directly related to issues of deterioration of display equipment components (hardware). Above and beyond its functionality, the equipment plays an important role in placing the work in a determined historical period, providing information about the cultural and technical context in which it was developed and created, attributing artistic value and meaning to the work [15]. Institutions generally have collection preservation protocols that follow good preservation practices for traditional objects. However, the storage of analogue and digital electronic equipment offers other challenges to institutions and conservators, despite that most of the factors that present risks to the works of Media Art being the same as those that affect other typologies, such as the age of the work, ultraviolet and infrared radiation, oxygen and humidity, which trigger deterioration processes such as oxidation or corrosion. Another issue that arises when storing this equipment is the period of non-use, which can put the operation of the work at risk. Although there are not enough statistics that prove the relationship between failure of electronic equipment and periods of dormancy, it has been proven that gradually turning on equipment that is stored for long periods of time is beneficial for them [16]. When asked about storage characteristics, 3 out of the 5 institutions claim to have exclusive storage space for Media Art, with one of the institutions storing this type semi-exclusively in a shared collection, and the other two claim that they do not have exclusive storage space, which means that not only do they not adapt the environmental conditions exclusively

for this typology, but it is also possible that they do not allow them to carry out safe conservation control through on/off cycles of the works, as this usually involves extraordinary handling of them.

When questioned regarding the existence of works in the collection that are considered lost/irrecoverable because they are composed of obsolete equipment, all institutions responded that the works in their collection are in operation and do not consider any of them as lost or irretrievable. This question did not seek to determine levels of negligence but rather to understand what protocols institutions would adopt if they assumed that they had irrecoverable works in their collection. Since none responded affirmatively, it was not necessary to move forward with the interview process in order to further develop this topic. However, one cannot help but question how institutions that do not have extensive collection preservation protocols and that cover substantially works of Media Art from the 1960s up to the present have not had losses in their collection. This is because only one institution mentioned the exchange of equipment parts, and the remaining institutions with an implemented preservation strategy mention migration and digitalization as the recurring methods. Although migration and digitization are extremely important processes for the preservation of Media Art, they are always accompanied by the factor of loss and alteration of authenticity values in the work of art, since they are processes where the original material is replaced for more recent material, especially on migration.

This data leads us to reflect on the extent to which museum collection strategies are up to date with changes in the art world, since works of certain typologies are not being collected because their collecting, preservation and exhibiting methods' do not correspond to the ones used in more traditional works, which will lead to a failure in the transmission of cultural heritage and to digital oblivion [9].

On the other hand, it is possible to analyze this issue in relation to the values of authenticity and how the museum can act as a reliquary. Weschenfelder [17] argues that the originals of our art and cultural history are, like the architectural monuments, complex constructions of superimposed layers of material and meaning, leading to the question of what can still be considered as a work and how the museum creates new narratives of the work through its gaps. Since Media Art works go beyond their materiality and focus for the most part on their concept and interactivity relationships, sometimes the authenticity associated with the material component does not pose a great risk when reading it. However, when no institution indicates that it has works considered irretrievable, it may mean that in cases where the materiality of the work is a relevant factor and migration is not the appropriate strategy for its preservation and exhibition, the institution may be adopting a preservation strategy that does not meet the concept and materiality of the work, and in this way does not expose the original, but rather a fragmented version in which the gaps were filled by the institution because it did not have the capacity to process the loss of the work. In conclusion, although Portuguese institutions collect Media Art, they are not yet properly prepared for the correct display and packaging of the most varied types of materials and interactivity that these artworks require. The preservation strategies implemented and human resources

existing in each of them to date and in accordance with the data collected appear to be in compliance with the requirements that the collections present, but until when will they be sufficient to ensure the preservation of future heritage? Institutions that seek to collect Media Art works recognize the difficulty in preserving them and that the acquisition of new works is intrinsically linked to the quantity and types of resources available at the institution. Given that this acquisition criterion could have a great impact on the perception and construction of cultural heritage in the future, a preservation plan can help to create lines of support not only during the period of exhibition and storage of the work, but also in the moment of acquisition.

7. Conclusion

Based on the information collected in the survey, it is possible to conclude that in Portugal there are actually five institutions that collect Media Art, with another seven institutions remaining to be determined. It was necessary to have access to a universe of data so that it would be possible, through comparison, to understand whether the number of institutions that collect Media Art is higher or lower, when compared with the number of institutions that collect typologies considered traditional. Regarding the way in which collections are preserved, Portuguese museums are conservative in the type of Media Art they collect, making their preservation strategies basic and, therefore they do not require a large multidisciplinary team or resources to implement them. However, if the institutions' goal is to acquire a greater volume of works or with a high degree of interactivity and dynamism, then an investment in the area of technical and human resources will be necessary.

With the growth of Media Art, it becomes increasingly necessary to meet the preservation challenges that it poses to the institutions that acquire and collect it. Technological obsolescence and the lack of financial and human resources are the main problems related to the preservation of Media Art. The justification for Media Art to represent not even 10% of the total collections in which it is integrated may be related with the discrepancy between the number of artists who dedicate themselves to the production of Media Art and the number of institutions that acquire it, meaning that an in-depth study would be necessary to explore this relationship in the national territory, not only applied to institutions but also to other spaces that display and collect this typology.

There is a lack of studies on the preservation and collecting of Media Art in Portugal, and, for this reason, the present investigation can not only contribute with current relevant data that could boost further investigations, but also contribute to the discussion on this issue. This discussion covers not only the world of art and conservation and restoration, but also the history of art, human and technological sciences. Taking this study as a basis, it would be possible to carry out a deeper and more extensive collection of data, starting from the institutions already highlighted and also covering galleries, studios, artist estates, private collections or other types of institutions, and using this data to compare the methods of preservation implemented in them and create a concrete preservation plan. This study sought to analyze the strategies currently implemented, and in order to draw up a preservation plan it would be necessary to apply them to practical cases and carry

out a comparative study on the applicability of each of them.

The main challenge of this investigation was the difficulty of starting from particular cases to build a general theory. It is curious how in Media Art this inversion of the order from particular to general instead of general to particular does not make the process of investigation and elaboration of concrete measures any easier. This is due to the fact that this typology is dynamic, and the components that make up the works differ so much from each other that it becomes challenging to create a canon of preservation. Therefore, just like the artworks, preservation measures must also be dynamic, in order to guarantee the preservation of contemporary cultural heritage. Another of the difficulties experienced during the investigation was related to the issue of communication with institutions. The lack of availability or human resources to answer such detailed questions about the collection is understandable. However, the present study would have benefited exponentially if all institutions in the sample had responded to the survey, providing a more grounded global view of the practice of collecting, conservation status and preservation measures relating to Media Art in Portugal. From the beginning, it proved to be quite difficult to obtain the contact details of those responsible for the collections, since it was essential to get in direct contact with those who were considered ideal for answering the questions proposed and thus be efficient with the resources and time available.

Therefore, in order to collect as much information as possible, the flexibility factor regarding the deadline dates already established had implications on the final result. It is also worth highlighting, regarding the speed with which the institutions responded to the survey, the discrepancy between the institutions that already knew the investigator and those that did not, where in the former case the response was almost immediate and in the latter case it took several months and required some insistence.

If it had been possible to restart the study, a shorter survey would have been the starting point and only then begin the interview process with those responsible for the collection. In this way, not only would more relevant information have been collected, but the process of collecting this data would also have happened differently, since personal contact with respondents facilitates communication and exchange of information and ideas. Another hypothesis for enriching this study in the future would be to incorporate case studies of Media Art works that are obsolete or that require an action plan before they reach this state.

To summarize, the current generation is fully immersed in information technology, but is not aware of its fragility associated with rapid obsolescence, risking failures in the future associated with our cultural identity. Therefore, with this research I propose a reflection on Media Art, from its conceptual component and preservation strategies, to the specific Portuguese case, requiring a critical perspective of the mode of action that demands for dynamism, multidisciplinary and teamwork. The specific Portuguese case will require a more in-depth study to be carried out in the future, where, through more extensive data collection and comparison of methodologies already implemented, a national preservation plan can be created with the aim of guaranteeing the preservation of this typology in

the national territory.

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Telidon Regained

Emulating 1980s Canadian Videotex Art

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Abstract

Launched in 1978, Telidon began as a project of the Canadian Federal Department of Communications to deliver interactive consumer-oriented information services over computer networks. Although similar videotex services were being developed elsewhere (most notably Minitel in France), Telidon's compact vector encoding format could deliver more sophisticated graphics than its competitors and by the mid-1980s had become the dominant North American videotex standard.

Telidon drew interest across the cultural sector and attracted the attention of numerous artists interested in exploring its graphic and interactive capabilities. Telidon art hubs arose in several cities in Canada and the US, providing access to content creation and display systems for their communities. Most notably the artist run centre Toronto Community Videotex (later InterAccess) focussed solely on Telidon art production in its early years. Telidon artworks were shown in multiple venues, including early Bell Vista Telidon field trials, Digicon '83, the 1983 Bienal de São Paulo, the 1986 Venice Biennale, and Expo '86 in Vancouver.

Ultimately, Telidon failed to gain widespread adoption in North America and by the late 1980s videotex had come to be seen as a dead end, supplanted by more promising computing technologies then entering the consumer mainstream. The specialized hardware required to display Telidon graphics ceased to be manufactured and as the years went by was increasingly hard to obtain. By the late 1990s Telidon art was observed to be "dead as a doornail," the files still extant on floppy disks but unable to be viewed except for a few non-interactive stills and video recordings. This became the consensus view, so much so that it was echoed in "The Lost Art of Canada's Doomed Pre-Internet Web," a Motherboard documentary on Telidon art, some 15 years later.

This paper describes a successful collaboration between InterAccess and the University of Victoria Libraries and Archives to recover and restore historic Telidon artworks, a selection of which were showcased in gallery and web exhibitions opening in 2023/2024. Spanning several years, our project has encompassed data recovery from obsolete media, use of period hardware, format migration, software reconstruction, and emulation. This paper considers the affordances and limitations of emulations developed for web display and gallery presentation, and how well the restored artworks capture the experience of the original presentation.

Keywords

Telidon, videotex, telematics, archives, restoration, emulation.

Sometime around the turn of the millennium, in a crowdsourced compendium of obsolete media called "The Dead Media Project," artist Geoffrey Shea pronounced Telidon Art to be "dead as a doornail." He went on to explain, "The artworks still exist on 8" floppies somewhere in a filing cabinet, but as far

as I know there is not an existing operating decoder that can display them" [13].

In making this assessment, Shea identified the central problem any attempt to restore Telidon art would have to address. Deeply enmeshed in the technologies of early 80s computing, Telidon required an obscure and specialized device called a "Telidon decoder" to interpret Telidon graphics code and render the result on a display. Even in the year 2000, only fifteen years after the Telidon project formally ended, few such devices still existed in an operable state. Telidon's failure to gain widespread adoption in the marketplace had the downstream effect of consigning an entire class of digital objects to apparent oblivion.

Launched with much fanfare in 1978, Telidon began as a project of the Canadian Federal Department of Communications to develop consumer facing interactive information networks. It was to be the Canadian version of videotex, a pre-Internet technology that evolved out of Viewdata, a service developed by British Telecom, and which would achieve its greatest success in France's Minitel network [11]. The Canadian variant differed from its competitors most notably in its capacity to transmit much more sophisticated graphics, using a highly compact vector encoding well suited to the limited bandwidth and storage capacities available at the time [2].

In the seven years of Telidon's existence, over 40 field trials were conducted [15]. public and private investment exceeded 250 million dollars, several attempts to commercialize the technology were made, and it became the foundation for a North American videotex protocol, called NAPLPS (the "North American Presentation Level Protocol Syntax") after AT&T and other US-based organizations got involved [11].

Although Telidon was initially conceived in the context of large-scale videotex, it could be presented in other ways. Had it been limited to videotex it would have remained exclusively in the realm of big government and large corporations, the only organizations with resources sufficient to underwrite the mainframe computers, databases, and telecommunications infrastructure required to run videotex networks. Yet, as noted by David Godfrey and Ernest Chang, "there is nothing within the basic Telidon technology that says it must operate only in a large-scale, videotex mode ... small entrepreneurs and public-sector groups can take advantage of the technology to achieve goals which might differ from the goals of the larger firms already involved" [6].

Telidon's ability to function outside the context of large-scale videotex networks opened the door to a wide range of participants, from small businesses to educators to artists. It is with the latter group that this paper is primarily concerned, in particular the artists affiliated with an artist-run centre called Toronto Community Videotex (TCV). TCV was founded in 1983, building on the success of a pilot program at Trinity Square Video initiated by Telidon artist Bill Perry in 1981. Like the Trinity Square program, TCV existed to provide access to Telidon equipment to artists and run education and outreach programs supporting the production of Telidon artwork [17].

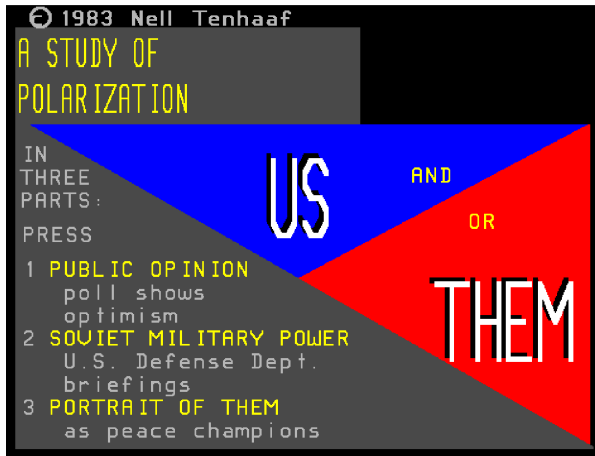


Figure 1: Title page, Us And Or Them [Nell Tenhaaf, 1983] showing numbered menu options

Although the graphical limitations of Telidon could plausibly be said to constitute a kind of “Telidon aesthetic,” it should come as no surprise that artworks made with Telidon were ultimately as varied as the individual artists working in the medium. From the political, text-and-image works of Nell Tenhaaf to the whimsical line drawings of Anat Matri, to Glenn Howarth’s coastal landscapes, to the Op-art computer generated Telidon code of Pierre Rovere, Telidon art covered quite a range. Some works were interactive, allowing the viewer to navigate with a keypad through a series of numbered menus; many more were presented as non-interactive image sequences. The “Telidon aesthetic” consisted of simple geometric shapes, lines and text slowly drawing on screen, often overwriting previously drawn objects in a kind of digital palimpsest. The first version of Telidon was limited to a palette of six colours (primaries and secondaries), six shades of grey, plus black and white; the palette was extended considerably in the second version.

Telidon was a protocol (and eventually, an international standard), not a proprietary technology. Telidon equipment was manufactured by several companies (notably Norpak, Electrohome, and Microtel) in different form factors. However, in its most characteristic early form the system required to view Telidon graphics consisted of a CRT monitor, a keypad similar to a TV remote, a Telidon decoder box, and a modem connecting the system to a remote server transmitting Telidon graphics in response to user input.

Although Telidon viewing equipment was expensive, it was at least intended to be affordable by the average middle class Canadian consumer. The same could not be said for the systems required to create Telidon graphics. For example, the Norpak IPS-2 was a workstation the size and form factor of an office desk, with dual monitors, keyboard, drawing tablet, and expensive minicomputer (a DEC LSI 11) built into it. It cost approximately \$25,000, which in 1981 was not far off the annual income of the average Canadian household. Consequently, artists wanting to create Telidon graphics could only do so under the auspices of an organization, whether that was a university research lab, a corporation, or an artist-run centre like TCV.

There were other centres of Telidon art production in Canada, however TCV was by far the most active. Over the years hundreds of artists would attend its workshops, dozens of whom went on to create notable Telidon artworks. Artists affiliated with TCV exhibited their work widely, in galleries as

well as in alternative venues such as the Bell Vista Telidon field trials, theatrical events, broadcast television, and Expo '86 in Vancouver; and internationally, at the 1983 Bienal de São Paulo. A group exhibition was prepared for the 1986 Venice Biennale, however it could not proceed as planned due to technical difficulties; analogue surrogates were shown in place of the Telidon artworks [14].

By the mid-1980s the “Telidon fever” that had gripped the Canadian telecommunications marketplace earlier in the decade had waned, as efforts to market Telidon systems and services repeatedly failed to achieve profitability [5]. Public funding for Telidon was withdrawn in March 1985, leaving further development entirely in the hands of the private sector. Going forward, the term “Telidon” fell into disuse except as a historical reference, replaced by the initialism NAPLPS referencing the international encoding standard [11].

NAPLPS art production outlasted the federally funded Telidon project by a couple of years, but by 1987 it was clear that videotex services in North America had come and gone without making much of an impact [9], and the technologies that had seemed so advanced a few years earlier were now being eclipsed by new computing systems entering the consumer mainstream. TCV expanded its repertoire to include Macs and Amigas, implemented a Unix-based dial up network called “Matrix” [7], and changed its name to InterAccess. In the years following, InterAccess’ Telidon equipment fell into disuse, obsolesced, and was eventually deaccessioned, and their collection of Telidon artworks was boxed up and moved to their archives.

Such was the state of affairs in the year 2000, when Geoffrey Shea declared Telidon art to be “dead as a doornail” due to the absence of functioning Telidon decoders [13]. It persisted at least until 2015, when Shea’s observations were echoed almost verbatim by Jordan Pearson: “The only remnants that exist today are photos and video of the original interactive pieces, as well as floppy disks,” Pearson wrote in “The Original Net Artists,” an article accompanying a short video documentary on Telidon art produced by Vice Media’s online magazine, Motherboard [10,18].

Coincidentally, 2015 is the year I began a project to restore the Telidon artworks of the late Glenn Howarth, that had formed part of a donation to the University of Victoria Archives a few years earlier. As I began work on the project, it became clear that solving the “missing decoder problem” would be a significant challenge [3].



Figure 2: Black Air Mattress [Glenn Howarth, 1984]. Restored 2015

The functional requirements for NAPLPS are extensively documented, such that it would be possible to create a modern, standards compliant Telidon decoder by implementing those requirements in code. This strategy was considered but ultimately rejected due to the complexity of the protocol. The functional requirements for a NAPLPS decoder run to 175 pages of dense technical prose [16]. Creating a new Telidon decoder was beyond the resources available for this project.

Another option would have been to utilize period hardware. Although Telidon computing hardware is extremely rare in the present day, Shea's observation that "there is not an existing operating decoder" [13], turned out to be not entirely accurate. In the 8 years since the beginning of our project we have been able to acquire two hardware decoders. While the output from these devices provided a valuable reference point for our restoration work, 40-year-old computing hardware cannot be relied upon to provide public access, as in a museum or gallery; or as more than a temporary solution in an archival context, as sooner or later it will permanently fail.

As the goal of our project was long term preservation and access, emulation - the reconstruction of computing hardware in software - was the only viable solution. And as programming our own Telidon decoder was not feasible, it would be necessary to locate a software decoder, if such a thing existed, and combine it with other software components to create a modern Telidon display system.

Jordan Pearson once observed that "The Apple II line of computers went through four upgrades in the time it took Telidon to die" [10]. The statement is accurate but quite misleading, as it implies that Telidon failed because it did not evolve with the times. In fact, Telidon hardware and software went through multiple iterations, taking advantage of rapid improvements in microcomputing technology to bring down costs. By 1984, it was possible to build an interactive NAPLPS display that consisted of an IBM PC equipped with a Telidon graphics card, running database software called "Videophile" to sequence graphics in response to user input [8]. The ill-fated 1986 Venice Biennale Telidon exhibition was designed to run on just such a system [12].

By 1988 it was possible to implement an entire NAPLPS system in software on an IBM PC, obviating the need for specialized hardware altogether. This was the strategy employed by Prodigy Online, an IBM/Sears joint venture that may fairly be described as the only successful mass-market deployment of a NAPLPS-based information service [1]. At its peak in the early 1990s, Prodigy boasted more than a million subscribers [4].

To render its NAPLPS based interface on screen, the Prodigy client program included a NAPLPS decoder implemented entirely in software. Called the Microstar Virtual Device Interface or MVDI, it was developed by a small company owned and operated by Peter Jordan and family, based in Ottawa, Canada. However, the Prodigy client was not suitable for our project, having been developed for a different use case. MVDI was tightly integrated with the Prodigy software, making it impossible to repurpose in that form.

In a stroke of what can only be described as remarkable good fortune, in 2018 our project received from the Jordan family a donation of the only known copy of Microstar's MVDI development kit, consisting of NAPLPS software libraries on four 5.25" floppy disks, and a binder of associated documentation. The kit was the foundation upon which we constructed a software program, VTKIOSK.EXE, capable of

sequencing and displaying NAPLPS graphics, in a manner replicating a PC based Telidon system from the mid-1980s.

Running software written for a mid-80s IBM PC on a modern computer requires a PC emulator. Fortunately, work done in the video game preservation space ensures there is no shortage of software capable of emulating an IBM PC.

The open source DOSBox emulator proved best suited to our project requirements. DOSBox is highly configurable, with several affordances that are key to the success of our project. One such is the ability to control the speed of the emulation by setting the number of processing cycles per second. One of the defining characteristics of 1980s Telidon art was the speed at which it rendered - shapes, lines and text drew slowly and perceptibly, in a succession of overlays as the work emerged on the monitor. Artists viewed this as part of the expressive aspect of the medium and made use of it in various ways. However, this characteristic was not intrinsic to the Telidon protocol, it was simply an effect of the limited processing capabilities and data transmission rates of early 1980s computing hardware. Setting DOSBox to run at the speed of a first-generation IBM PC was sufficient to reproduce this characteristic of early Telidon.

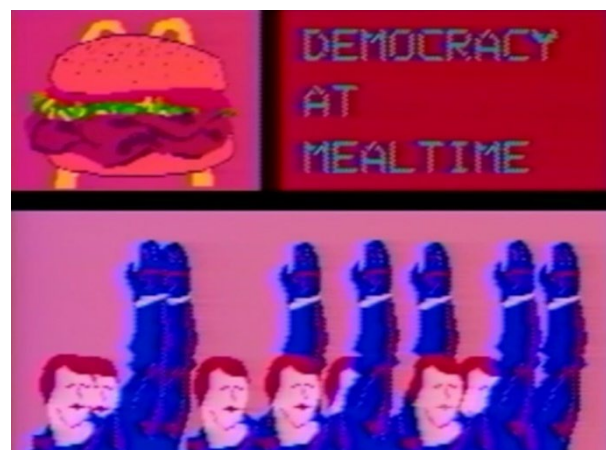


Figure 3: Democracy At Work [Geoffrey Shea, 1984]. Still from undated (mid-1980s) videorecording

Although our display system is fully NAPLPS compliant, it does not perfectly emulate any of the Telidon displays used by artists in the early 1980s. As MVDI best renders graphics in DOSBox via its VGA driver, its 640x480 resolution is higher than the characteristic 320x200 resolution of a hardware decoder displaying Telidon on a CRT television. Font styles were not part of the NAPLPS specification; consequently, text renders differently in MVDI than on period hardware (compare Figure 3 and Figure 4). Display timings are also imperfect. When viewed alongside the output from a hardware decoder, it is apparent that our decoder draws text somewhat faster, and polygons somewhat more slowly. Shapes draw from the bottom up rather than top down, as was common with earlier decoders - an aspect of presentation also not addressed by the specification. However, it is the use of modern LCD displays rather than the original CRTs that makes the most radical departure from the aesthetics of early Telidon. The characteristic visual artifacts of CRT displays added variation and depth to Telidon graphics that are lacking on modern LCDs.

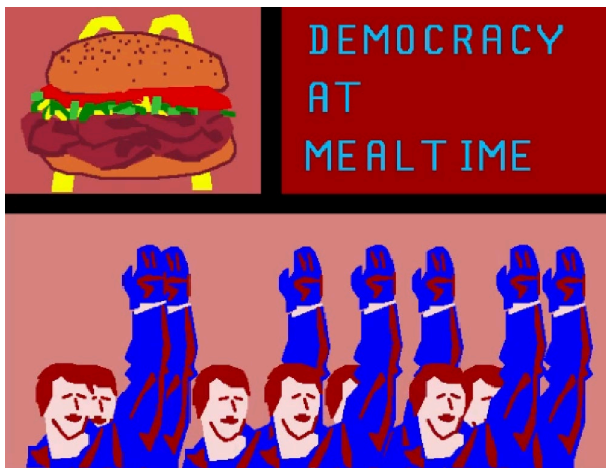


Figure 4: Democracy At Work [Geoffrey Shea, 1984]. Restored 2018

Ultimately, the decision whether these differences are important or incidental must be left to the artists. In preparation for two planned exhibitions over a dozen artists were asked to review our restorations of their works. Given that it was not uncommon for Telidon graphics to display differently on different decoders even when the works were new, it is perhaps not surprising that we have not yet encountered a case where the differences introduced by our emulator were seen to constitute an unacceptable deviation from the artist's original concept. In two cases however we were asked to increase the rendering speed of an artwork.

Our modern Telidon display system ran on four Linux computers at InterAccess from September 6th through October 21st, 2023, as part of a Telidon exhibition commemorating InterAccess' 40th anniversary [19]. Fifteen Telidon artworks were on display, selected from over 60 artworks we have recovered and restored to date, along with a collection of Telidon artifacts and documentation. An accompanying web exhibition is planned to open in July 2024.

Although Telidon was never quite "dead as a doornail," it existed in a state of extreme and increasing precarity for many years. As we have seen, the success of our project was ultimately dependent on a confluence of fortunate circumstances: the donation of a rare software development kit, the acquisition of obscure 1980s computer hardware, the survival of 40-year-old floppy disks, and the availability of the original artists to evaluate the results of our work. As the possibility of a recurrence of those circumstances diminishes with every passing year, it is important to take steps now to ensure the Telidon artworks we have restored do not return to a precarious state. Although digital preservation is a field fraught with uncertainty, it is reasonable to hope our work will long outlast our project. Thanks in no small part to our reliance on the open source, versatile, and cross-platform DOSBox emulator, we have minimized our external dependencies so that it should be possible to adapt our display system to run on any capable Turing complete computing platform that might emerge in the years to come. Work is underway to archive the artworks, software and other digital materials recovered and created by this project in a national preservation storage network, under the collective management of one of Canada's public Archives. Their ongoing stewardship will ensure these early examples of

Canadian telematic art will remain accessible well into the future.

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A brief history of the signature in art and media culture

NFTs are not a medium of art but a signing system used to attribute works to an author

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Abstract

The digital signature system via blockchain technology, called non-fungible-tokens (NFT) creates a hybrid art object, which inherits characteristics of physical art objects as well as from net-based approaches to art. Digital signed art objects are publicly accessible while still offering the concept of ownership. We will compare examples of this new signing technology to an example of a traditional signed physical artwork and pay a closer look to how NFT signed art compares to net-based art to describe the hybrid status of NFT signed artworks. It is feasible for analytic purposes to differentiate between the digital signing system and the medium of expression. NFT signed art works are modular and possible self-referential. Further we will give a short outlook on how these hybrid art objects impact artistic practice.

Keywords

Non-fungible-tokens, NFT, digital signature, art object, hybrid, net based art, public access, ownership

1. Introduction

I work with non-fungible-tokens (NFTs) in my art practice daily and I reflect these experiences as a lecturer and researcher in media studies. This is the perspective from which I address this topic.

The duality of medium and signature, as two modular elements is an abstraction of the technical structure of non-fungible-tokens. In some cases, the token serves merely as a signature for a data set, in other cases the non-fungible-token is used to certain degrees as the medium itself. With NFT technology the medium and the signature system become a possible self-referential feedback loop. We will dive deeper into this with our analysis of digital art works. To put digital art objects in a historical perspective we then compare this digital signature system to its physical equivalent and further ask how digital signed art compares to the characteristics of net-based art. Theoretically, we will determine the characteristics of the trace these digital signatures establish and what kind of art object do they produce. How do medium and signature relate to each other?

There is a difference between a medium of art containing the artwork and a signing system which is used to attribute works to an author. This is quite an obvious statement in general, but seems to need some attention when talking about NFT signed

art. In this case the difference is blurry in everyday language. Whereas the notion “to mint” an art work seems to make this distinction, even if not explicitly, there are phrases like “making an NFT”, which blurs the difference completely. Do I make NFTs? Actually, I do not. My art is making JPGs or MP4s which I sign via NFT technology. The NFT technology (in many cases) does not contain the artwork, but attributes it to its author.

The here used definition of medium I describes it to be relational to the artistic practice and hence allows our distinction between medium of expression and the system of signature to be gradual. The definition needs to be gradual because of possible feedback loops between signing system and combined data set containing the artwork. In some cases, the signing system itself is used as medium of expression. But nonetheless the distinction between medium and signing system is useful for describing digital signed artworks. It is this duality which establishes the digital art object as a hybrid which is clearly defined (ownership) but still pragmatically (publicly accessible, self-referential) open to its context.

2. A signing system as artistic genre?

It is quite interesting that the terms NFT-Art and Crypto-Art are used as a genre description². We do not say something like hand signed art for paintings and drawings. Why is it that the signing system and not the artistic approach is used as genre?

NFT is a technology is used for multiple purposes for example: to collect bonus miles at Lufthansa, to proof of presence at a certain event, to authenticate sports or politics related collectibles, or to sign art works. The term NFT does not relate solely to artistic use. Further the terms NFT-Art / Crypto-Art are used for a quite heterogeneous field of art practices from physical paintings turned to time-based jpg art to more digital formats like MP4 loops or VR and AR or coded artworks. The common quality of all these works is that they are digitally signed. They highly differ in their artistic approaches, their methods of expression and their content / context relation. They almost bear hardly similarities beyond their digital signature. It seems obvious that the terms NFT and Crypto do not offer much insight for aesthetic or conceptual classification of art works, since it merely focusses on the signing method. We do not call works on paper or canvas “hand signed art” or some kinds of media art “certificate art”. This leads to the question what the terms NFT-Art and Crypto-Art describe? If they are not feasible to describe the aesthetics or conceptual approaches of art works, why are they still very common? The mutual use of signature

¹ For the definition of medium I follow the approach laid out by Ranciere, that it is relational to the artistic practice, „the milieu in which the performances of a determined artistic arrangement come to be inscribed, but also the milieu that these performances themselves contribute to configuring. “

² These terms are widely used within the Crypto Twitter scene, but there is debate about their descriptive value. Further it is used by the ZKM as an ongoing exhibition title. <https://zkm.de/en/exhibition/2021/04/cryptoart>.

technology for a collectibles and artworks leads to mutual ecosystems, shared marketplaces, and collectors' relation. Crypto-Art is an open field of varying artistic approaches and genres which are visible, exhibited, criticised and traded within the same communities and institutions.

It is also important to mention that NFT technology is not a single standard, but a principle used in different blockchain environments. For example, there is different types of NFT on the ETHEREUM chain, the TEZOS chain or on the SOLANA network. Thus, on the technological level different NFT technologies offer different functions and are not compatible to each other. This means that there is not one, but many overlapping ecosystems, which form the crypto-art space.

3. Digital data and scarcity

Digital data is essentially time-based³ and constantly reproducing itself. Just for displaying one image in my web browser data is cloned from a webserver to the internal hard disk, then to the Random Access Memory of my computer, then to the screen buffer, where it is constantly refreshed. Data is always available in variations⁴. How to create a singular art object in this environment? Instead of prohibiting coping of the artwork's data, like most Digital Rights Management (DRM) systems and physical approaches to scarcity do, the non-fungible-token approach is to keep data publicly accessible and do not restrict its distribution, but connect one single instance exemplarily to an immutable chain to establish ownership. NFT technology combines a data set (an image, a video, digital code, etc.) with a token on the blockchain and thus creates one unique instance of possible endless copies of this data set. This process is called minting. Whether NFT signed artworks are immaterial, virtual and without an aura is a matter of discussion, but they are clearly a well-defined art object. The final NFT signed artwork is a bundle of a data set containing the artwork and a non-fungible-token within a blockchain⁵. And this art object offers specific functions modelled after physical processes, like owning, transferring, burning, buying and selling as the most prominent. Peter Weibel argues in his article⁶ that digital images are quasi objects, since they potentially do not only represent content but offer functions. This seems to be true for all digital images, but for NFT signed art works it is a necessity.

4. Comparison digital and physical signatures

4.1 Digitally signed art objects. The first NFT signed work I want to talk about is highly contextual since the signing system itself serves as the medium and there is hardly any data beyond. The only data is the cryptographic reduction of an artwork, which nobody but the artist has ever seen. Rhea Myers Secret Artwork consist of compressed data in a smart contract on the ETHEREUM blockchain. To compress the data, the artwork, we never saw, she used a mathematical hash function. This cryptographic technique reduces any amount of data to "a unique but meaningless numeric identifier [...] This proves that the artwork exists (to the extent it can be cryptographically verified) but offers no clue as to the content."⁷ The Secret Artwork is contextual since it depends not only on the blockchain to exist,

but also on tools like block explorers and descriptions or images to be contemplated. Further medium and signing system are inseparable intertwined for meaning generation.

The second digitally signed work offers a clearer differentiation between the medium of art and the token used for signature. At least in its final ownable form. Tyler Hobbs' artwork FIDENZA is an example for unpredictable, chance-, and participatory-dependent and adequate varied long-form generative art. Long-form generative art differs from traditional computer art insofar that the selection of the results is not human but algorithmically curated, which allows for larger sets of art works but makes more autonomous algorithms a necessity⁸. FIDENZA is a set of 999 different algorithmically generated artworks. There are certain rules coded into the smart contract which generate aesthetic variations, which then are saved as an image file. The contextual aspects here are the on-chain algorithm, which generates the artworks, the documentation on how the algorithm was designed and the chance function when collecting the file. Collectors do not know what image they are buying. They pay to mint a version, the algorithm produces a work, connects the work to a token and this is attributed to the collector's wallet. When minted there is a clear duality between image⁹ as artistic medium and token as signature. These mechanics are used in almost all works of the genre long-form generative art.

4.2 Physically signed art objects. The signature as trace references to a precise, historical person and thus connects art with an author-function¹⁰ how Foucault describes it. The signature helps therefore in the hermeneutic process since it positions an artwork in a certain socio-cultural context and establishes the financial evaluation for art markets. Further the signature enables connections of a single work to corpus and to contextual information which is not present in the artwork itself¹¹. Fliescher further writes in her article *Signatur Malerei Alterität* about the signature as identifiable mark which serves together with a bureaucratic apparatus as expression of identity. NFT technology offers exactly this while the blockchain serves as bureaucratic system, the tokens as the individual gesture and the wallet as my digital identity. The novel aspect here is that with blockchains we have systems which are technically constructed to grant immutable uniqueness to its elements. The history of software shows a lot of approaches to scarcity and uniqueness by preventing data from being copied, like the beforementioned DRM systems. NFT technology with its roots in the Open Source Community and Open Information philosophy does not prohibit copying, nor tries it to hide data on proprietary servers. It does not stop the flow of digital information to generate scarcity or uniqueness but offers a system which connects data sets unreversibly to its chain elements. Even if there are possible endless, fully accessible copies of the data set there is one single set which is connected to an identity and thus establishes ownership. Data stays fluid and accessible and this accessibility is one main difference between digital NFT signatures and signatures on paper or canvas in physical space. This accessibility grants that anybody can download and view the artwork, while somebody else owns

³ Christiane Paul,

⁴ L. Manovich. 2002. *The Language of New Media* (1st. ed.).

⁵ Mostly the data set itself is not stored on the block chain, but on systems like the Interplanetary-File System (IPFS) or Arweave since blockchains are not designed for heavy data usage.

⁶ P. Weibel. *Ortlosigkeit und Bilderfülle*.

⁷ Rhea Meyers. 2018. Secret Artwork. Retrieved September 10, 2023 from <https://rhea.art/secret-artwork/>

⁸ Tyler Hobbs. 2021. The Rise of Long-Form Generative Art. Retrieved September 10, 2023 from <https://tylerxhobbs.com/essays/2021/the-rise-of-long-form-generative-art>

⁹ In this case it is the AVI Image File Format (AIFF)

¹⁰ M. Foucault. 1969. Was ist ein Autor? In *Texte zur Literaturtheorie der Gegenwart*. Reclam, Stuttgart

¹¹ M. Fliescher. *Der Witz der Kunst*. Diaphanes. S. 70f

the work. And contrary to the lament “why buy an JPG, if I can download it” this is a feature of digital art objects. NFT signed artworks share this characteristic with net-based art in general.

5. Conclusion

We see that these digital art objects even if mathematically well-defined do not re-establish a clear cut between content and context, between work and viewing situation. They are hybrid objects open to context in several ways, while still offering the concept of ownership. Art objects signed via NFT technology share some characteristics with physical art objects, like controlled uniqueness, the aforementioned functions, and the possibility of ownership nevertheless they offer the openness of digital code to different context factors. Shortly put, they grant public access to the artworks data, while still enabling private ownership of the work.

5.1 Outlook from a practical perspective. First: The NFT hype shined a light on digital formats like GIF, MP4, JPG, digital code, etc as mediums of art which leads to artistic use of new digital only artworks, which are conceptual independent from the devices which make them visible. This aspect fits the broad topic of this conference. A pure digital production will be accelerated where physical instances are not essential. NFT technology can further help reduce the use of resources, since it helps to develop digital-only production environments for artists. The use of resources for storage and preservation of these works is at a small percentage compared to physical artworks. Second: There are new economic models for art practices which do not necessarily produce art objects. Digital, multidisciplinary, performative, community or research-based art practices often lead to results transgressing boundaries of mediums. In these cases, there are often fragments which are bundled via written text to work documentations. Like picture frames or display cases in the physical exhibition space NFT technology is a tool which helps formalizing heterogeneous fragments of ephemeral processes in digital realms.

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Creative, collective, and divergent practices in the virtualization of cultural heritage

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Abstract

In recent years, a myriad of three-dimensional digital doubles of our cultural heritage have grown up around us. For the purposes of dissemination and communication, the creation of pedagogical tools, or for study, reconstruction, and/or preservation, various institutions –through specific projects or associated companies– have turned to virtualizing their collections. The digital world has been filled with models that, although technically advanced, in many cases fail to activate the cultural heritage on which they are based, thus increasing the number of abandoned digital objects.

Given this context, it is relevant to research creative projects that approach 3D digitization in a critical and creative way. This article will review three of them: *Material Speculation: ISIS* (2015–2016), *Antes del Olvido* (2019), and *Arts Santa Mònica Official Tour* (2021). Through their study, we will observe the renewal of the debate about what should be preserved, the divergent and creative tactics to do so, and the social implications of these processes.

Finally, these cases are useful to approach heritage's duration. The techniques call it into question and makes us face our choices. What do we make last? and what we discard? If it was born to remain why is made ephemeral by circumstances? Or, on the contrary, why fleeting works persist in the heart of digital culture?

Keywords

Cultural heritage | 3D digitization | Photogrammetry | Antimonuments | Collective practices

1. Introduction

There are currently several techniques of varying complexity, speed, and cost for the 3D digitization of physical objects and spaces. Depending on the quality of the resulting digital object, it can be used for preservation, dissemination, education, the study of tangible pieces that for different reasons cannot be physically accessed and even to generate hypotheses for restoration and reconstruction in the field of virtual archaeology.

The digitization of movable and immovable heritage brings with it a series of wide-ranging and disparate issues to reflect on, including the construction of a conceptual framework to address the continuities and ruptures between the physical and virtual spheres (often anchored in the concept of a “digital twin”, coming from the so-called Industry 4.0); the legal dimension related to these processes; intellectual property; and the openness and accessibility of the new resulting object.

In practical terms, it forces us to think about the execution of the digitization process (planning, technological and human needs, post-processing tools); models of documentation, preservation, and archiving for these pieces; stabilization

systems; and interoperability and permanence over time, including communication and dissemination. Precisely, the ability to maintain existing audiences and attract new ones in the online space is one of the most pressing challenges faced by collections that are made virtual.

Finally, the digitization of heritage also makes us reflect on political issues, such as which entities have access to virtualization, and which will continue to remain invisible, that is, what are the explicit or implicit prioritization criteria for three-dimensional virtualization.

2. Taking care of heritage, by digitizing it three-dimensionally?

According to UNESCO, ‘digital heritage is made up of computer-based materials of enduring value that should be kept for future generations’ (2009). Digital materials are heterogeneous and may include texts, databases, still images, audiovisuals, graphics, software, web pages, etc., created in different contexts and in different languages, forming a constantly growing list of items. This type of heritage has diverse origins, ranging from industry to the arts, as long as it fits within what that the community (which does not always match the geopolitical organization of today's world and its legislatures) considers to be valuable and worthy of preservation. Its ephemeral nature, and in many cases the rapid obsolescence of its technological foundation, requires efficient maintenance and prompt handling to be retained over time.

Digital heritage may have been born as such, or it may be the product of the digitization of other types of analogue resources. The three cases addressed in this study respond to the latter case, in which digitization starts from tangible objects, digitally replicating them to operate as documents and be the legacy of our cultural present to future generations.

The cases we will work on are *Material Speculation: ISIS* (2015–2016) by Morehshin Allahyari; *Antes del Olvido* (2019) a collective project coordinated by Cristóbal Cea; and *Itinerario Virtual* (2021) by Mario Santamaria.

3. Material Speculation: heritage, 3D printing, and digital colonialism

Material Speculation: ISIS (2015–2016) by Iranian artist-activist-curator Morehshin Allahyari is possibly the best known of the three cases we will be working on and can be described as a project born in response to viral videos in which ISIS supporters could be seen destroying artifacts from the Mosul Museum in Iraq.

Allahyari worked intensively to recognize in the videos a final corpus of 12 destroyed works holding historical importance for the region, belonging to the ancient cities of Hatra and Nineveh. The purpose of this selection was to digitally reconstruct the pieces, replicate them using 3D printing, and

make them publicly available so that they could be materialized in different territories (a strategy that changed over the course of the project and will be discussed in section 3.2).

The corpus is the product of extensive research with handicaps such as a lack of data, inability to access a complete catalogue of the collection, and differing titles in English and Arabic in the various sources consulted. Allahyari tracked down dozens of images, taken from various angles, to inform and refine the digital models, while maintaining an active correspondence with museum staff members, researchers, and historians, among others.

Allahyari's artistic practice is not only focused on the result of partially restoring the destroyed heritage but also on the complexity involved in the process of doing so. All the material from her research is rescued in a second instance of the project called *Distributed Monument* which belongs to the *Download* project curated by artist and educator Paul Soulellis. *Distributed Monument* is the second instalment of the project that, anchored in the practice of sharing and downloading content on the network, seeks to transform the screen of each Internet user into an exhibition space. The downloadable 570 MB ZIP file contains the bibliography used during the research, documentation that served as the basis for the reconstruction of the pieces, the video, 44 images of the destruction of the works in the Mosul Museum, correspondence from the artist in various languages and, finally, STL and OBJ files for printing the model of *King Uthal*, a Roman-period figure from the Mosul Museum.

3.1. A persistent copy

Distributed Monument explores the role of additive technologies “as tools that allow us to remember, resist destruction, understand, or make sense of the historical dimensions of an object”¹. In line with his *3D Additivist Manifesto* developed with Daniel Rourke, it is a project that imagines and practices 3D printing as a radical and poetic action, a political instrument to shape matter and its digital destiny.

Generating the twin of *King Uthal* gives the figure a complex digital life, multiplying and mobilising around the missing original. Every time someone downloads the .zip of the project or accesses the 3D model, it activates and expands the memory of this absent heritage.

The dissemination, openness and potential appropriation of Allahyari's project aimed to ensure some kind of permanence between presence and disappearance of the source monument. Soulellis describes the action with a synthetic and lucid concept: “a persistent copy” (Soulellis 2016).

However, the multiplication of *King Uthal* brought with it a less desirable side: that of cultural appropriation. This concern led the artist to cancel the distribution of the rest of the eleven remaining recreations.

3.2. Digital colonialism

The release of *King Uthal* proved the success of its circulation, but almost exclusively for Western audiences and their institutions (Net Art 2015). It is not that Eastern institutions could not effectively access the model, but rather they lacked the economic, material, or human capacity to print, preserve, and

disseminate it. Therefore, the artist's strategy took a 180° turn during the project.

Allahyari decided to direct her efforts towards placing her work in Middle Eastern institutions supporting the commons in the region's centres, in order to combat what she understood to be a practice akin to “digital colonialism”, i.e., the trend for information technologies to be deployed in ways that reproduce colonial power relations.

Allahyari's reflection prompts us to rethink the conditions of openness, accessibility, and gratuity of digitised heritage and whether they are sufficient to preserve certain assets in the way they need to be. This concern is related to similar ones having to do with heritage, and questions about where plundered objects should remain, and who has the right to retain or reclaim them.

Is it possible for these questions to find new answers in a hybrid material world? Is it feasible to design a space for virtual heritage under different parameters than those governing tangible conditions?



Figure 1: 20. War. Part of a viral video included in the content of the *Distributed Monument* zip file. Folder: Artifact Information. Sub-folder: Destruction-Images. Author of the artwork: Moreshin Allahyari.

4. Anti-monuments: the collective resistance of memory

Antes del Olvido (2019) is a co-creative and collective learning platform built around blurring the lines between education and creation, testing new forms of authorship (and teaching), and solving the methodological problem of “capturing” an evolving historical moment (Centro Cultura Digital 2020).

This project sought to three-dimensionally document popular interventions in public spaces during the Chilean *estallido social* (October 2019) in which a large part of the population participated in mass protests and demonstrations. With the aim of generating an open archive of the uprising's collective memory, the project was organised around a series of workshops and tutorials in which, the techniques of photogrammetry and 3D modelling was taught to small groups for its subsequent implementation and dissemination (via the project's own website and the SketchFab platform) (Cea 2019).

Photogrammetry is a technique that makes it possible to produce three-dimensional models of movable and immovable objects using digital photography as the main source of data. Therefore, “since the main source of data is digital photography, the quality of the 3D model obtained will depend on the original photographs” (Shults 2017). Depending on the purpose of the

¹ As it is explained to Christopher Jones by the artist in one of the letters to of the year 2015 (accessible as part of the *Distributed Monument* material) (Net Art Antology, 2015)

models, levels of quality may vary. Even so, researchers such as Roman Shults have found that “low-cost photogrammetry” has proven to be sufficiently effective in overcoming the challenges of documenting cultural heritage. Therefore, and considering the malleability of this technique—low-cost models can be produced even with a standard mobile phone camera—photogrammetry is open to the possibility of collective appropriation in which *Antes del Olvido* has been anchored.

The workshops of *Antes del Olvido* were attended by over a thousand people who sought to recognise, virtualise and preserve those visual expressions that tend to accompany protests and opposition. These manifestations tend to be ephemeral by nature: Once order is re-established, they are eliminated from the public space. In this sense, the *Antes del Olvido* collective bets for rescuing the tangible and virtualising it, even if it also exposes it – inevitably – to other kinds of challenges.

4.1. 3D models, or how to maintain a plurality of points of view

Focusing on citizen interventions in the urban fabric, the *Antes del Olvido* team opted for a different documentation than the usual photography, resulting in “a concerted effort to produce 3D models of the main protest sites, rather than collecting single photographs, which were already taken by millions of protesters and observers anyway” (Pfaller 2022). 3D scanning was chosen over 2D photography to overcome the static viewpoint attributed to the latter.

The urgency of fieldwork led them to request collaboration for site detection, documentation, modelling, and geolocation. Cooperation has enabled the documentation, modelling, and mapping of more than 100 models capable of recording an ephemeral moment, enabling the potential return to a convulsive and dynamic present (Centro Cultura Digital 2020).

It is essential to highlight the spatial aspect of this project. The slogans, graffiti or banners surveyed have no meaning outside the logic of the specific place where they have been performed (and they come from a wide variety of places and origins, although they are mainly located in Santiago de Chile); places to which they are returned in the form of 3D images, geolocating them with the image of the “perro matapacos” [cop-killer dog], which became a local icon in the Chilean spring, but soon after was emptied of meaning, co-opted by the merchandising of the uprising.

The models are far from perfect. Cristóbal Cea, in his open tutorial, explains the model of the monument to General Manuel Baquedano in the renamed Plaza Dignidad, which he chose as an initial case to explain the use of the software (Cea 2019):

...there are several photos that weren't taken, like this side at the back. It could be due to a misreading of the cameras, but I think it's interesting that it looks a bit like a ruin and it has a slightly poetic quality in the sense that there's something missing. In a sort of metaphorical sense, there is a shadow in the image.

He adds that he finds it interesting that people appear in the final model—something unusual in institutional virtualisations—which makes it possible to understand that the interventions on this monument are current, keeping it as a living monument.

Among the different ways of spreading and pluralising the practice of photogrammetry in *Antes del Olvido*, there is one action in particular that is worth highlighting: the anti-selfie or photographic *cabildo*. To make a virtualisation using photogrammetry, one must surround the object or property to be digitised and take a sequence of photographs with an overlap of two thirds covering its entire surface. In certain high-end photographic studios, there is also a reel of cameras shooting at the same time. The practice proposed by *Antes del Olvido* was to stop self-photographing, to look at the world, and to generate a human reel that allows us to collectively virtualise immovable objects from the shots of different individuals. Leaving a thread to pull on and rethink concepts such as authorship, it aligns itself with old and still current debates in the field of the arts.



Figure 2. Virtualized monument “Ícaro y Dédalo” by Rebecca Matte, intervened with the motto “justice and dignity” during the Chilean Spring. Source: *Antes del Olvido*, SketchFab.

4.2. Anti-monuments

These models account for the spontaneous and reclaiming expressions of a population at a given moment, which are themselves ephemeral, and through their virtualisation they become what we could call an anti-monument (Stanley 2019). Following with the emergence towards the end of the twentieth century of a scene of artistic practices related to memory, the anti-monument emerges from the desire to remember borderline situations whilst being aware both of the impossibility of complete memory and the painful nature of memory. We are talking about “works that bring a mixture of memory and oblivion, the work of remembrance and resistance” (Seligmann-Silva 2020).

The anti-monument moves away from the engraving of memory in stone or marble with an eternal vocation, choosing more ephemeral materials and rituals.

Nowadays, the space of reclamation seems to have been extended or even transferred to the virtual world, and specifically to social networks. Yet these hold other kinds of dangers: on the one hand, they serve to momentarily reclaim (and not to archive); and, above all, they are hosted in proprietary spaces whose future—as the history of Geocities and so many other platforms teach us—escapes the control of those who produce the content that feeds them.

Antes del Olvido is an anti-monumental practice—horizontal, open, viral—that poses the updating of memory into the present, with all its tensions and contradictions, with its pain, its polysemy, its inaccessible aspects, its documentary capacity, and its material fragility.

5. In the bowels of infrastructure

Arts Santa Mònica Official Tour (2021) is a project commissioned to Mario Santamaría and exhibited at the centre of the same name during the exhibition *Exponer - No exponerse - Exponerse - No exponer* curated by Enric Puig Punyet, which took place between 24 September 2021 and 9 January 2022 (Arts Santa Mònica, sd)

The tour designed by Santamaría offers an unusual invitation: to virtually tour spaces inaccessible to the public in the Arts Santa Mònica centre in Barcelona. In other words, the route created by the artist, far from reproducing the centre's exhibition halls, chooses to sneak through ceilings, drains, pipes, etc. "as if a flying rat were crawling through the bowels of the building to show what we can't normally see" (BeTeVe 2021).

Why is it interesting to look inside the walls and over the ceilings? And what makes us think that this type of visit is the institution's "official" one? The infrastructures that support the centre itself, as well as the exhibitions and activities it hosts, are usually taken for granted by the public, they are not questioned. Going further, even the workers do not question them unless they must take care of specific maintenance tasks. They only become apparent when they fail: a leak shows the wear and tear of roof tiles; the inability to send email indicates faults in fibre optic cables; unexpected gusts of heat remind us that there are air-conditioning machines here and there. But as long as maintenance and repair are efficient, there are no loopholes to peek into the amount of work and materials involved in sustaining such a space. Not to mention that institutions tend to actively invisibilise them, as if the works and projects they house could live within them naturally. This fact is more acutely evident in museums and collections than in permanent exhibitions (a paradigmatic case is the study on the Mona Lisa in the Louvre by Fernando Domínguez Rubio (2016)).

In this sense, Santamaría's project is a great success, as are other projects by the artist that aim to raise awareness of—and contact with—infrastructures in a playful way that is not exempt from a certain taste for parody, together with a use of virtualisation that expands the horizons of the possible, and of the institution itself.

5.1. Subverting the official copy of the world

In the cloisters of Santa Mònica, a series of stations allowed the audience to navigate 110 stops through the ancient and invisible infrastructure in the tour designed by Santamaría, implemented in Google Maps. These could be accessed through consultation points in the rooms during the exhibition, as well as through Maps.

Why does a project of this nature decide to anchor itself on a platform like Google Maps? The artist replies:

It was problematic to upload the tour to a multinational application (to a technological behemoth), but in the end, I realised that this was precisely what I needed if I wanted to make the visit official. Google gave me the aura of institutionality I needed. Google gave me the official copy of the world (Santamaría interview, 2023).

This official copy is subverted from within by the project itself, which uses a popular interface—which has educated our gaze in the virtual world, becoming the model of plausible

representation par excellence—to embody other possibilities of representation.

In the interview cited above, the artist explains that he considers the vast majority of three-dimensional digitisation projects that deal with digital replicas to be problematic. The question that organises his work revolves around how can other content be deployed in digital versions of institutions? He adds: "What is the role of the people engaged in symbolic production in this domain? Do they only provide content to containers?"

The fact that Santamaría's project is alien to the logic of its contender (i.e., Google Maps) and breaks its rules (distance between points, inclusion of vertical movements, etc.) has meant that the connections between the different stops on the tour have been deactivated. In this way, some of the images can still be accessed, but not the whole route. The work, in performative and interactive terms, is no longer alive. Part of the information of this project can be reconstructed through the photographic documentation that is published on the artist's website, Flickr and Instagram.

5.2. Beyond digital replicas

Arts Santa Mònica Official Tour destabilises the usual three-dimensional institutional representation in several ways. By escaping from the replica of the rooms and the pieces on display, it takes us on routes that move away from the patterns we have internalised as correct: position of the average spectator at 1.60 m, fluid routes between the corridors and the rooms and clear points of information, among others.

The entrails of Santa Mònica are an unusual subject for a virtual tour, and so is the way in which it is captured digitally. Even physically. It is interesting to note that in order to scan behind the walls or on the roofs, Santamaría and his team had to drill holes, set up ladders, and even throw cameras through the cloisters. All these activities leave traces in the form of holes, dust, tools and other traces. Neither have the holes been plugged, the dirt removed, nor the materials hidden. The traces of the virtualisation work completed the physical exhibition, also showing how the boundaries between practices in the digital and tangible worlds are fluid and blurred.

The search for virtual representations that go beyond the twin, the replica or the double is not simply an act of artistic creativity, but a call to rethink the role that heritage institutions can play as articulators of representational universes, and not only as managers of content.

The notion of cultural heritage is not stable. According to the European Commission Innovation in Cultural Heritage Research in its 2018 text (European Commission. Innovation in Cultural Heritage Research 2018) three decades ago we found ourselves immersed in the Third Regime of cultural heritage that includes an expansion in terminology, meanings, and the number and diversity of assets. Likewise, the adherence of communities to the debate on the definition and construction of cultural heritage, understood in terms of co-creation. However, as can be read in the following passage from Niccolucci, Felicetti, Hermon (2022).

This century's development of digital technologies is having profound effects on our way of life, our work and our communication attitude. However, in most of the activities related to cultural heritage the digital component has not been internalised by institutions and professionals, using it

as a device to perform the same tasks and to achieve the same objectives as before.

The authors advocate incorporating the digital component in methodological and practical terms in what would become the Fourth Regime, characterised precisely by the effects of digital transformation on cultural heritage activities, institutions, practitioners, and communities.

It is in this search on how to deal with digitality in heritage that Santamaría's position should be taken as an opportunity for reflection and going deeper.



Figure 3. A visitor watching the *Arts Santa Mònica Official Tour* during the exhibition *Exponer - No exponerse - Exponerse - No exponer*. Source: Roberto Ruiz.

6. Conclusion

The three cases discussed here converge in the use of digitisation and 3D modelling technologies to look at heritage in an unconventional way. The first case deals with the destroyed collection of a museum. Therefore, the pieces have already gone through a process of legitimisation, but political circumstances have endangered them to such an extent that they have led to their destruction. The artistic approach to their reconstruction is not restricted to the production (i.e. modelling and 3D printing) of the pieces, but rather brings us face to face with a series of questions: the complexity of reconstructing what has disappeared materially without leaving traces or documents; the legitimacy of possessing objects from other cultures (even if they are digital doubles); and the power of 3D printing as a democratising tool. It can also introduce us to a new face of colonialism, a digital one.

The second case is on the fringes of what is traditionally conceived as heritage, since it documents social action, a specific and ephemeral juncture that involves the intervention of monuments, but also of other symbolic urban community spaces. Its objective has not been the conservation of heritage, but rather how it is dynamically appropriated and re-signified. In this gesture, along with attempting to grasp a key moment in Chilean history from a multiplicity of angles, Cristóbal Cea and the *Antes del Olvido* team discuss the very notion of heritage.

Finally, in the tour offered by Santamaría, the gaze is focused on the unrecognised part of heritage, that which is absent to the gaze, but that supports it and requires maintenance and care, often enormous and generally invisible. From there, the artist questions how virtual institutional spaces are being approached representationally and symbolically.

In all these cases, the final objective exceeds the limits of the preservation, study, or pedagogy of their objects through digital strategies, to take root in other terrains that critically observe their uses and propose new practices. Distributed monuments, collective photogrammetries, or official tours through the entrails of institutions rescue and preserve a set of circumstances, but also activate heritage in a creative way, focusing on recording or evoking the subjective and collective experiences that surround heritage objects.

Digitisation in itself can be an interesting—and even essential—tool, but it is not enough to safeguard heterogeneous assets of different natures born in the heart of diverse cultures. In the field of digital heritage, it is urgent to continue reflecting on three-dimensional representations, considering how this translation from the tangible to the digital world can affect its own definition, its limits, and its scope, and even to what extent the two can be connected and mutually influence each other. It is necessary to continue to address the challenge of engaging communities in practices linked to digital heritage, encouraging and facilitating their appropriation in order to be able to keep it active. In the words of Torres Barragán and Delgado Rojas, we must remember that:

...heritage that is not known, used or visited may as well not exist; and content that does not have an impact on the community will be quickly forgotten in the same way that tangible heritage is abandoned (Torres, Delgado 2017)

The projects reviewed here can be an inspiration to ask questions that allow us to conceive other possible worlds that include and exceed the notion of the digital twin in a creative, collective, multiple and divergent way.

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How to break from eurocentrism's echo chamber: the incommunicative as identifier of posthuman (media) entanglement and other miscommunications

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Abstract

Imagining the sedimentation of future memories as the residual aftermath of replay within a persistently Eurocentrically oriented socio-technical echo-chamber foretells a grim outlook. In this moment, characterized by the urgency of addressing multiple crises with innovative approaches, the imperative lies in opening channels of communication for strategies that transcend current interpretations. The indispensable necessity involves actively seeking avenues to communicate the unknown, the unforeseen and novelty in thought.

This essay delves into the critical and transdisciplinary examination of the systemic Eurocentric entrenchment of digital communication strategies, given their pivotal prevalence in everyday life. One perspective of the approach involves exploring ways to reshuffle the system-immanent epistemological sediment by contrasting interpretations of classical information theories with current cybernetically applied methodologies. As a second aspect, the transversal approach of the text takes recourse on methodologies employed by marginalized communities to exemplify pathways for integrating the unknown.

Reconsidering noise and miscommunications as potential informants broaden the spectrum of contingency, which is a considered a necessity for cognitive invention and openness as well as for information transmission. These two strains are drawn together through attempts at redefinitions of what noise can account for and thus possibly contribute. Thereby, not only positive interpretations of noise but also glitchy miscommunication come to the fore. Building upon the original interpretation of noise, the intent is to revive the hiss and other miscommunications, recognizing their co-constitutive role in information transmission. More generally, the argument posits the need for a changed attitude of listening to what is typically deemed incommunicative.

Keywords

Algorithmic thought, knowledge, listening, noise, sociogeny

1. Introduction

This text interweaves the framework of the standardized grammar of modern computational technology with recent critiques of Western modernity. It aims to create a transmission channel for what is often associated with the absence of order or norm, thereby typically dismissed as irrelevant or categorized as noise. From this perspective, noise maintains its role in contributing to information transmission, as originally formulated in information theories (Shannon, Weaver). Not confined to a common sense understanding of noise, but through identifying 'incommunicative' side effects, it serves as a marker for the inaccessible within posthuman media (/data)

entanglements (Cecchetto 2022). This identification potentially offers a tool for offers a tool for deciphering the fault lines in the entwined relationship between humans and non-human technological entities.

The current method of agential flattening emphasizes posthuman aspects, while decentering the human. However, it simultaneously enforces the systemic degradation of other human and non-human beings ingrained in the predominant epistemology. Instead of alluding to the imprecise term 'the West,' I refer to such epistemologically entailed superiority of what counts as proper knowledge by using Sylvia Wynter's modification of capital m 'Man' (2003). The significance of this point is amplified as current technological enhancements necessitate dealing with sensory ex-and impressions that challenge the representational interpretations entrenched in the computational paradigm and its foundation, the Western-universal thought paradigm. What currently appears as the unformulated of other humans, non-humans, and technology might manifest as unknown (alien) thought(s) that could significantly contribute to addressing the current moment of crises. Interweaving the unrepresented with the standardized 'representational grammar' involves drawing on sound studies and information theories to establish a broader framework for reinterpreting what is considered knowable. Developing a scope for the incommunicative (or presently labelled as noise) becomes imperative given the increasing digitization and automation (data as action conversion), and crucial for redefining frameworks of the knowable beyond the limited epistemic structure of the Global North. Formulating a demand for different listening attitudes (Robinson 2021) towards other knowledges will be pivotal in determining future memories as the world becomes worlds, significantly influencing which aspects become apparent and knowable in both the virtual and the actual.

For tackling those aspects that elude 'our' actual knowledge, i.e. evade auditory or visual comprehension as expressive forms of sense-making, my approach takes the form of a transdisciplinary endeavor. I engage in a comprehensive exploration across various fields— from critical race studies to media studies to sound studies—seeking pockets of access for listening and, consequently, knowing differently. This implies making sense of noise as identifier of the uncommunicative— furthermore a key notion that also may help us guide the growing complexities of increasingly posthuman media entanglements.

2. Grammar of states affairs¹ - the technology of capturing

With the question of how to evolve from the "nets of capture, [as] the intersecting technology of getting and keeping" (2020, 102), the black feminist writer and scholar Alexis Pauline Gumbs wants to imagine an end of capitalism by evoking its historical traits. Gumbs' wish to "outgrow rope" traces the "tangled legacy" (2020, 102) braided into the literal rope as traits of violence. A past (meaning) that also overshadows and permeates contemporary organizational (i.e. information technology-based) activities. The recognition that connotational significations comprise narratives transferred from the actual to the virtual hints at the systemic violence ingrained and tacitly accepted as a 'by-product', often remaining unrealized in its full impact. In this sense, I draw on the capture process not only as a primary processual tool within the overarching framework of capitalism in western modernity but also as a simultaneous reference to operational modes of computational technology. To some extent, this point aligns with Philip Agré's statement regarding the concept of 'capture.' By comparing the impact of different tracing methods, Agré concludes that "capture is never purely technical but always sociotechnical in nature" (1994, 111).

Returning to the customary technique of fishing with nets, Gumbs highlights the threat of extinction, either 'by accident' or as an 'unwanted' consequence, affecting species not even on the to-be-captured list. This description points already at an industrial scale of the fishing process where indifference towards unwanted entanglements and thereby the collateral susceptibility of maiming is deemed acceptable due to "a system that says" it cannot act otherwise without immense (monetary) costs (2020, 103). Gumbs' descriptions pertain to the impact of actions in the 'real' world, yet also illustrate how inscribed (programmed) habituation, through a grammar of states, defines what can be tracked. As Luciana Parisi states, algorithms, as state defining initiators, rather than transferring absolute truths, enact "operations or pragmatic procedures" that provide "incomplete pictures of a world in the making" (2021, 34). In this instance, tracking serves the objective of aiding the fishing industry in maximizing their 'profitable catch,' and not the statistically negligible noise of wounded by-products, whether they be human or non-human, as demonstrated by other conflicts. Returning to the point of interest as the wider definitions of the uncommunicative: the numbers of collateral catch (or injury) as 'non-captured capture', while rarely ever gathered and processed, equally contribute (as unrealized) information to the structural basis, prompting a grammar of states that affects and directs embodied action.

In the 1990s and early 2000s, Agré identified the intertwined processes between what is considered the way of thinking and consequently programmed into machines, as stemming from observed (captured) embodied action. This, in turn, influences methods of action and consequently the thinking associated with them. Employed, varied, and verified for years, these 'looped returns' become increasingly blurred making it "hard to separate today's algorithms from [the] history" of the technology's

development in the 1960s (Dobson in Small 2023). According to Agré's analysis, it is algorithmic specification based on "a grammar of states and state changes and the technical means to detect the states (or the state changes)" (1994, 113) that enforces tracking. Yet, the resulting generalizing loop reduces "the dynamism of life and of thought that comes from lived experience" by rendering it into a formally abstract deterministic relation (Fazi 2019, 819). In her book *Race after Technology* (2019), Ruha Benjamin provides various examples of 'unwantedly' produced algorithmic bias that are manifested overtly or covertly in code. Encoded within "systems of meaning" that operate in accordance of a certain grammar, things can be rendered visible or invisible, become distorted or vilified (2019, 7). In one example Benjamin cites Alison Bland's experience with google maps, where the X of Malcolm X Boulevard was interpreted as ten. According to Benjamin, this misreading reflected a solution to the coding challenge, suggesting that the letter could be conceived as Roman numeral. However, lacking an understanding of lived experience and cultural context, Bland rightfully pointed out through her tweet that this programming choice signaled to her that "there were no black engineers working there" (2019, 77-78).



Figure 1: classic tweet 'Malcolm Ten' by Allie Bland, Twitter (now X) @alliebland, November 19, 2013, 9:42 PM (CET November 20, 2013, 3:42 AM)

Despite the passage of several years since this Google maps example, where continual technological advancements typically enable significant progress, artist and writer Hito Steyerl recently highlighted the persistent issue of stereotypical misrepresentation through abstract rendering in her essay "Mean Images" (2023). Her conception of 'mean images' thus must be read not only as the average, but that the underlying epistemological median is still based on biased discriminatory assumptions, in this case considering the facial structures that lay outside average western conceptions. For Steyerl, the term 'mean' not only denotes an average but can be taken as a descriptor for the enforcement of biased discriminatory (ugly) assumptions that are intertwined with it, reflecting the distorting outcomes she observes.

The cultural historian James E. Dobson, whose field is the history of computer vision, endorses Agré's interpretation of the sociotechnical influence of algorithm-based invention. Originally shaped by "the social and technological conditions of the mid-twentieth century" sensual extensive technologies disperse such inheritance into "the pervasive technologies of seeing in the twenty-first century" (2023, 3). Interventions by programmers, like blocking out certain keywords or the 'feeding' of less biased data, cannot address these fundamental problems

¹ Argé, P. 1994. Surveillance and capture: Two models of privacy. In *The Information Society* 10 (2), pp. 101–127. DOI: 10.1080/01972243.1994.9960162.

ingrained in technological development sufficiently. In times when algorithms become increasingly complex, Dobson expresses concern about what is "still sitting there inside the model" that might enable further garbage processes of distorting 'mean' renderings (in Small 2023).

FIGURE 1: 'Images of Hito Steyerl' Found on LAION-5B



Source: haveibeentrained.com

FIGURE 2: Stable Diffusion's 'Image of Hito Steyerl'



Source: stablediffusionweb.com

Figure 2: page with illustrations in Steyerl, H. 2023. Mean Images. In *New Left Review* 140/141 (Mar/June), pp. 82–97. Available online at <https://newleftreview.org/issues/ii140/articles/hito-steyerl-mean-images>

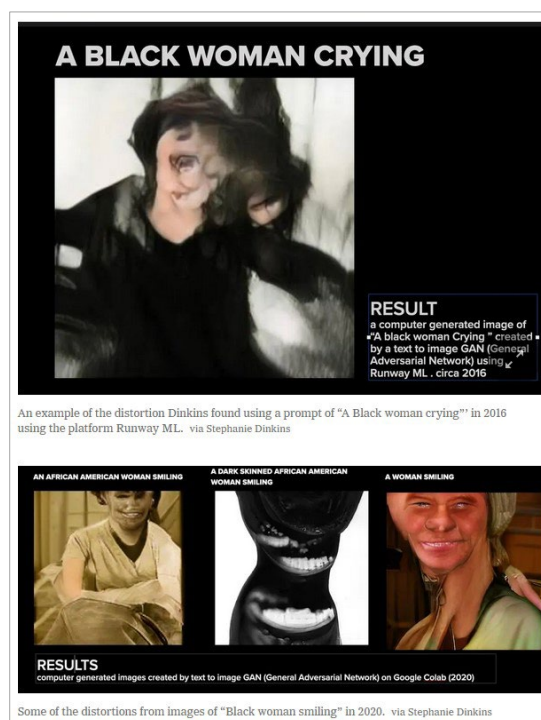


Figure 3: images via Stephanie Dinkins in Small, Z. 2023. Black Artists Say A.I. Shows Bias, With Algorithms Erasing Their History. In *The New York Times*. July 4, 2023. Available online at <https://www.nytimes.com/2023/07/04/arts/design/black-artists-bias-ai.html>

3. Algorithms as ideas

Dobson's consideration of algorithms as being primarily ideas clearly demarcates a connection between the history of computation and the prevalent epistemology of intellectual history (2023, 14, 8). Furthermore, the algorithmic concept of tracking, which involves evaluation into an average statistical rendering, exhibits a historicity that can be traced back to Allan Turing's definition of digital computers as "discrete state machines" (1950, 436, 439; Fazi 2019, 822). This point is further solidified, according to Beatrice Fazi, a scholar specializing in digital humanities, by the mechanistic interpretation of links Turing drew between calculation and cognition (Fazi 2019, 819). Fazi's observation not only points out the relation between technology and human thinking but emphasizes a similarity in the treatment between human thought and that of a machine. Engaging in a technoscientific epistemology that positions "algorithmic thought to represent the prosthetic extension" for the "neurocognitive sapience of Man," Luciana Parisi suggests a reversibility between huMan2 and machine (2021, 34, 48, 49). If indeed such socio-technical mutuality is preconceived, its interpretative consideration as a loop that replays (within) certain epistemic traits is a logical consequence. It manifests a historicity that references the establishment of computation within the knowable horizon of the western-centric knowledge production. Consequently, it clearly inscribes specific intellectual values into coding, embodying traits inherent to the prevailing sociogenic framework. It is therefore not surprising that contemporary algorithmic thought is conceived as simulative transposition based on "a semiotic order of

² The usage of capital M for man refers to Sylvia Wynter's analysis of the *homo oeconomicus* (2003, 2007) that as she expresses led to a "conception of the human, Man, which overrepresents itself as if it were the human itself, and that of

securing the well-being, and therefore the full cognitive and behavioral autonomy of the human species itself/ourselves" (2003, 260). Therefore, huMan with capital m marks this definition as based on a biased conception.

knowledge" (Parisi 2021, 38), rather than considered through and by its own contingency (Fazi 2016). While this paper cannot comprehensively analyse the definition of cognition in relation to artificial intelligence, which currently favours a "synthetic post-neoliberal simulation aesthetics" (Goodman and Munster 2023), it endeavors to 'trace' the sociotechnical traits and deeply ingrained biases inherent in this development.

This poses the question of what to infer from the preceding discussion in terms of new technologies that, as Steyerl illustrates, continue to operate through widely unchallenged 'settled' means? How to develop a method of perceiving these 'unwanted' by-products still enacted within actual applied technologies? Taking heed of the insight that only the prior captured can be identified, the sediment of coding activities ingrained in socio-technical tracking processes must be attentively considered as an influence in the reprogramming of futurity. Interactive feedbacks, based on these captured means, are enhanced by the fact that the digital rarely forgets an encoded movement (process). Socio-technical assemblages are, therefore, established in a specific sociogenic environment than in conscious individual expressions and cultural backgrounds. This leads to the troubling observation that future memories are accumulated through calculational loops whose detecting states are predominantly influenced by preconceptions of white patriarchal capitalism (Cecchetto 2022, 8).

4. Determining the sediment from which future memories emerge

However, from a vantage point within these systemic settings, its traits are scarcely recognizable. The example of Malcolm Ten (X) illustrates that paying attention to multidirectional perspectives requires a cultural awareness that exceeds the prevailing perception. Whether consciously acknowledged or not, the deployment of socio-technical assemblages (Parisi 2021, 36) often imposes ingrained bias on acting-thinking that manifest 'our' (Global North) intra-active-agential way of doing-being (Barad 2007). To discern these in their deep rootedness, this essay engages with transdisciplinary approaches that intertwine associative practices, similar to the method applied in Gumbs' text. By enforcing de-sedimentary processes that disrupt customary understandings, these methods uncover historical-philosophical meanings and metaphors. Notably, Fred Moten's methodological use of the interinanimate is well-recognized, enabling the emergence of the unspecific non-addressed, ultimately disclosing neglected connection points (Moten 2004, 280).³ The interinanimate is originally a literary concept where meaning is not explicitly given within a sentence but arises from the context of 'surrounding words'. First defined by I.A. Richards⁴ and picked up by Fred Moten to lay out the aesthetics of the radical black tradition in his book *In the Break* (2003), the concept appears helpful to access strictly separate fields through interweaving. By allowing meanings to seep through one another, as in the above paragraph, the interinanimate offers a mode of listening differently, enabling

intersections through which unlikely or suppressed meanings surface.

According to Agré's analysis, the stated implications of the recursive loop of algorithmic processings are impacted by, and re-constitute throughout, sociogenic circumstances (Fanon 1952; Wynter 2001). This means that socio-technical assemblages not only influence acting but also the interrelated activity of thinking. In other words, the 'mean' as ratio(nal), cited by Steyerl (2023), is not only based on inherent representational transpositions within the digital but also operates inversely, shaping habitual patterns via the actual grammars of activity. As a result, the encoded or inbuilt (re)arrangements of activity (Agre 1994, 110) not only incorporate bias enlisted in "zeros and ones", but if not handled carefully (Benjamin 2019, 62) can restructured "institutional dynamics" as designers' approaches "will normally be oblivious to the political dimensions of activity" (Agre 1994, 112). In their analytical insights both Agré's concern about the socio-technical, as equally Benjamin's tracing of biased coding assert with James Baldwin's claim that the force of history is carried "within us, [that we] are unconsciously controlled by it in many ways, and history is literally present in all that we do" (1998, 723). A fact that Gumbs' aforementioned associative writing style intentionally attempts to make perceptible.

This also provides the basis for what this essay attempts when introducing with Gumbs' remark about the fishing nets: the seemingly unrelated (noisy-disturbing) appearances that commence to shine through when being interinanimated. A provocation that asks for which noise is permitted especially when regarding the interlocked 'unwanted' extinction in Gumbs' description. What can be heard or seen and how much unwanted/unintended by-product is the acceptable amount of noise in the administered (undisturbed) information transmission of grand scale fishing? When is something deemed to be an unsuitable 'noise', and thus imperceptible, often due to obviously being glutted with historic undertones of ongoing exploitation, extinction, and suppression? Providing an unsuitable fit for the prevalent paradigm these historic sediments very obviously become reproduced in actual activities, while seemingly indiscernible for the main actors.

To make sense of this reaction I compare the original information theories as defined by Claude Shannon (1948) and how the resulting socio-technical appliances developed along these theories influenced epistemological definitions of communicative strategies in return. Originally noise still was acknowledged as fundamental element contributing unpredictability in the transmission of information, however throughout the development of telecommunication, noise's conception increasingly was rendered towards that of an unwanted quality. Shannon's concept of 'information entropy' as defining "the correlation between novelty of information and disorder" lost support in favor of a "clear-cut conceptual opposition between information and noise" (Malaspina 2018, 4). This transition reveals much about the epistemological orientation underpinning current socio-technical assemblages

³ In his text, "Knowledge of Freedom" (2004), Fred Moten uses interinanimation to imagine a different phenomenology that, allowing the set of "mathematico-metaphysical objects", whose object (ensemble) emerges from the tenuous difference between totality and singularity, can be enacted as "the improvisation of and through the opposition of totality and singularity in and as a

descent into the generative cut between description and prescription". A phenomenology that reveals "some opening of the possibility of political agency, of another mode of organization unopposed to freedom."

⁴ I.A. Richards: *Context Theory of Meaning*. <https://personalpages.bradley.edu/~ell/iarichar.html> [accessed 25.01.2024]

are based. The deeply ingrained definition of this concept (in consequence of Turing's insights) constructs a framework that defines human cognition through invertible interpretations of "neurocognitive and formal models of automated cognition" (Parisi 2021, 33). Concurrently, this conceptional foundation of cognitive functions, based upon a correlation of mechanistic principles of machinic information transfer, fosters an affirmative understanding of negentropy, delimitating the impact of contingency. Contrary to this, as Brassier and Malaspina emphasize, processes of cognitive invention require entropic possibilities, constituted in "the 'negation of the negation of contingency'" (Malaspina 2018, xii, 183).

5. Coded inscriptions

The passing of markers of historicity (i.e., sociogenic circumstances) occurs frequently on a subthreshold level and leaves no apparent trace. The representations "expressed within some mathematically definable representation scheme, which is capable of expressing a certain formal space of states of affairs" (Agré, 1994, 105), particularly recognize those fitting into the 'grammar of states'. Therefore, the calculated representation generated in coding tends to reinforce a white positionality, rendering any less represented (African, Asian, Arab) as 'mean', glitchy or distorted. The procedure generally derives its rationalization by assigning the idea of "computation as universal exchange to Leibniz's concept of a universal conceptual language that could unambiguously represent all that can be thought and expressed, and that could be acted upon according to a general mathematical science" (Cecchetto 2022, 10; Fazi 2019). By universalizing a Eurocentric standard as foundational epistemological means, however, there is a neglect of the entanglements of technology and colonialism that this very part of the world has yet to acknowledge in full extent. Parisi, therefore, demands a fundamental rethinking of the current approach towards technology and algorithmic thought. One that must recognize "that mathematical and biological universalities are part of the global entanglements of technology and colonialism, enfolded in the neurocognitive neural networks of today's intelligent machines" (2021, 34). In this regard, Philip Argé's early observation of the intermingling 'feedback' loops between the 'analog' living world and its computational transposition (capture) demarcates it as the procedure's echo of becoming oblivious to the incorporated (captured) traits, hearing only its own sound and tonality replayed.

For addressing the problem of how to break free from this oblivion and access novelty and content beyond the known within information transference, Malaspina's epistemological re-evaluation of noise becomes essential. Similarly based on "the impossibility of a noiseless transmission [as] foundational to the field of informatics" (2022, 3) is David Cecchetto's research of *Listening in the Afterlife of Data* (2022). Considering the incommunicative as part of any communication, Cecchetto attempts to establish a certain incommunicative digital residue that acts as a distinctive marker for posthuman (socio-technical) listening. Thus, advancing the original interpretation of information theories, Cecchetto defines the incommunicative as active "in the future anterior, naming the bundle of materials, concepts, and phenomena that will have been the enaction of communication through

miscommunications". Miscommunication here, however, addresses the generally incommunicable within communication, eventually converging in concepts of aesthetics, affect and excess (2022, 6). In my interpretation, the attempt to listen to the incommunicative of computer profiles serves as a search for sensed sparks that these profiles ultimately entail, thereby providing distinguishing marks of posthuman entanglements. Considering that "the imposition of a grammar cannot be distinguished from the other ways in which activities change" (Agré 1994, 111, 112), Cecchetto's concept researches the potential for discerning between means and meaning from within the noisy channel. The incommunicative eventually provides a faint (sensed/listened) marker, allowing 'us' to discern some type of distortion within 'our' ways of communicating. This offers not more, but also not less than an opportunity to notice the posthuman phenomena that are almost imperceptibly encroaching upon current ways of acting and thinking within these socio-technical entanglements. The concept importantly sensitizes 'us' to what, at first glance, seems miscommunicated.

6. The incommunicative and other information

By intertwining information with entropy (dispersal/uncertainty), Claude Shannon, pioneering researcher in information theory, recognized noise as key element within information theories, defining its precedent and integral role in every communicative relation (1948).⁵ However, this counterintuitive point of information transmission has been insufficiently acknowledged within natural and human sciences. Instead, common interpretations prefer the more intuitive cybernetic definition, which renders information as a state of negentropy. In simplified terms, this definition characterizes information as being more or less cleared of the indeterminate. Whereas in the more original definition contingency contributes to an increase in the amount of available informational bits. Conceiving such a complex trait through its negative definition has significant influences on the broader discourse:

"Wiener's idea of information as negentropy subtly inflects our thinking about organization: from the organism to the ecosphere, from sociopolitical to economic relations, from networks to the idea of globalization. As a result, by emphasizing the negation of contingency our idea of information has become tethered to predictability and consequently antithetical to noise as the unpredictable" (Malaspina 2018, 5).

In Michael Serres' (1982) philosophical consideration, noise interferes, inhabits and acts as a milieu, medium, or means within material relations. In doing so, it (noise) establishes itself as the antecedent of a communicative relation that begins before the establishment of a connection between sender and recipient. From this perspective, noise "does not simply destroy but constitutes the relation" (Thompson, 2017, 62), but engages co-constitutively "in the formation of knowledge" (Malaspina 2018, 9). 'Noisy appearances,' when activated in a cross-fertilization of fields as in the associative writing of Gumbs or the interinanimate dripping through of word meanings in Moten, provides a means to access what is rendered out into the imperceptible, becoming apparent despite - or perhaps precisely

⁵ "Information Entropy - A layman's introduction to information theory" can be found at <https://towardsdatascience.com/information-entropy-c037a90de58f> [accessed: 12.10.23].

because of – seeming disparity. As a seeming deviation, which also manifests as glitch or 'mean rendering' in the digital realm, such incommunicative indicators hint at mis(sing)information or a lack of communication.

The essay's transversal trajectory, combining diverse re-conceptualizations from information theory to interanimate writing methods, reflects on the necessity of incommunicative as well as noisy remnants in communication. These emergences, even if not effectively transferred, are essential contributions for discerning missed-out or differing content. This equally pertains to recognizing discerning anything new and breaking free from the loop of reprogramming ourselves into the ever-same framework. If cognition is understood not as static-mechanistic but as subjected to processes of plasticity, knowledge and its attainment must undergo similar transformations.

However, a computational perspective is still widely considered as non-affective, thereby perpetuating "an idea of information as something that would remain unchanged as it moves between contexts, such that data can be raw, pure, and fundamentally nonrelational" (Cecchetto 2022: 8). Nevertheless, considering the incommunicative demands a reassessment of what is deemed negligible noise. To effectively capture unknown or unforeseen information, it requires not merely an expansion of acceptance but rather a reformulation of the definitions of noise (Thompson, Malaspina). Interconnected with these shifts are redefinitions of listening, as explored by Cecchetto in the digital realm and advocated by scholar Dylan Robinson for indigenous ways of knowing. Imperial connotation inherent in the concept of capture, as the sense of 'getting and keeping,' must be acknowledged and thoroughly be redefined. Rather than thinking world (worlding) through possession, expressions must be found for the 'non-static graspable', as something that changes with, by, and through us and we ('our world) with it.

Beatrice Fazi attempts to actively situate 'us' in the world 'we' created by linking Alan Turing's question about machines' ability to think with the pursuit of 'anything new'. A comprehensive response to this reformulated question of whether computational machines can generate novel thoughts, requires for Fazi "re-defining and enlarging the prospect of what rule-based thought might be" (2019, 823). She proposes thus to re-evaluate machinic thinking as a speculative onto-epistemology of its own. Suggesting a technical mentality, as outlined by Simondon, that fosters an inventivism "not afraid of nature, and its creativity" (Massumi, 2009, 38), Parisi orients her research in a similar direction. The core concern is once again how algorithmic thought could be epistemologically defined by its own generics rather than being locked within representations of the neuro-cognitive schema that solely aims to "upgrading scaffoldings of Man's sapience". In applying Wynter's capital-M-interpretation of anthropocentrism Parisi attempts an understanding of computing that by its own technical signs and mentality interactively creates a route that is not "re-originating the universality of colonial and patriarchal cosmogony" (2021, 35, 33).

To free what can be known (thus heard) from the resonance of static echo chambers, constrained to replay themselves within a specific socio-genic setting, might indeed involve confronting a posthuman condition more radically, with all its flaws written into its definition by western epistemology. This includes

confronting the dehumanizing aspects still channeled as presumably inaudible, while simultaneously elevating the machinic as huMan-like and fearing it as superior. To acknowledge the creativity inscribed in human, non-human and technical (socio-)languages means realizing the "alien dimension of the cosmos, of life, of language, of intelligence in order to continue to refuse the planetary extension of neurocognitive automation and its accelerated surrogacies" (Parisi 2021, 38). Its foremost implication is to diminish exceptionalism and relocate the Eurocentric 'us' as one part amongst many human and non-human others and to realize their (incommunicative) murmurations.

7. Conclusion

This essay has undertaken a transdisciplinary interweaving of various fields, ranging from information theory to methods of writing and reading. All these are understood under a consensus of information transfer that necessitates specific abilities of affective listening. The text seeks to develop a more expansive approach to concomitant incommunications, as hints to (dis)missed signals. It tries to excavate deeply ingrained routes that shape the standardized grammar of modern computational technology and confronts them with recent critiques of western modernity.

Commencing with Philip Agré's analysis of the process of capturing (human) activity "as a kind of language" (1994, 108) within the digital realm provides a perspective on the sediments of the contemporary social-technical moment that are poised to precipitate into future memories. Anything not formulated within the current (linguistic/coding) system, i.e., considered illegible and thus subject to entropic dispersal (noise), cannot be rendered as providing relevant information. Contemporary linguistic desedimentation strategies used by writers and scholars from marginalized communities (e.g. Gumbs, Moten, Robinson) dissect the limited comprehension of 'capture'-ing techniques based on 'once and for all' (Barad) interpretations. Access to the systemic is obtained through the relevance of noise in classical information theory, challenging the simplified equivalence of information with negentropy as the exclusion of contingency. Discerning that such a simplified understanding of cybernetics, sedimented as systemic influence into many other fields (Malaspina 2018), demands opening a channel for a less exclusionary filtered listening. This is not meant metaphorically but involves taking recourse to strategies developed and employed by marginalized communities (African American writers, indigenous scholars), as well as artistic-research-based insights. These methods from the fringes of acknowledged knowledge achievement enable a more nuanced discernment and knowledge of what can be perceived beyond settled epistemological grounds.

Subsequently, diverse approaches (Fazi, Parisi) that argue for an 'inventivistic' approach towards algorithmic thought and computation can be explored. In their interdisciplinary entwinement, these approaches eventually enable the disruption of the unconscious socio-genic (Wynter) looping that Agré early on discerned as socio-technical inscription. In my inquiry into noise and listening otherwise, I also ask whether such a shift could ultimately aid in acknowledging the alarmingly increased noise levels (especially concerning inter-cultural themes, as well

as environmental aspects), that are often unheard, especially in the hemisphere shaped by western-universalist-modernity.

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Extending Research in New Media Art Conservation A Bergson-Inspired Multi-timescale Approach

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Abstract

In this paper, we propose a model anchored in the Multi-timescale (MTS) interpretation of philosopher Henri Bergson's theory of time, to analyse and describe the experience of participants concerning media artworks. As Dewey emphasized, experiencing artwork is about active engagement rather than mere passive observation. Therefore, in the context of media art, the term 'participants' resonates more deeply, reflecting their pivotal role in the interactive fabric of the artwork. The conservation of media art, unlike its traditional counterparts, grapples with distinct challenges. It's not merely about conserving physical components or the software environment; it's about safeguarding the essence of the participant *experience*. This endeavour proves to be intricate, given the inherently internal and subjective nature of such experiences. Additionally, the evolving technological landscape, marked by dramatic shifts in factors like computing power and internet speed over the past quarter-century, further complicates this endeavour. When re-exhibiting older works that leverage computer systems and internet connectivity; artists, curators, and researchers face the challenge of maintaining the core participant experience while adapting to contemporary technologies. If we can analyse and describe in detail the participants' subjective experiences regarding an artwork, we will be able to make appropriate judgments when re-presenting it in a different media milieu than the original. To tackle this issue, we propose the MTS model. By elucidating the emergence and sustenance of consciousness in participants, the MTS model facilitates a deeper understanding as to why participants were so engrossed and the internal dynamics of their engagement. Such insights equip us with the knowledge to discern which elements of an artwork are vital for conservation. To validate our model, we reference *Light on the Net* (1996), an iconic net or interactive art piece from a quarter-century ago. The installation featured a 7x7 matrix of light bulbs at the entrance of a building, complemented by a web browser interface. In the 1990s, a latency of around 15 seconds existed between a participant's action and the resulting visual reaction on a web browser. We conducted our analysis in two major steps. Firstly, based on the foundational concepts of Bergson's time theory, we analysed the participants' experience with the work using the key concept, *durée*. Through this lens, it's evident that the participants' experiences were not diminished by the slowness but were rather enriched by it.

To provide a more nuanced understanding of this phenomenon, we aimed to incorporate the MTS interpretation into our adaptation of Bergson's theory of time. Through the MTS model, we could provide a detailed account of the artwork's experiential nuances. To further validate the model's robustness, its applicability to a diverse range of artworks needs to be explored. Moreover, given the chance to evaluate contemporary artworks, we intend to refine our model using tools like the video-cued recall method. While the model is nascent, it has potential for deepening our understanding of existing studies. We hope that our proposal will pave the way for future research and advancement in media art history and conservation.

Ccs Concepts

Human-centred computing → Interaction design → Interaction design theory, concepts and paradigms • Applied computing → Arts and humanities → Media arts

Keywords

Art, Interactivity, Bergson, Multi-timescale, Archival research

1. Introduction

As Dewey (1934) emphasized, experiencing artwork is about active engagement rather than mere passive observation. This sentiment is echoed by Duchamp, who posited that beyond the artwork itself, the involvement of the audience holds paramount significance. In traditional art domains, these individuals are referred to as beholders, viewers, spectators, or observers. Yet, in the context of media art, the term 'participants' resonates more deeply, reflecting their pivotal role in the interactive fabric of the artwork. As Manovich (2002) and numerous artists and theorists have suggested, while virtually all artwork experiences are interactive, this interactivity is especially emphasized in media art pieces (Ahmed, 2018). This participatory essence, while enriching the artwork's experience, simultaneously presents unique challenges, particularly in the realm of conservation.

The conservation of media art, unlike its traditional counterparts, grapples with distinct challenges (Noordegraaf et al.,

2013; Laurenson, 2014). It's not merely about conserving physical components or the software environment; it's about safeguarding the essence of the participant experience. This endeavour proves intricate, given the inherently internal and subjective nature of such experiences. While methods like the video-cued recall proposed by Costello et al. seem promising in capturing the depths of these experiences (Costello et al., 2005; Alarcón-Díaz et al., 2014). However, they come with inherent limitations, especially for artworks from the past where recordings during exhibitions are unavailable. Additionally, the evolving technological landscape, marked by dramatic shifts in factors like computing power and internet speed over the past quarter-century, further complicates this endeavour. When re-exhibiting older works that leverage computer systems and internet connectivity, artists, curators, and researchers face the challenge of maintaining the core participant experience while adapting to contemporary technologies. Determining aspects like latency, integral to the original experience, become paramount.

This is where our proposed model, anchored in the Multiscale (MTS) interpretation of Bergson's theory of time, offers potential insights (Hirai, 2022). By elucidating the emergence and sustenance of consciousness in participants, the MTS model facilitates a deeper understanding as to why participants were so engrossed and the internal dynamics of their engagement. Such insights equip us with the knowledge to discern which elements of an artwork are vital for conservation. For instance, if the artwork's system had a slow response due to technological constraints of its time and this played a pivotal role in engagement, then preserving that 'slowness' and adapting it to resonate with modern-day participants is essential.

To validate our model, we reference *Light on the Net*, an iconic net or interactive art piece from a quarter-century ago (Fujihata, 2016; Paul, 2023). Participants, using a web browser, collaboratively manipulated a light situated in a physical space. Despite its seemingly straightforward premise, the deliberate slow response — a characteristic of that era's technological constraints

— played a central role in captivating its participants. We'll introduce *Light on the Net*, delve into the foundational concepts of Bergson's time theory and analyse the work using this key concept. Subsequently, we'll introduce the MTS model for a deeper analysis, further scrutinize the work using the model, and conclude by pondering on the model's potential and constraints.

2. *Light on the Net*

Conceived in 1996, this work was the product of a collaboration between a university research laboratory led by media artist Masaki Fujihata and an institution dedicated to advancing the information industry¹. The installation featured a 7x7 matrix of light bulbs at the entrance of a building, complemented by a web browser interface (Figure 1). When participants engaged with the artwork via the web browser, the lighting arrangement in the physical space would respond. Simultaneously, a camera captured this luminous

transformation, reflecting the changes directly onto the participant's browser display.

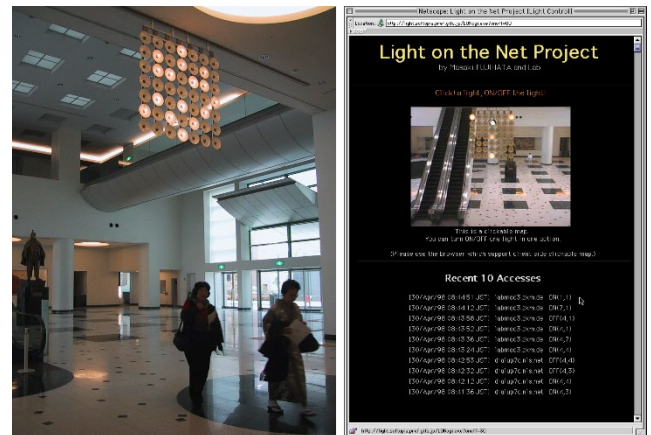


Figure 1: The light in the physical space (left) and the interface on a web browser (right) (photo courtesy of Masaki Fujihata)

Participants were actively engaged, as shown in Figure 2. For instance, one participant illuminated a heart symbol each morning. When another attempted to display the word “HI,” someone else sought to partially erase it, leading to intriguing interactions. Through this dynamic, various exchanges transpired over the lighting equipment situated in the physical space and connected to the Internet.



Figure 2: Timelapse images of *Light on the Net* (photo courtesy of Masaki Fujihata)

The lighting component of this artwork, exhibited for about five years, remains intact and can be displayed again under suitable conditions. However, during a symposium held roughly two decades after its inception, speakers highlighted the marked difference between the media milieu of the late 1990s and today [9]. In the 1990s setting, a latency of around 15 seconds existed between a participant's action and the resulting visual reaction on a web browser. This latency was due to the slower responsiveness of the lighting equipment and the lack of real-time communication protocols, like WebSocket, that could maintain a connection.

¹ Masaki Fujihata Laboratory at Keio University and Softopia Japan Foundation

If this work were adapted to today's media environment, this latency would significantly decrease.

To draw a comparison, Fujihata's 2021 creation, *White Balance*, stands as a testament to the evolution of media art. While *Light on the Net* employed incandescent bulbs and was bound by older web technologies and slower internet speeds (typically tens of kbps), *White Balance* utilizes LED bulbs, harnesses contemporary web technologies like WebSocket, and benefits from today's typical high-speed internet connectivity, reaching speeds of a few hundred Mbps. As a result, in *White Balance*, the latency from a participant's action to the visible response is a swift 0.2 seconds. This contrast underscores the importance of technological context. When considering a re-exhibition of *Light on the Net* in today's media landscape, determining the appropriate latency becomes a crucial concern, as it will significantly influence the participant's experience.

Interestingly, during the symposium, speakers differentiated between two terms when describing the roughly 15-second time span. The first, termed as "latency" or "delay," pertained to the objective time between a participant's action and the subsequent reaction. In contrast, the term "interval" — or in Japanese, 'Ma (間)'

— conveyed the subjective experience of a participant as they awaited a response to their action. Out of the eleven speakers at the symposium, all but Fujihata predominantly used the term "latency" (Iida et al., 2018). Fujihata, in specific contexts, distinctively referenced "interval" (Fujihata, 2018). Behind these terminological differences lurks a significant philosophical issue regarding time within the experience of media art. Indeed, for such explorations, Bergson's philosophy of time seems to offer valuable conceptual tools, emphasizing the qualitative experience of time with *durée* as the key concept. We'll now explore Bergson's *durée* in greater depth to better understand and analyze the experience of the interactive artwork in question.

3. Four Basic Features of Bergsonian *Durée*

In this part, we will introduce four basic features of Bergsonian *durée*.

3.1. Qualitative experience of time

Firstly, *durée* is a lived time, not a measured time. Measured time consists in a comparison of the *time-points*, whereas *durée* is an enjoyment, embodied experience of a certain interval of time.

"The concrete consciousness, compelled to **live through the intervals** instead of **merely counting their extremities**" [emphasis added] (TFW 117 [87]²)

The usual phrase 'measuring time' is misleading in the following respect: it gives the impression that time, as a 'quantity to be measured,' is ingrained in the universe itself, as if it is something to be read. In reality, timing is always nothing but a comparison, or calculating the ratio/proportion of two concrete, real movements.

"It is agreed," he describes, "to adopt as a unit of duration the physical phenomenon which has been chosen as the term of comparison" (ibid.) Alongside the phenomenon one wishes to measure, a moving object designed by a conventional unit system (typically, a clock) is activated, and the moments of its start and end are recorded. This arithmetic difference between these moments is conceived as the quantitative 'value' of time.

On the other hand, our experience of *durée* always lies in enjoying this very interval as its raw material, which makes it *qualitative* in the sense that it precedes comparison, measurement, and quantification.

3.2. Thickness of the present

Secondly, Bergson claims that our present has a certain concrete thickness of time.

"My concrete and complex perception - that which is enlarged by memories and offers always a certain breadth ['épaisseur' in French, literally means 'thickness'] of duration" (MM 26 [31])

"The real, concrete, live present - that of which - I speak when I speak of my present perception - that present necessarily occupies a duration" (MM 176 [152])

This means that our present contains in itself its own past and future.

"The psychical state, then, that I call 'my present,' must be both a perception of the immediate past and a determination of the immediate future" (ibid.)

This feature might remind you of the 'halo' or 'fringe' of W. James, 'protension' and 'retension' of E. Husserl, but you can see an apparent difference in that Bergson defines this length of the present by the *temporal specifications of the sensori-motor system*.

"I conclude that my present consists in a joint system of sensations and movements. My present is, in its essence, sensori-motor" (MM 177 [153])

3.3. Interpenetration of elements

Thirdly, there is a unique, special mode of interaction in *durée*, which is called 'interpenetration.'

"Within myself a process of organization or interpenetration of conscious states is going on, which constitutes true duration" TFW 108 [81]

"Thus in consciousness we find states which succeed, without being distinguished from one another; and in space simultaneities which, without succeeding, are distinguished from one another, in the sense that one has ceased to exist when the other appears" (TFW 227 [171])

In 'interpenetration,' Bergson envisions a kind of temporal fusion among the constituents of the *durée*. In the conventional picture of

² Quotations from Bergson's works are indicated by an abbreviation followed by the page number. The numbers inside the brackets refer to the page numbers in the French PUF edition.

time, one state disappears when the next state emerges. Succession is depicted as an overwriting or replacement of moments. However, in the *durée*, past moments don't just integrate abstractly; they immerse and meld into subsequent moments, unlike in Husserl. This implies a fundamental work of memory, and this memory is clearly said to be pre-personal, as seen in the following quote:

"It is memory, but **not personal memory**, external to what it retains, distinct from a past whose preservation it assures; **it is a memory internal to change itself** (*mémoire intérieure au changement lui-même*), a memory that prolongs the before into the after, keeping them from being mere snapshots appearing and disappearing in a present ceaselessly reborn." [emphasis added] DS 44 [41]

This memory, which does not belong to a person's mental function but enables it, is described as being 'internal to change itself.' Notably, this pre-personal memory is defined in an operational, *depsychologized* manner.

"Without an elementary memory that connects the two moments, there will be only one or the other, consequently a single instant, no before and after, no succession, and no time. We can bestow upon this memory just what is needed to make a connection. **We shall nonetheless have introduced memory.**" [emphasis added] DS 48-49 [46]

In this context, acquiring memory signifies a shift in the temporal structure from a system where moments alternate to a larger one where moments can be connected together.

3.4. Time makes consciousness, not the inverse

Bergson does not presuppose consciousness a priori, *neither in ontogeny nor in phylogeny*, and examines the conditions of its emergence in the temporal dimension of living systems.

"Psychologists who have studied infancy are well aware that our representation is at first impersonal. Only little by little, and as a result of experience, does it adopt our body as a centre and become our representation" (MM 43 [45])

[in the lower organisms, such as protozoa, echinodermata, and coelenterata,] "the complete process of perception and of reaction can then hardly be distinguished from a mechanical impulsion followed by a necessary movement" (MM 22 [29])

The above-mentioned pre-personal memory, understood as the shift of the temporal structure of a system, serves as the *explanans* for the emergence of consciousness.

It's not that there's consciousness first and then an experience of time; rather, the emergence of consciousness is explained by the developmental or evolutionary transformation in the system's temporal structure.

To illustrate, see the following diagrams. In Figure 3, there is a sensori-motor process, a living being interacting with its environment. Figure 4 depicts that when it takes only a shorter duration, the flow would be automatic, smooth, reflexive and, most

importantly, less conscious-provoking. However, when the same sensori-motor system takes a longer duration like in Figure 5, where the flow becomes stagnant, diversified, deviated and delayed, then the system will have a richer phenomenal consciousness.

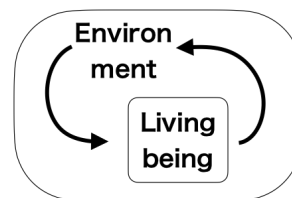


Figure 3: A sensori-motor process

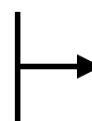


Figure 4: Less conscious-provoking

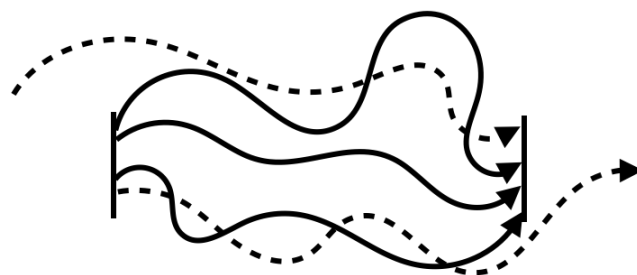


Figure 5: Richer phenomenal consciousness

According to this view, the delay or larger interval of the sensori-motor system, brought by the pre-personal memory, constitutes the very condition of the emergent consciousness. This is why Bergson advocates that creativity requires a corresponding amount of 'delayed' time.

"time is what hinders everything from being given at once. It retards, or rather it is retardation. It must therefore, be elaboration. Would it not then be a vehicle of creation and of choice?" CM 110 [102]

4. Analyzing *Light on the Net*

Drawing upon Bergsonian *durée*, we aim to delve into an analysis of *Light on the Net* (Figure 6). Upon their initial encounter with the artwork, participants are presented with the unique opportunity to manipulate light via a web browser, triggering an emergence of consciousness. In the experience of the artwork, the result of one's action is not immediately confirmed and has to be anticipated. In addition, with multiple participants engaging simultaneously, there is the possibility that the intervention of others may disrupt the reaction. The participants enjoyed the interval, and their consciousness was intensified and sustained. Through this lens, it's

evident that the participants' experiences were not diminished by the slowness but were rather enriched by it. To provide a more nuanced understanding of this phenomenon, we aim to incorporate the Multi-timescale (MTS) interpretation into our adaptation of Bergson's theory of time.

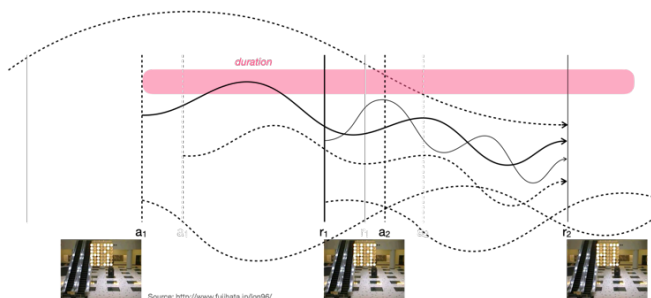


Figure 6: A description of a participant's experience using the *durée* concept

5. MTS Interpretation of Bergsonian *Durée*

5.1. Multi-timescale (MTS) interpretation of *durée*

Firstly, *durée* is not a 'scale-free' phenomenon, but inherent to its own specific timescale. For instance, human's time flow experience doesn't occur in milliseconds or centuries; it resides in the scale of seconds, due to the temporal specifications of our sensori-motor system. Different scales of time lead to distinct forms of 'durée', which in turn suggests a pluralism inherent in the concept of *durée* itself.

"In reality there is no one rhythm of duration; it is possible to imagine many different rhythms which, slower or faster, measure the degree of tension or relaxation of different kinds of consciousness, and thereby fix their respective places in the scale of being" (MM 275 [232])

Not only that, but *durée* is *diverse across species*. More interestingly, *durée* is also multi-layered within a single individual. The 'time of an individual human' is no longer monolithic, but spans multiple temporal layers defined by different intrinsic articulations, which is not reducible to the so-called 'psychological time.'

The overview of the Multi-timescale (MTS) structure of a single human individual is presented in Figure 7, an integrated representation of the various timescales that Bergson discusses in different contexts (cf. Hirai 2022, 56).

At Layer 3, you have a 'personality' or 'character' which corresponds to a life span length of time (roughly 10^{15} sec.). Here, all of your past experiences (Layer 2) are 'condensed' and accumulated in a single personality, which makes it irreducibly qualitative (Layer 3). However, under the usual configuration, changes in this timescale are beyond our capacity of conscious perception.

"our **character**... is indeed the actual synthesis of all our past states. In this condensed form our previous psychical life exists..." (MM 188 [162])

"Our **personality**, which is being built up each instant with its accumulated experience..." (CE 6 [5-6])

At the bottom, you have a physical time layer below humans' time resolution (roughly 10^{-12} in case of the red light). In reality, 8 trillion oscillations occur within our smallest perceptual time scale which is 20 milliseconds. Bergson believes that such a vast amount of events (Layer 0), when condensed, manifests as a *quale*, sensory quality (Layer 1).

"the subjectivity of **sensible qualities** is due precisely to the fact that our consciousness, which begins by being only memory prolongs a plurality of moments into each other, contracting them into a single intuition" (MM 292 [246])

In this picture, the *durée* as a psychological flow experience is located between Layer 1 and 2.

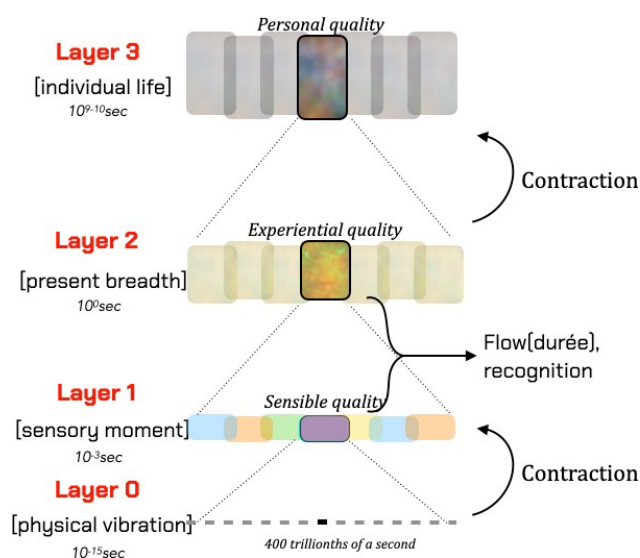


Figure 7 (Hirai 2022, 56): Positioning within the MTS structure regarding consciousness and mind

5.2. Vertical interaction of different time layers

Due to the interpenetration of moments, a moment cannot be determined only by the just-preceding moment, but also by the moments further in the past³ and, most interestingly, by the subsequent moments (red arrows in Figure 8).

"The perceptions which filled the first period of this interval [...] were then really 'loose' ['en l'air' in French, literally means 'in the air'] as long as the decisive part of the event had not occurred" (MM 225 [192])

³ This point has already been noted by Čapek 1971, 159.

What is at issue here is a unique temporal realm where a kind of postdiction or retrodetermination is allowed (Hirai 2022, 116-118), where subsequent events determine preceding ones. The determination is tried but remains ‘on hold’ until the overall trend is determined by subsequent events, as can be understood in case of hearing a single note of a melody. These distinctive temporal dynamics are precisely characterized by the ‘imperfective’ aspect in linguistics.

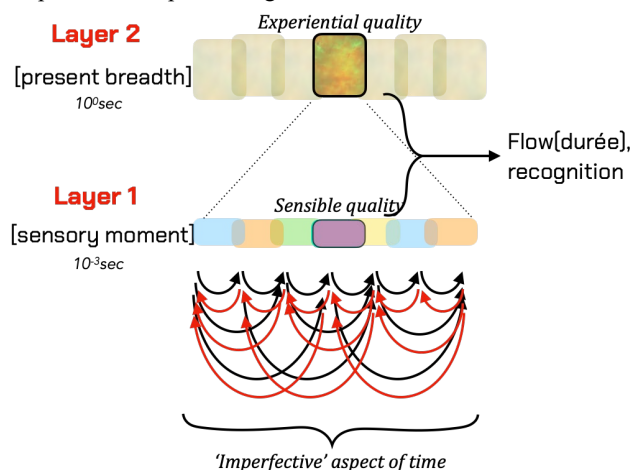


Figure 8: Vertical interaction between Layer 1 and 2

Furthermore, there is not only interdependence between parts (moments), but also between the parts and the whole (period). In the case of Figure 8, the lower time units correspond to what Bergson calls ‘sensible qualities,’ while the higher time units correspond to ‘memory [souvenir]’ (which Hirai refers to as ‘experiential quality’ in alignment with the former). The sensible qualities are equivalent to sensory qualia in modern terms, referring to qualitative impressions that directly correspond to external stimuli, such as the color red or the note C, which are, in Bergsonian scheme, considered as minimum time units of our experience. A large amount of these sensible qualities, interpenetrating in the above described way, constitutes a single experiential quality, that is a memory.

What needs to be noted is that within the Bergsonian framework, the higher time units are not merely ‘broader’ in extension. Due to a kind of condensation, they can become ‘simple’ regardless of their internal complexity (cf. Gestaltqualitäten’ (Ehrenfels 1890)).

“For every event of which the recollection [souvenir] is now imprinted on the memory, **however simple we suppose it to be, has occupied a certain time**” (MM 225-225 [192])

The same temporal event, an interpenetrated *durée*, is constituted of two different time scales that are *contemporaneous*⁴ with each

⁴ Bergson uses the term ‘contemporaneous’ rather than ‘simultaneous’ to describe the temporal coexistence between these different time scales. See ES 157[130].

⁵ The philosophy of time in the Anglo-American sphere has evolved starting from J.E. McTaggart’s seminal 1908 paper “The Unreality of Time,” where a debate unfolds

other. This means that “the formation of memory is never posterior to the formation of perception” (ME 157[130]).

“the situation, **even before it has come to an end**, seems to us something which must form a whole [...] Could we recognize what is being unrolled if we did not know what is still rolled up?” (ME 167 [138])

Here, it’s evident that the conventional model of time progression, which forms a sequence from one moment to the next (Figure 9, left), is being supplanted by a different model (Figure 9, right). This is why, as previously mentioned, the unique dynamism of time is best encapsulated by the ‘imperfective’ aspect rather than the ‘present’ tense, as is done in McTaggart-based analytic philosophy⁵ (Figure 10).

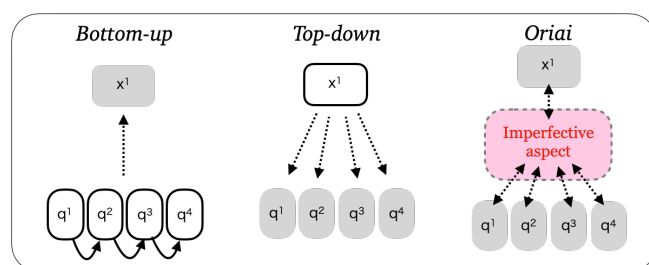


Figure 9: Three modes of determination

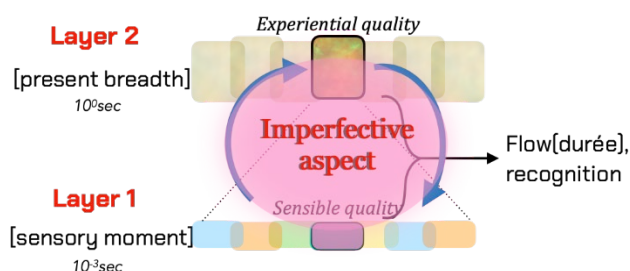


Figure 10: Imperfective aspect emerged between Layer 1 and 2

5.3. The ‘Oriai’ model and the imperfective present

Due to the fact that the linguistic notion of aspect wasn’t as developed as it is now, Bergson struggled with how to express it, and he turned to the Latin term ‘modus vivendi’ to represent this imperfect aspect.

“Does not this **delay**, caused by the necessity in which the scheme finds itself of bringing gradually the manifold elementary images to a **new modus vivendi** among themselves, caused also, in many cases, by **modifications** which the scheme itself undergoes in order to become capable of developing into images — this **delay sui generis** made up of **tentatives**, of more or

between the A-theory, which asserts the reality of tenses, and the B-theory, which denies it. However, the inherent presupposition of temporal sequence in the A-theory itself has been pointed out by Bergsonian scholars such as Deppe (2016; 2021), Moravec (2022), Hirai (2022), and Sinclair (2019), among others.

less fruitful **trials, adapting** images to the scheme and the scheme to images, letting the ideas **interact and intermingle** — does not this delay measure the interval between the difficult attempt and the easy execution, between the learning and the doing of the exercise?” [emphasis added] (ME 219 [180-181])

This quote includes the keywords of the Bergsonian imperfective, such as tentatives, trials, adaptation between the upper and the lower layer, intermingling of the elements, and so on. However, the Latin term ‘modus vivendi’ may not convey all these nuances than the Japanese term ‘Oriai (折り合い)’ does. The latter is derived from the combination of two verbs, ‘Oru (折る)’ and ‘Au (合う)’. ‘Oru (折る)’ basically means ‘to fold,’ and by extension, it can also imply ‘to concede’ or ‘to compromise.’ On the other hand, ‘合う’ means ‘to match’ or ‘to align.’ The term fits perfectly, which is why Hirai named this model the Oriai model (Hirai 2022, 130).

This Oriai model of imperfective aspect has an advantage in that it explains very well why our present experience is so special in its ‘internal temporal constituency.’⁶

Neither the physics that focuses solely on quantitative temporal extension (the eternalism) nor the analytic McTaggartian ‘A- theory’ appealing to ‘tense’ (temporal modality) could explain this specialness. Only the third axe of time, temporal aspect, particularly the imperfective aspect defined by the ‘Oriai’ mode of interaction, would give us a model explaining the ‘immediacy of uncertainty,’ (Hirai 2022, 130) of the tension and instability realized only in this very ongoing moment.

5.4. Extended imperfective: exploratory functionings of memory

Finally, the same ‘Oriai’ imperfective sometimes opens in the upper layers, between Layer 2 and 3. Far beyond the window of the present (Layer 1 and 2), this leads us to the *exploratory interpretation, recollection and invention* (ME 188-223 [155-184], Hirai 2022, chap. 6)

When we try to unravel intellectual riddles or mysteries, an exploratory recollection comes into play. We sometimes find solutions to problems even when the approaching method is unknown. In this context, one cannot simply follow a ready-made formula or a one-way sequential procedure. The meaning of the question itself retroactively becomes clear through the exploration of the answer, which requires some non-conventional temporal structure, which is precisely the ‘Oriai’ model. However, in this case, it does not unfold as a mutual penetration of sensible qualities within the present flow, but rather, within the vast manifold of memories (Layer 2-3).

In an art experience, shifting away from conventional ways of thinking is essential. This involves *altering the resolution of the entire memory* and forming exploratory hypotheses that span different contexts. All these processes are carried out by *transforming the way of interpenetration and organization of our past experiences* stored in Layer 3. In this way, Bergson explains

how re-organizing the system of memory can give rise to a genuine intellectual creativity.

This is why, we believe, the Bergsonian analysis of temporal structure is the key to the understanding of the art experience.

6. Reanalyzing Through the Multi-timescale Model

Moving forward, we seek to reanalyse *Light on the Net* using the MTS model (Figure 11). Initially, when participants immerse themselves in the unique experience of manipulating a light via a web browser, ‘Oriai’ emerges between Layer 1 and 2, and the participant experiences the ‘imperfective’ present flow. Subsequently, anticipations of the future and recollections of the past extend beyond the scale of Layer 2 (i.e., a few seconds). This dynamism unfolds as multiple participants intervene, waiting alongside the complex consequences. As a result, the ‘imperfective’ realm shifts from between Layer 1 and 2 to between Layer 2 and 3. This led the participants to exploratory interpretation, recollection, and thought, which enriched the experience of the artwork. As described above, through the MTS model, we can provide a detailed account of the artwork’s experiential nuances.

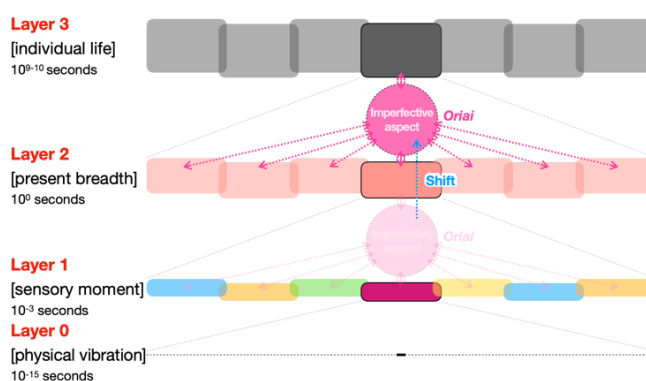


Figure 11: A description of a participant’s experience using the MTS model

7. Discussion

As highlighted in the previous section, utilizing the model rooted in the MTS interpretation of Bergson’s time theory, we were able to shed light on the emergence, reinforcement, and persistence of participants’ consciousness within the interactive artwork. *Light on the Net* holds a prestigious place in media art history, with expert discussions about the artwork meticulously documented. The evolving media landscape further underscores the challenges in conservation. Given its significance and complexities, this artwork was aptly chosen for our initial validation. To further validate the model’s robustness, its applicability to a diverse range of artworks needs to be explored. Moreover, given the chance to evaluate contemporary artworks, we intend to refine our model using tools like the video-cued recall method.

⁶ This expression was used by the linguist Comrie when defining the concept of “aspect.” (Comrie 1976, 3)

While the model is nascent, it has potential for deepening our understanding of existing studies. For example, Krzyzaniak et al. (2022) analyzed an ‘interactive art’ piece hosted on a website, noting that latency from user input to visual feedback didn’t affect user engagement duration. This seems at odds with our discussion on *Light on the Net*. In Krzyzaniak et al.’s research, graphics responded to user adjustments, yet the time lag between action and feedback was mere delay, devoid of any anticipation or retrospection. Through the MTS model’s lens, while an ‘imperfective’ flow was observed between Layer 1 and 2, the absence of a transition to Layer 2 and 3 indicates a lack of sustained attention and its exploratory enhancement. The MTS model could provide a nuanced perspective on such seemingly contrasting results, fostering further investigation.

8. Conclusion

Historically, discussions concerning media art have focused predominantly on the artworks and their creators, often sidelining participants’ experiences due to the absence of analytical models for subjective temporal experiences. In this paper, we unveiled a model grounded in the Multi-timescale interpretation of Bergson’s time theory. With *Light on the Net* as our case study, we demonstrated the model’s prowess in analysing participants’ interactions and consciousness with media artworks. We are optimistic that our proposal will pave the way for future research and advancement in media art history and conservation.

Light on the Net is a prime example where factors like technological advancements, participant interaction, and the necessity to adapt to the changing media milieu converge. Similarly, artworks such as Olia Lialina’s *My Boyfriend Came Back from the War* (1996), John F. Simon Jr.’s *Every Icon* (1997), and Rafael Lozano-Hemmer’s *Amodal Suspension* (2003) might benefit from analysis through our model. Consider the dramatic improvement in personal computer processing speeds. Even if we replicate the original software environment, the participant’s experience will differ significantly from that in the past. It is insufficient to merely approximate the processing speeds from the era of the artwork’s creation. We must also account for the evolved perception of participants, shaped by ongoing changes in the media milieu. Our model offers a framework to identify and analyze various factors impacting the conservation of media art, focusing on the participant’s experience. This approach enables a more nuanced understanding and informed decision-making in the conservation process, ensuring the integrity and relevance of media artworks in an ever-evolving technological world.

Abbreviations

The references to Bergson’s work are indicated by the following abbreviations and English translations, with the corresponding French original page numbers provided in brackets.

CM Bergson, H. (1946), *The Creative Mind*, trans. M.L. Anderson, New York: Philosophical Library. *La Pensée et le Mouvant* (1934), édition critique réalisée par Arnaud Bouaniche, Arnaud François, Frédéric Fruteau de Lacroix, Stéphane Madelrieux, Claire Marin, Ghislain Waterlot (2009).

DS Bergson, H. (1965), *Duration and Simultaneity*, trans. L. Jacobson, Indianapolis: Bobbs-Merrill. *Durée et simultanéité* (1922), édition critique réalisée par Élie During (2009).
ME Bergson, H. (1920), *Mind-Energy*, trans. H. Wildon Carr, New York: Henry Holt and Co. *L’Énergie spirituelle* (1919), édition critique réalisée par Arnaud François, Élie During, Stéphane Madelrieux, Camille Riquier, Guillaume Sibertin-Blanc, Ghislain Waterlot (2009).
MM Bergson, H. (1911), *Matter and Memory*, trans. N.M. Paul and W.S. Palmer. London: George Allen and Unwin. *Matière et mémoire* (1896), édition critique réalisée par Camille Riquier (2008).
TFW Bergson, H. (1910), *Time and Free Will*, trans. F.L. Pogson, London: George Allen & Unwin. *Essai sur les données immédiates de la conscience* (1889), édition critique réalisée par Arnaud Bouaniche (2007).

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Exploring a Digital Art Archive in Mixed Reality

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Abstract

In this paper we report on the work being carried out in the archival and presentation in mixed reality of materials pertaining interactive artworks, in the context of a state-funded partnership project. We describe our approach in scanning and organizing materials as a contribution to an existing online archive of digital art; and in the design and implementation of a mixed reality (MR) application for interacting with archive contents. Digital archives offer expanded possibilities for experiencing the content, which can be tailored to different use-cases and types of content. As frameworks for mixed reality become more common and accessible to a wider audience, an archive can more readily combine characteristics of both the physical and digital worlds to empower the activities of visitors and scholars alike. For this, it is necessary to experiment with newer forms of presentation and interaction, as well as types of content, such as 3D models. We offer details and insights about the processes used and decisions taken in both the archival and experimental aspects of our contribution and conclude with directions for further work.

CCS Concepts

- Human-centered computing → Human computer interaction (HCI) → Interaction paradigms → Mixed/augmented reality
- Information systems → Information systems applications → Digital libraries and archives • Human-centered computing → Visualization → Visualization techniques • Applied computing → Arts and humanities → Media arts

Keywords

Digital archives, mixed reality, augmented reality information visualization, interactive art, user experience, human-computer interaction, embodied interaction.

1. Introduction

In this paper we present the work being carried out in the archival and presentation in mixed reality (MR) of digital materials pertaining interactive artworks, within a partnership project. Our focus has been twofold: gathering materials as a contribution to an existing online archive of digital art; and developing an experimental concept for exploring archive contents using mixed reality.

We start by introducing the context of our work, outlining also the contributions of each partner, and our goals within the project's framework. We proceed with describing archival tasks, which include scanning and organizing printed materials as well as updating the existing online archive. Following this, we introduce a more recent endeavour, the recreation of selected artworks as 3D models for inclusion in the archive. Finally, we present a mixed reality tool allowing participants to explore an

archive, interact with archived materials using their hands and create spatial arrangements with these. We conclude with insights acquired throughout the project, and plans for further work within the remaining time frame.

2. Context and Goals

The work described in this paper takes place at Interface Cultures, University of Art and Design Linz (Austria) in the context of a state-funded partnership project with two other Austrian institutions: the Center for Image Science of the University for Continuing Education in Krems, and the Institute of Digital Art, University of Applied Arts in Vienna. The project is titled *Lehr- und Forschungsinfrastruktur für Digitale Künste an Hochschulen* (in English, *Teaching and Research Infrastructure for Digital Arts at Universities*), abbreviated to LeFo. The project is kindly funded by the Austrian Federal Ministry of Education, Science and Research (BMBWF).

In broad strokes, LeFo concerns itself primarily with the actualisation and expansion of the Archive of Digital Art (ADA, for short) a database freely accessible online, established by Oliver Grau in 1999. The ADA contains information about thousands of works, artists, institutions and other related entities, and has been a valuable tool for teachers, students and scholars in general in the field of media art since its inception (Archive of Digital Art n.d.). The effort includes exploring new forms of access to and interaction with the archive, both in the familiar context of the web browser and in the newer context of mixed-reality devices and frameworks.

Within the larger project, our tasks consist of archival work and development of an experimental mixed-reality tool. Archival work consists of scanning and organizing materials and contributing to the actuality and richness of the online archive. Since the ADA is openly accessible online, this benefits all current and potential users, including researchers, educators and students but also the general public (Kronman 2013). Much of the material resulting from archival work is also meant to be displayed in an experimental mixed reality tool for exploring a digital archive, which we dubbed AR[t]hive (pronounced “archive”). This effort seeks to explore and inform the design and development of future interfaces for digital archives. Presented as an experience for the public, it also serves to raise awareness towards the existing online archive. In our approach, there is a marked emphasis on playfulness and discovery, using forms of interaction that are becoming increasingly common and accessible to a broader audience.

Our contribution takes place as part of the activities of Interface Cultures, a study programme founded in 2004 by the international artist duo Christa Sommerer and Laurent Mignonneau. Having produced over fifty artworks over the past three decades, Christa and Laurent have amassed a wealth of materials related to their works and artistic practice. Among

these is a collection of printed materials such as books, exhibition catalogues, conference proceedings and smaller formats such as booklets or leaflets; wherein are references to several of the works, interviews and other relevant content. The artists can also provide materials in digital format, such as photos or videos of the artworks and visitor interactions, as well as notes and drawings.

3. Archival Tasks

One of the archival tasks has been to revise and complement the information already present in ADA relating directly to the artists and their work. This includes creating entries for artworks that were not yet listed, revising existing entries and uploading additional material provided by the artists (e.g. images and videos). The task was carried out by one of our archivists, with feedback and occasional help from our partners at the Center for Image Science, who manage the ADA. As part of this task, the archivist provided feedback upon ADA's frontend, regarding usability pain points and occasional content editing issues.

The other, decidedly more time-consuming task has been to scan and organize as much of the printed material provided by the artists as possible. As introduced above, this is a collection which includes books, magazines, exhibition catalogues, conference proceedings; and smaller formats such as booklets and pamphlets. There are almost five hundred such items, with each containing at least one meaningful reference to the duo or their work: articles written by the artists, references to one or more artworks in the context of a scholarly article or, quite commonly, descriptions of the works as part of exhibitions and other events. English is the language most often found in the sources, yet many others are also present. Among these, German is quite common, resulting from a continued connection with institutions supporting interactive art such as the ZKM Center for Art and Media Karlsruhe (Germany) or the Ars Electronica Center and yearly festival in Linz (Austria). Likewise, there is a similar amount of material in Japanese, which comes as a result of a long-standing connection to Japanese institutions, most notably the International Academy of Media Arts and Sciences in Gifu (IAMAS, for short) and the ATR Media Integration and Communications Research Lab in Kyoto.

The task is divided into two workflows: scanning and organizing. Scanning consists of producing scans of relevant materials as digital image files, whereas organizing consists of sourcing metadata for the files and organizing these in folders. As the archival task is very time-consuming and has been shared between different archivists, separating scanning and organizing allowed us to divide workloads, working more efficiently and avoiding inconsistencies. All archivists took part in scanning, whereas only one, working longer-term in the project, has been in charge of organizing – the more complex of the two workloads, described further below.

For each source or volume, only relevant references to the artist duo or their works were scanned. If relevant pages were identifiable as part of a larger section such as an article, then the complete section would be scanned. In a way this complies with the existing material available in ADA, where articles but may be found linked to works, artists or scholars. For the volume itself, which may contain multiple articles of relevance, commonly the cover, back and copyright pages were scanned. Other pages were occasionally scanned so that the archivist

could later procure relevant metadata (e.g. editors, publisher, year). Scans were made using a book-edge scanner for formats up to A3, in 600 dpi using lossless TIFF format. With nearly 500 volumes archived in total, this has yielded (in approximate values) 7900 scans taking up 600 GB, averaging 75 MB per scan.

In the organizing workload, the archivist sourced relevant information about the item or volume, the articles or sections of relevance, and which works are referenced. This metadata was then used to compose a unique filename for each digital scan. Scans were placed within a folder structure starting with the year at the top level, with each year containing folders for months and other periods (such as quarter); and these in turn containing folders for each volume, named by authors and editors. In some cases, the information didn't exist (e.g. some books may not have editors); and in other cases, the information could not be found reliably for a number of different reasons. Both cases are handled by the use of special tags.

Storing the metadata in each file's name has advantages and disadvantages. The grounding reason for this choice was to not rely on any additional files other than the scans themselves – such as database files or markup – while keeping the scans organized in folders in a reasonably navigable manner for humans and programs alike. It is a fairly radical way to future-proof the data as a file-system-based archive made up solely of image files and folders. It may also be searched using the basic text search functionality in common file managers (e.g. *Finder* or *File Explorer*). This does not mean that further processing is not possible or desirable – quite the contrary. The folder structure can be traversed by a software program to extract the metadata from filenames and produce any desired format, such as a JSON-format index or even a complete relational database, a follow-up task introduced further below.

As the information is entered by a human agent, and repeated in each filename, there is a higher chance of mistakes and inconsistencies; something which has happened occasionally, and understandably so. One of the most glaring limitations of this method, however, is the size of filenames in different operating systems (e.g. Windows, macOS, Linux) but also in the file system itself (e.g. FAT, NTFS, HFS, ext4). A common limit for the filename itself is 256 characters, including the file extension. In some cases, this may include the complete path from the root of the drive. To mitigate this, we have occasionally had to abbreviate titles and, less commonly, first names to initials. Translating names to a western format also has its issues. For instance, some Japanese kanji characters can have different pronunciations and consequently, different westernized spellings. Also, filenames do not accept some special characters, which were found commonly in art contexts, in many (rather original) titles of exhibitions or publications. Especially in the case that such titles must be extracted and reconstructed from the filename-as-metadata, this means that the result may be incorrect, if by a small degree.

While we do have our basic rules for the task, the archivists have had to intervene and make decisions with relative frequency, sometimes bringing up a specific case for discussion and feedback between ourselves. We tried to keep exceptions to a minimum and signal or document them internally as best we could; but on the other hand, we have also avoided creating

unnecessary complexity and unreasonably extending the workload in a blind effort to adhere to a rule.

As a result of scanning and organizing, we have a primary archive consisting of organized digital scans in high quality, to be kept for long-term reference. This archive will be processed for use in other contexts – namely the ADA and the mixed-reality app AR[t]chive, introduced in detail further below. At the time of writing, work is already underway: a custom program was written to traverse the folders, gather the metadata for each file, and compose an index of scans in JSON format. This index will be used to create a series of PDF documents plus associated BibTex metadata for upload into the ADA; and lower-resolution versions of the scans plus database entries for inclusion in the mixed-reality app. The script which produces the JSON index also checks for errors or inconsistencies in the filenames, and outputs other useful information which helps us to find and address further issues (such as spelling mistakes, or the same name spelled differently in different sources).

3.1. Production of 3D Models

Complementing the materials gathered during the work described above, we had also the opportunity of producing fairly accurate three-dimensional models of some of the artworks by Sommerer and Mignonneau. Common web browsers on personal devices are quite capable of displaying 3D-models, even if simplified to some degree. A good example of this is *Google Maps*' 3D view, which combines satellite imagery with fairly detailed 3D models of buildings and other prominent landscape features (albeit only in specific locations like major cities and famous landmarks). Due to its three-dimensional nature, such content is potentially more informative when viewed in mixed reality and/or on a stereoscopic display, for instance when experiencing *Google Earth* in virtual reality (VR). An earlier example of this is the use of aerial stereograms in military surveys since the 1950s (Paine & Kise 2012).

Online sources, including archives but also shops and other outlets, already offer three-dimensional recreations of a variety of items, for instance: Sketchfab's partnership with museums offering a "platform to publish and find 3D, AR, and VR cultural content online" (Sketchfab n.d: n.pag); the Smithsonian's online collection of a wide range of 3D-scanned artefacts (Smithsonian 3D n.d.); or the *IKEA Kreativ* web and mobile app which allows customers to virtually place furniture in their rooms, seamlessly tying into the purchasing process (IKEA n.d.). Interaction can reinforce the understanding of artefacts and/or the processes behind their creation – an example of this is the *3d Pottery* experiment from Google Arts & Culture (Google Arts & Culture n.d).

The occasion for capturing selected interactive installations presented itself as the exhibition *The Artwork as Living System* was taking place in Linz. We initially experimented with 3D scanning using a LiDAR-enabled iPad Pro and commercial photogrammetry apps, with neither yielding satisfactory results across the collection of works. This was in most part due to difficulties in capturing small-scale details, reflective surfaces, foliage (of which some works have plenty) and low-light environments. Instead, we hired a duo of digital artists, who took references of eleven works on display and recreated not only the works but also the space of the exhibition in 3D. A walkable scene, rendered in real-time with realistic lighting was created in

Unreal Engine. Each work was replicated in great detail, from the choice of textures and materials to the level of detail in complex elements, such as the foliage in some of the works involving plants. The models are not animated nor interactive, however. While an interesting proposal, interactive re-creations of artworks were not within the scope of our contribution. Each artwork model was also exported as a glTF (Graphics Library Transmission Format) file so that it may be made viewed online or indexed in an archive such as the ADA.

For display in the mixed-reality app (detailed further below) the original high-quality models had to be simplified. In a nutshell, detail and overall file size had to be greatly reduced, respectively to cope with the hardware rendering limitations of the mixed-reality headset, and to speed up the download of each model from a media content server. Based on the original models, we simplified the geometry (for a lower triangle count), reduced the size of textures and in some cases removed detail textures (such as normal maps). As an example, the simplified model for *Life Writer*, shown in figures 1 and 2, has 17500 triangles and a file size of 1.9 MB.



Figure 1: Simplified 3D model of *Life Writer*, displayed in textured, shaded mode in *Windows 3D Viewer*.



Figure 2: Simplified 3D model of *Life Writer*, displayed in wireframe mode in *Windows 3D Viewer*.

4. Mixed Reality Tool: AR[t]chive

Much of our initial work in designing and developing AR[t]chive has been described in a previous publication

(Martins et al. 2023). We offer here a recontextualized introduction and brief update of the user experience, for a matter of completeness.

4.1. Background and Related Work

Natively digital archives may hold the advantage in terms of accessibility and researchability. Digital technologies can empower curators and archivists, as well as researchers who want to peruse archived materials, through “new tools to present, collect, access (cultural artefacts), connect, explore, research, manage, and visualize data;” which “embrace interactivity [and] make use of linear and non-linear structures” with reimagined “expressive methods available for displaying and archiving collections” (Grau et al. 2017: 9). Digital archives more easily adopt an “elastic” architecture, literally or metaphorically, “allowing unlimited movement in time and space” and able to adapt to the particular requirements of a visitor or scholar (Bogner 2017: 58).

Within the last decade museums have provided apps for visitors, often resembling games and occasionally augmented reality (AR) experiences (Ding 2017, Katz 2018) in a bid to engage younger audiences. With the increasing interest in augmented and mixed reality applications, the near future may come to see wearable mixed-reality displays or “smart glasses” steadily taking over (and perhaps eventually superseding) the role of nowadays’ smartphones as nearly indispensable and deeply personal tools for communication, information access and entertainment (Azuma 2017).

The body plays a central role in user experiences for mixed-reality, as does our intuitive understanding of a three-dimensional world of objects and people and possibilities for action within (Wagner et al. 2009). Beyond a window into a (hyper)space of flat media, a mixed reality application is inherently empowered to be more akin to a museum or exhibition – albeit one where visitors are encouraged to touch and even play with the artifacts. Consequently, digital archives can embrace aspects of the *Wunderkammer* as “places of play, where the practice of *ars combinatoria* created something new each viewing by recombination, chance, or instant linkage and inspiration,” also as “spaces for day dreaming, unexpected discovery and surprises” (Engelke & Osswald 2017: 280).

These perspectives have inspired our design of AR[t]chive: the possibility of being immersed in an archive that shares characteristics with both the physical and the digital, that exists in a physical, three-dimensional space but is also elastic, that is partly tool and partly toy, offering the freedom to explore and play with archived materials. This approach also synergises with the intended setting for the experience, as part of the overall project: to be shown at events, most notably as part of the traveling exhibition *The Artwork as Living System*. As such it should be fairly easy and pleasant to engage with, while also having value as an experimental design.

The experience is mediated via a Microsoft HoloLens 2 headset, chosen due to its comfort factor, technical characteristics and interactions it enables. The device is quite comfortable to wear, with a form-factor that is still a standard today. The see-through display is embedded in a clear visor,

allowing participants to remain aware and able to act in their physical environment¹. The headset is also natively capable of scanning the geometry of the physical environment, which can be used to simulate physical interactions with virtual elements; and of tracking the user’s hands, allowing for a more natural interaction with digital content.

Among the works that informed our own are *The Living Room* (2001) and *The Living Web* (2002) by C. Sommerer and L. Mignonneau, as immersive intelligent spaces which react to the visitors’ gestures and speech to “engulf” them in images related to their conversations (Christa Sommerer & Laurent Mignonneau Artist Website n.d.). More incidentally perhaps, the project *Naked in Paradise* (2017, ongoing) by Luc Courchesne constitutes an immersive and interactive collection where materials collected from the artist’s personal experiences can be organized and displayed in different ways (Naked in Paradise n.d.). While most of the digital material that we could source consists of two-dimensional media like images, videos and also text, both the work *Legible City* (1989) by artist Jeffrey Shaw and the HoloLens app *Type in Space* serve as great examples of using something as conventional and typically linear as text to compose sculptural or architectural elements and altogether create a landscape open to exploration (Jeffrey Shaw Compendium n.d, Park 2018).

As references for both audio-visual presentation and interaction design, we also considered the freedom offered by creative tools like *Tilt Brush* and *Gravity Sketch*; as well as the colourful open-ended play of modular construction sets (*LEGO* being but one example among many) and digital games offering a similar experience, *Minecraft* the most well-known. This aligns with a more playful or toy-like kit-of-parts approach, as it does with handling collections of discrete items in a digital archive. As a plus, it also conforms to the design guidelines for HoloLens 2 apps: a preference for small elements which can be manipulated with one or both hands, fit within the limited field of view; the use of bright colours, since the see-through waveguide display cannot effectively render darker colours.

In AR[t]chive, visitors can navigate collections of media arranged in three-dimensional space. This is done by directly grabbing and rearranging virtual items using one or both hands, and participants can also create their own compositions, such as mind maps. The archive is composed of materials related to the artworks of Sommerer and Mignonneau. We are using primarily digital format materials (images, videos and text) provided by the artists, complemented by relational information from ADA. A local database with a structure very similar to that of ADA’s core allows for querying and retrieval of indexed media from a server, instead of the HoloLens’ limited storage.

4.2. User Experience Summary

The home scene (figure 3) resembles a “galaxy” of spheres, each representing one of the fifty-plus artworks in the collection. Highlighted artworks, typically those that are also present at the exhibition or event where AR[t]chive is experienced, form a ring closest to the centre, with other works spreading outwards. The visitor can grab a work-sphere and expand it or pull it apart using both hands.

¹ Headsets with stereoscopic pass-through in colour are now becoming the norm (e.g. Meta Quest 3, Pico 4 and Apple Vision Pro) but this was not the case at the start of the project.

When expanded in such a way, a work will open into a “swirl” of related media (figure 4), engulfing the visitor, with a small descriptive plate at the centre showing the work’s title, short summary and a small 3D model of the installation, if available (figure 5). The displayed media items include images, videos, keywords and other related work-spheres. All of these can be grabbed, moved around, placed in three-dimensional space or attached to real surfaces. As before, work-spheres can in turn be expanded into corresponding swirls.

Keywords can also be expanded into three-dimensional word clouds (figure 6), with the origin word remaining at the centre and related words distributed around it. The more strongly related words are displayed in larger size and closer to the origin, and less strongly related words are displayed in a smaller size and farther from the origin. Each of these can in turn be expanded into a word cloud. The cloud also contains a few work-spheres which relate to the origin word.

As result, visitors can navigate the archive by grabbing and expanding items, for as long as they like. To conform to the limitations of the device, only one collection (galaxy, swirl or word cloud) is visible at a given time. A hand menu, displayed when the participant looks at the palm of their hand, includes familiar buttons such as “home” and “back” much like in a web browser. The “back” button returns to the previous collection (swirl, word cloud or galaxy) whereas the “home” button returns directly to the galaxy. Visitors can also return to the previous collection by closing or contracting the current one – that is, by grabbing the item at the centre (the info plate of a swirl or the origin keyword of a cloud) with both hands and bringing them closer together.

Besides the menu, on the palm of their hand the visitor may find two tools. The first is a pin, which can be attached to media placed in the environment and used to create lines to previously placed pins (figure 7). This is a way to let participants create connections between items which they have arranged in some manner, e.g. to compose a mind-map. The other tool is a small inventory box in which visitors can store media they have picked up, by dropping the desired item close to the box’s opening. While attached to the palm of the user’s hand, the box remains relatively small (figure 4). Only the most recent items are displayed and cannot be retrieved from within. However, the inventory can itself be picked up and dropped in the environment, in which case it will become larger, floating above the floor (figure 8). In this larger working configuration, contents are paginated and can be both stored and retrieved. The inventory may be picked up, whereupon it will shrink to a smaller size, and returned to the participant’s hand.



Figure 3: AR[t]chive's home or “galaxy” view.



Figure 4: AR[t]chive's “swirl” view. The descriptive plate and 3D model of the work are hidden in this image for clarity. The participant is holding the inventory box.

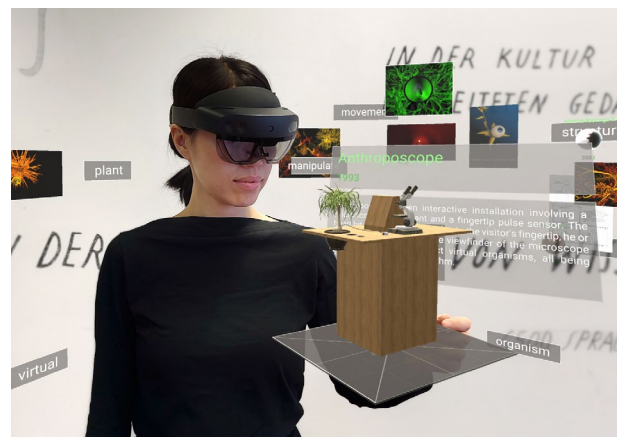


Figure 5: AR[t]chive's “swirl” view, close-up on the 3D model of the artwork, with descriptive plate visible behind.



Figure 6: AR[t]chive's "word cloud" view.



Figure 7: The participant using the pin tool to create connections between items.



Figure 8: The participant examines a keyword. The inventory box is floating above the ground in its expanded state. Five items are displayed at a time and the pagination arrows are visible to either side of the inventory.

5. Insights and Future Work

As the partnership project is ongoing at the time of writing, it is hard to offer definite conclusions, especially in what relates to the usability of the mixed-reality tool. We hope to address this in the future (see below). Nevertheless, with a considerable amount of work done up to the time of writing, we can offer

insights about our experiences and results, besides what has already been discussed above.

Gathering, scanning and organizing materials is a very time-consuming task. The complexity and time needed for the task were initially underestimated, although we have been able to accommodate. Important decisions begin with choice of equipment and methods. The fact that the project kicked off during a time of pandemic-related lockdowns made it harder to try things out, which is advisable before committing long-term to equipment, procedures and workflows. An initial period of trial-and-error should be expected. We do not have reason for regrets, but it is good to acknowledge these needs in advance.

With the outlook of contributing to an existing archive such as the ADA, it is extremely important to have a reliable engagement with the archive's team. This helps to inform decisions about the process of acquisition and processing of materials and avoids putting hours of work into producing content that is then deemed sub-optimal or outright unusable. In our case, close cooperation with a digital archive was inherent to the partnership nature of the project. Nevertheless, involved parties may lack the resources (e.g. time, experience) to provide support or address issues. Communication between project partners can also become a bottleneck for success. Fortunately for us, this was not the case, and we are thankful for that.

One additional thought regarding collecting material to expand existing archives it is that also newer types of material should be collected, supported by newer forms of presentation and interaction. This brings with it questions regarding methods of acquisition, supporting technical frameworks, among others, as some of the digital formats are either relatively new or in constant evolution. Even in the case of digital images and videos, we may find that materials archived in what was considered high quality a couple of decades ago have aged poorly. One way to address this may be using software tools to generate higher-resolution visual materials from lower-resolution ones.

AR[t]chive has been on display at several events for the past two years, most notably as part of the traveling exhibition The Artwork as Living System at the ZKM in Karlsruhe, Offenes Kulturhaus Oberösterreich (OK) in Linz, Art Center for Digital Cultures & Technology (iMAL) in Brussels and the Ars Electronica Festival Campus in Linz. At events, as well as impromptu demos, we have (albeit informally) gathered mostly positive feedback from visitors and participants of different age groups and backgrounds, who are in general very welcoming of the experience. A formal usability study is upcoming.

Initial ease of use seems to vary significantly with age group, with younger participants being generally quicker to understand and fluently use the tool. Context and mindset are also important factors. For instance, some visitors simply do not have the time or patience to engage deeply with AR[t]chive, whereas others are quite fascinated and spend more time playing around. As pleasant and intuitive as a new tool may be, one typically needs to be willing and able to engage with it to fully reap its benefits. There is a difficult balance between having an experience that is pleasant and easy to engage with in an exhibition setting, especially when presented as a companion piece to the works of Sommerer and Mignonneau; and a depth and complexity that can sufficiently inform the design for an actual research tool. We provide panels for quick visual guidance, as well as a looping

video illustrating the user experience. At some venues or events, dedicated staff may be at hand to ease in the experience, answer questions or suggest courses of action.

In the remaining timeframe of the project, we aim at integrating the archived materials with the existing data in ADA. This process, introduced earlier, will be partially automated, with help from our partners to upload a large number of files in bulk (as opposed to one-by-one via the existing web interface, which would be unreasonably time-consuming). The same source materials will also be processed for inclusion in AR[t]chive, where we plan to display them as virtual books which can be expanded into a collection of contents, much like the “swirl”. Once this feature is implemented, we wish to conduct a usability test of AR[t]chive. The goal is to validate the design, uproot major issues and share findings which may contribute to the design of future tools for digital archives and potentially other applications, environments and/or types of content.

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Critical Database as Practice: Hypomnesis and Anamnesis Intertwined

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This paper emerges out of a general critique of reductionist data practices entirely reliant on quantification and analysis, with a particular focus on new media art practices engaged with data and its many representations. By proposing a counterpoint, I underline the notion of database as a critical object by initially providing a genealogy of data configurations and reconfigurations in media art and history. Via the work of the new media curator Sarah Cook, I will provide a brief overview of the shape-shifting forms of data and information in new media art. Subsequently, I will outline the (dis)correlation between database and narrative via the scholarship of Lev Manovich and N. Katherine Hayles. In the next section, I will shift the focus towards data onto-epistemologies while drawing on the interpretive nature of data as an imaginative phenomenon theorized by communication scholars Lisa Gitelman and Virginia Jackson. I argue that this imaginative quality can have a critical dimension which needs to be extended to build narratable imaginaries and materialities that afford the database the opportunity to act as a critical object able to grapple with the impossibility to cognize hyperobjects. My attention in the last section will be centered around the hyperobject as unfathomably complex socio-political circumstances leading to catastrophes as I will illustrate this critical affordance of database through three seemingly disparate case studies intertwined with socio-political catastrophes: Forensic Architecture's 2022 project *Drift-Backs in the Aegean Sea* that documents and archives over 1000 cases of violent border defence practiced at the EU's southeastern frontiers against asylum seekers in the form of a data visualization platform; Morehshin Allahyari's 2015-2016 project *Material Speculations: ISIS*, that provides archival databases on artifacts destroyed by ISIS embedded as flash drives into their reconstruction as 3D prints; and finally my own ongoing project (anonymized) through which I have collected my somatic markers during episodes of watching documentation videos of the recent wave of violent oppression in (name of country) as a large database that I represent as an acoustic experience. To conclude, I will highlight the operative logic of these case studies that by a certain framing of data offer a differential dynamic of information transmission offered by the convergence of embodied and external memory, theorized by Bernard Stiegler as anamnesis and hypomnesis consecutively.

CCS Concepts

Applied computing → Media arts; Digital libraries and archives.

Additional key words and phrases

Data imaginaries and materialities, Critical database, Data narratability, Embodied memory, External memory

1. Context

Given the accelerated mode of data generation, ubiquity of big data practices and their costly sustenance towards their application in every aspect of life and nonlife, concerns have been raised about their *raison d'être* including data collection and analysis, and crucially ethico-politics around such practices that reduce the reality of complex phenomena into data as an extension of the controllability obsession of the systems of power-knowledge. [2, 8, 16, 22]. This paper has the ambition to think differentially about data: to not only go beyond abstracting and distracting from the material basis that data is extracted from but also quantification and number crunching aimed at correlating, patterning, classifying, and predicting as the modus operandi of data practices and an epistemic virtue. Intriguingly, it is not only the fields known to be intertwined with data science that make unquestionable use of such logics, but also a large portion of new media art practices that by relying on industry's 'gold standards' for technological treatment of data for their operation get folded in the same systems of power-knowledge [3]. The aim behind what follows is to probe various inscriptions of data within media theory to then offer a window into alternative data manifestations within new media practices that through adopting a critical lens, posit the antithesis of the "mean", aggregate image constructed by statistical procedures conventionally conducted to make sense of data [24]. Criticality in this context lays emphasis precisely on the phenomena in question where "differences are sharpened and brought into contrast, rather than reduced to the 'blurry' representations of aggregated perspectives" [11]. The select case studies discussed subsequently underline the material origins of data (embedded and embodied in humans and/or nonhumans) to build thought-provoking constructs by offering certain incarnations out of data to raise awareness towards urgent socio-political circumstances. As such, they nurture the technological processes not only with social thickness as Sheila Jasanoff claims [17], to create an assemblage of the socio-technical [18, 26], but also political density towards socio-politico-technical assemblages.

2. From data to narratability

In the opening of her introductory essay for the title *Information*, new media curator Sarah Cook provokes her readership by posing prompts around transmission, reception, and processing of information including a question regarding locality of information relevant to my inquiry: does information reside in an archive? A cloud? [7] In asking this question she is of course interested not only in information-holding substrates but also in networked interactions that make the construction of information possible. Beyond looking at information theory in

its classic embodiment, Cook is interested in the concept of infosphere via the scholarship of Luciano Floridi [13], as a constantly in-flux phenomenon with its life cycle that goes from wire to code, highlighting its infrastructure, format, medium and language and how these dynamics are made, unmade, and remade. In this context, she discusses transmission of information as a flow that can take forms to deliberately include or exclude noise, draw on large volumes or scarcity of data, and that can be visible, audible, legible or illegible. Over and above the support and format, via the words of the artist Hans Haacke [23], Cook discusses the real-world operation and the socio-political impact of information systems re-presented as creative work. But while this type of sharing information can act as a conduit for socio-political awareness, it is perhaps useful to consider that it is not strictly the inherent qualities of data made information that matter as much as the process of its manifestation, given Baudrillard's idea of exhaustion of meaning through the act of communication [5]. In this context, Cook further underlines the artistic manifestation of staged performance of information that does not intend to signify or make meaning as much as highlighting transformation and transmission as an entry point into the context intended by the artist [5].

While Cook discusses many handlings across the data-information continuum, she does not deeply deliberate on the dynamics of transformation, of being data and becoming information. Lev Manovich underlines this shift through foregrounding database as a genre of new media and the iterative process of transforming the database into the narrative form [20]. Manovich posits database as a form and concept in media history that impedes and fragments the discreteness of information and the logic of sense making that relies on causal sequences and predictability. Inherently databases do not offer a sequential logic that will make them legible as such unless they are given a sequence through a particular form that narrativizes data. He calls this open-ended quality and always hidden potentialities of database the anti-narrative logic. In fact, he deems databases and narratives as natural enemies, hence disjointed and uncorrelated [20]. To go beyond the conventional definitions of the narrative form as linear, legible and 'hard-coded', and to take it instead as a container for certain framings of data, N. Katherine Hayles responds to Manovich's deduction with an opposite approach: she finds a correlative relationship between database and narrative in the form of a symbiosis. She compares the database to water buffalo and narrative to a bird that rids the animal from its parasites. In this way, Hayles finds the database in desperate need of narrative for interpretability of data juxtapositions [15].

3. Imaginaries and materialities

As a provocation, however, rethinking what counts as data in the first place and how it is shaped can help in better shaping the understanding of the onto-epistemology of data and its creative applications. As Paul Edwards contends through the term data friction, there has been an abundance of anxiety over the structure, immutability, and comprehensibility of datasets within and beyond disciplinary boundaries to determine what data is and how it behaves [12]. While such anxieties are often entwined with the notion of scientific objectivity in 'hard sciences', in its representability data can go beyond obsession

with showcasing numbers in charts and graphs to instead form eccentric databases where the correlative relationship between data and its representation is tinkered with. As such, it is not unusual to see binaries of quantitative vs. qualitative being questioned by such heterogeneous databases where "data can also consist of words or stories, colors or sounds...systematically collected, organized, and analyzed" [10]. But beyond pondering upon shades and qualities of data, it is perhaps useful to consider that as data is defined and determined as such, it does not just auto-generate and come into existence but needs to be imagined to be configured in specific ways and not others, hence the reason why it is claimed to have never been "raw" [6, 14]. Media and communication scholars Lisa Gitelman and Virginia Jackson allude to this imaginative quality of data by acknowledging that "data are imagined and enunciated against the seamlessness of phenomena. We call them up out of an otherwise undifferentiated blur" [14]. I extend this argument by proposing that this imaginative quality can have a critical dimension which needs to be extended to build a narratability potential against the logic of data as an ontologically reductionist phenomenon subject to a strict rule-based system so that any insider or outsider attempt to interfere with these steps is considered a sacrilegious act to the experts in the field of data science and management.

Drawing on Cook's argument on multitude of forms taken by information transmission, Manovich and Hayles' narrative logics, and the imaginative quality of data argued by Gitelman and Jackson, I make the case that through media art practices that address representation of data critically we deal with an interpretive immanence that reconfigures data into a certain expressive form. Such a potentiality can subvert the disciplinary handlings to cut out certain imaginaries and materialities out of data that affords the database the opportunity to grapple with hyperobjects through narratability defined by its productive formations. Hyperobject, a concept originally proposed by Timothy Morton in the context of climate crisis is theorized as complex conditions beyond our immediate cognition that affect what we know as the normal flow of life [21].

I take hyperobject out of the context of global warming and across its regenerative stance to expand the concept to structural forces that shape the scaffolding of our world which we can only comprehend the depth of through data and its many representations. Here I posit catastrophic socio-political events that their inception and consequences shape the realities of life more for some than for others as a hyperobject and contend that certain materialization of databases as narratives can facilitate the sense making out of such unfathomable circumstances. Through the case studies that I will present, I aim to underscore the creative and critical practices that engage with an against-the-grain reading of data as a generative and not only an illustrative reconfiguration that in their disparate forms, engage with what Lev Manovich refers to as poetics, aesthetics, and ethics of database [20].

3.1. Case study I

As an ongoing project released in 2022, Forensic Architecture's Drift-Backs in the Aegean Sea [4], maps the data on illegal drift-backs of the asylum seekers at the Greek border since 2020. Drift-backing is the practice of forcefully returning asylum seekers to the sea by coastguards trained to do so practiced excessively at the coast of Aegean Sea with frequent

injuries and drowning as a result. Forensic Architecture has collected and pulled this data into an interactive cartographic platform that allows for browsing the evidence of 1081 drift-backs involving 27,464 refugees (figure 1). In this sense, they create an object that if not realistic to be browsed one at a time provides a schematic of the scale of the catastrophe that along with the written description provides a narrative flow of data through encoding and decoding

the evidence as legible narratives, establishing an ethico-poetics where data is not just numerical values populating rows and column of spreadsheets as matrices but is carved into a database that brings direct attention to those assaulted and circumstances imposed on them. However, as the sheer volume of the cases deems the database permeable to the staged performance of information, the goal is not direct and detailed transmission of each and every case but to expose a hyperobject that draws attention not only to brutally violent border measures but also to economic realities linked to local conflicts within the larger scope of international power relations.

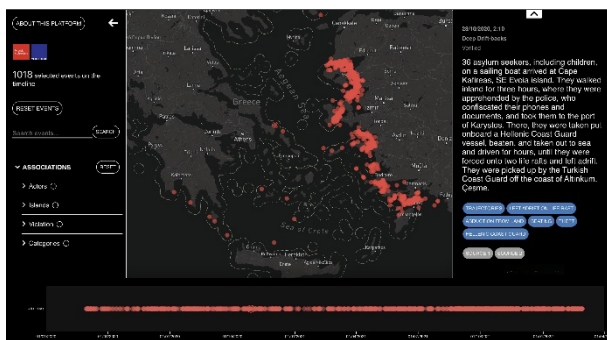


Fig. 1. One case out of 1081 integrated in the interactive platform, selected by clicking on the location of the drift-back on the map.

3.2. Case study II

The second case study is Morehshin Allahyari's 2015-16 project *Material Speculation: ISIS* [1], that provides a database of artifacts destroyed and publicized by ISIS in Hatra and Nineveh regions of Iraq as a flash drive embedded in 3D printed artifacts reconstructed from photographic images. The database provides a heterogeneous web of narratives that resurrect the destroyed objects through a series of images, videos of destructions, documents, maps, 3D files of the objects, correspondence with museum experts where the artifacts were held, as well as documentation of the process of modeling and printing. By way of juxtaposing different formats, of analog documentations turned digital, and digital encodings turned material through 3D printing, the database contains imaginaries and materialities around objects as the focal point of the narrative thread. The rhizomatic relations in the database as Allahyari states "inspects petro-political and poetic relationships between 3D printing, plastic, oil, technocapitalism and jihad" [19]. In her inquiry through certain convergence of data, Allahyari foregrounds archival entities that are anything but static: by open sourcing her models she allows for a constant reconstruction of the archival material leading to an ever-expanding dataset. As archival studies scholar Annet Dekker contends, a digital archive deals with a kind of dynamic materialism where "the default state is re-use instead of storage, circulation rather than centrally organized memory, constant change versus stasis" [9].

3.3. Case study III

The last case study I will deliberate on is my project titled (anonymized) [19], through which I created databases of my somatic markers during a frequent exercise of watching cellphone-shot, social media feed of the socio-political oppression in (name of country) captured by protesters and activists and posted by opposition news channels anonymously. To communicate the sensory qualities of my lived experience of exile as a complex psychophysiological phenomenon irreducible to quantification, I chose a database aesthetics and poetics that encodes my affective data by recording my breathing patterns and my physiological markers to be translated into an acoustic experience. As such, the transformation of affective-embodied residues tied to socio-political oppression into sound reconfigures data into a state of illegibility, a step further than the performative staging of information, to dissolve the data into an entirely new imaginary narrative substrate. Such a reconfiguration draws on sensory intertwinement through data where quantitative measures fail to capture the complexity of stress responses that run deep into historical memory and collective identity formed by overarching socio-cultural structures. By stripping data off its intended use and positing it as an affective medium and a driver for sound, my project evokes imaginaries that postulate data as a relatable mess able to conjure up emotions and facilitate sociality.

4. Conclusion

The case studies discussed touch upon the possibility of exposing violent exercises of power and their ramifications through socio-politico-technical assemblages framed as critical database practices. Given their reproducibility, they offer the capacity for memory preservation by intertwining the technical externalization and extension of memory with embodied memory, what Bernard Stiegler calls hypomnesis and anamnesis consecutively [25]. I infer that by a certain convergence and encoding of data these projects posit a reading of hyperobjects aided by technologies of memory that bypass the urge to position such databases within the archive or the cloud to instead focus on their potential as fluid objects that facilitate the symbiosis between external and embodied memory. But the relationship between these two types of memory is a contested one and for Stiegler an always already a political question which he refers to as grammatisation through which the reproducible nature of mnemotechnics ought to be probed. In other words, hypomnesis is inherently a double-edged sword: a pharmakon as Stiegler calls it: simultaneously a poison and a remedy, destructive and constructive. In symbiosis with embodied memory, it can produce sustainable hypomnesic terrains as critical databases while in accelerated mode it can be an object of desire of techno-industrial control with big data practices running rampant. The question to take into account is how to walk this tightrope in a way that the toxicity of pharmakon can be contained by its restorative potentials?

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Theatre of the documents of everyday: Studying documentation strategies in Rimini Protokoll's city performances via their official website

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Abstract

The paper investigates the body of work of the theatre group Rimini Protokoll via the documentation of their works to identify documentation strategies of their documentary city theatre and performance projects. Most of these projects are based on documents (historical, administrative, etc.) and statistics, and are aimed to be performed in various places around the world. Therefore, the performative structure of these works creates a network of documents within each city project. However, providing a documentation strategy for such works seems to be complex. Due to the ephemeral characteristic of performative arts, these works cannot be fully documented and even after documentation, cannot be able to fully present the original performance project. However, by shifting the point of view of documentation from ontology to historiography, a documentation strategy for such projects can be created in which the possibility for prolonging the existence of these performances over a period of time, along with the possibility for similar outcome for the re-performances/ re-enactments of these works can be provided. Rimini Protokoll's city projects and their website as case study showcase documents and data in their documentary theatre projects, therefore, this paper explores methods which ascertain the possibility of a documentation strategy for time-based documentary arts using this case study. Here, the author identifies a strategy consisting of different levels within each performative project, which investigates the relationship between the subject of the project, its audience and its re-enactments as documents, and the structure of the performance, as an ephemeral architecture.

Key words

Documentation, Rimini Protokoll, performance structure, documentary theatre, re-enactment

Introduction

In most cases, the structure of a performance production is inherently temporary; a performance – as a space- is created within a period of time (present tense), and disappears after that time frame passes. Therefore, finding a strategy to document performance art is -if not impossible- complicated, and even imagining a full documentation of performance pieces seems rather questionable and paradoxical- regarding the characteristic of this media. It was said that documentation can never become as the original performance piece itself, however, it can be an architectural/conceptual representation of the performance piece. In this case, how would it be possible to find a strategy to document a performance piece for the history of performance art,

and for those who could not be present at the time of the performing of these artistic pieces?

In this essay, I will study city projects of the theatre group Rimini Protokoll as an example, in which not only the documentation will be important to understand the main context and structure of the projects, but also documentation is going to be experimented on various levels. It seems that in their projects, the authenticity - as a term- of the performances—as non-documentable phenomena- is intentionally in question via a layered documentation structure.

Following Christopher Bedford's opinion about documentation of performance arts in his paper "The Viral Ontology of Performance" (2012, pp. 77-88), I want to show the networks of documents within Rimini Protokoll's projects and their website, in which the life of each project will extend into the history of arts, from the day the project is performed, to an ever-lasting future. Not only Rimini Protokoll as performance artists play the role of archivists, but the participants and audience who are participating in their performances and viewing their website (and hence, enter into the performative space(s) of Rimini Protokoll) take the role of documenters as well.

I will study the ideas above in three levels, which I call levels of documentation and put an emphasis on the process of documenting each work. Afterwards, I will look at the way these documentations are presented on the website under the level four of documentation.

Methods

Performance studies theorist Richard Schechner argued that there are no remains of a performance after it was performed: "Performance originals disappear as fast as they are made. No notation, no reconstruction, no film or videotape recording can keep them" (Schechner, 1985, p. 50). In fact, most of the early performance studies theorist believed as such. The characteristic of performance is based on existence of it in the present and only present; therefore, considering any possibility of existence of the remains of it after the performing was impossible and also against the nature of the performance - as a radical form of artistic creation which was built in opposition to the integration of other artistic forms with the mechanism of capitalism.

In her 1993 book *Unmarked: The Politics of Performance*, Peggy Phelan puts the emphasis on this aspect of performance:

Performance's only life is in the present. Performance cannot be saved, recorded, documented, or otherwise participate in the circulation of representations of representations: once it does so, it becomes something other than performance. To the degree that performance attempts to enter the economy of reproduction it betrays and lessens the promise of its own ontology.

Performance's being, like the ontology of subjectivity proposed here, becomes itself through disappearance...Performance occurs over a time which will not be repeated. It can be performed again, but this repetition itself marks it as "different." The document of a performance then is only a spur to memory, an encouragement of memory to become present (Phelan, 1993, p.146).

This classic quote also shows another characteristic of a performance piece: its resistance to recording and re-production.

Following on the Peggy Phelan's theory, Jonah Westerman (2018) argues that there are two main point of views regarding the question of re-productivity of performance art. He calls them *absence* and *presence* model. In absence model which is derived from Phelan's ideas, "Performance flashes into existence, only to vanish—it is fleeting, ephemeral, and its power and possibilities reside in this inevitable evanescence. ...it privileges what we no longer have when the show is over and posits that performance exists only there, in that void" (Westerman, 2018, p.7). On the other hand, in the presence model, which is based on Philip Auslander's theories regarding the documentation of performance "...materials used in making a performance and representing it 'after the fact' not only guarantee its continued existence (and later access to the work), but are in fact responsible for its qualifying as performance in the first place" (Westerman, 2018, p.7). What both absence and presence model follow, Westerman says, is to "bind a performance work to an originary moment. On the absence model, this is the irretrievable live moment that immediately recedes. For the presence model, the moment of creation bears authorial intentions invested in a work's relation to mediatization" (Westerman, 2018, p.8).

On his paper "the viral ontology of performance" (Bedford, 2012), and by analyzing Chris Burden's performance *Shoot* and its different versions as documents over periods of time, Christopher Bedford suggests that "art history, art criticism, art practice, and even popular journalism all participate in the extension and reproduction of performance art in the public sphere and are, therefore, in the absence of a conventional "object," as potent and performative as the originary work" (Bedford, 2012, pp. 77-78). Bedford's opinion is about moving the question of ontology, which is the core in Phelan's and Auslander's models, to the question of the position of documentation of performance in the history of arts and connecting its ontology to history: "I want to draw attention to a new concept of the ontology of performance art, one in which a given performance ... splinters, mutates, and multiplies over time in the hands of various critical constituencies in a variety of media, to yield a body of critical work that extends the primary act of the performance into the indefinite future through reproduction" (Bedford, 2012, p. 78). Here, authenticity and origins are not at core, but transition of performance piece into other different formats as documentation, placement (of them as documents) into the history of the performance piece itself as new versions - or "the new originals"- and their place in the history of arts as representatives of the performance piece is: "my interest lies in the conviction that through the reproductive function of discourse, these works become performances through time that reflect the shifting imperatives of art history and more broadly (and importantly), the ideologies of the social worlds in which they intervene and of which they ultimately become a part" (Bedford, 2012, p. 78). Here, Bedford presents his term *the viral ontology of performance* as a suggestion: "This approach in turn forces us to relinquish our attachment to the performance

as primary act and instead submit to the notion that the object of performance art is in fact a long, variegated trace history that begins with the performance, but whose manifestations may extend, theoretically, to infinity. This extended trace history I will refer to as the viral ontology of performance art" (Bedford, 2012, p. 78). Usually, when documenting a performance piece, the starting point would be to take such ideas in terms of determining how and based on what point of view the concept and personality of our chosen performative piece should be considered. It is an important step since it is going to determine how the final documentation should look like.

Among theatre projects of Rimini Protokoll, I am going to specifically focus on five projects: *100% City* (2008- 2022), *Remote X* (2013-2022), *Home Visit Europe* (2015-2019), *Utopolis* (2019- 2022), and *Call Cutta* (2005-2009), since all of them can be categorized under the title 'city projects', or 'site-specific theatre'. In these works, city appears as a subject itself, in which the concepts of the city, politically, geographically and technologically are being questioned. In *Remote X* (2013-2020), a group of fifty participants explore a city, with the guidance of an Artificial intelligence, to practice collective decision making, *100% city* (2008-2022) summons percentages of an official survey about the city as the people on stage who are representing these numbers and data, *Home Visit Europe* (2015-2019) chooses a table as a stage which connects historical and mythical narratives around Europe to the lives of the people sitting around it in a house located in a European city, *Call Cutta* (2005-2009) uses the act of walking around the city as a game in which a caller who is not present in that city guides a person who is present in that city and weaves fiction and history into actual locations, and *Utopolis* (2019-2022), which targets public places on a city such as courts, city halls, and libraries as places of decision making for a future Utopia. These performative projects of Rimini Protokoll can be called documentary in the sense of employing documents such as statistics, geographical data and maps, as well as historical evidences, interviews and personal narratives into creating their theatrical texts and projects. However, unlike documentary theatre format which still abides the rules of traditional theatre space, Rimini Protokoll's projects exit the classical theatre arena (or the rules of this stage) and use techniques of performance art "...such as real-time versus re-enacted presence, interactivity with the audience, and non-scripted, yet structured action" (Fordyce, 2008, p.168). In this case, documents and documentation should be acknowledged via the strong connection to the structure, which in Rimini Protokoll's projects is in the form of the real-time gameplay. The purpose of such projects is to put emphasis on the documents themselves, which are often materials derived from the everyday, and also appreciating "the quality of the everyday: that it is both monumental and ephemeral" (Fordyce, 2008, p. 176). Therefore, in this study, not only the methods which help to preserve the performance piece itself into documentation for the future will be addressed, but also looking at documentation as a subjective history will be the purpose.

LEVEL ONE OF DOCUMENTATION:

Documenting the city and the everyday, as subjects of the city projects

Subject of Rimini Protokoll's city projects like *100% city* (2008-2022), *Remote X* (2013-2022), *Utopolis* (2019-2022), *Call Cutta* (2005-2009) and *Home Visit Europe* (2015- 2019) is

the city itself and how it functions for its residents and people who are experiencing it. Therefore, the core and the starting point for creating such performance pieces is usually statistical data as document. For example, *100% city* uses the official micro-census statistical survey, which as Thomas Gerlach, the present statistician on the stage of *100% Berlin* (2008) describes, “is not about appraisals like ‘my favorite brand of orange juice is ‘Hohes C’ with added fruit pulp’, but it is about the collection of personal data, such as age, marital status, nationality, current or former occupation, main source of income, as well as net income” (Kirschke, M. & Fischer, F., 2008: 02:40). As Ehren Fordyce states, this type of surveys and data are represented on stage with the performance of the bodies of the residents of each city [here, residents of Berlin] “to offer a glimpse into the lived reality hidden behind statistics” (Fordyce, 2008, p. 170).

In such fashion, *Utopolis* and *Call Cutta* work with the map of the city and specific locations on it, and *Home Visit Europe* uses historical and mythological texts regarding the word and term ‘Europe’ as raw material. In fact, document and documentary around these subjects as Florian Malzacher states “is documentary in the sense that it relates directly to the world as we experience it, an experience that often goes unacknowledged or unappreciated” (Malzacher, 2010, p. 80). The purpose of Rimini Protokoll’s projects is to make these everyday data visible. In this case, the performative projects of Rimini Protokoll can be considered as the “theatre of the everyday”, in which the theatre itself will emerge from the everyday and as a creative piece encapsulating it. Therefore, documenting these performative pieces can be considered as ‘creating an archive of/for the theatre of the everyday’, in which ‘everyday’, which had borrowed parts of itself to the performative pieces as documents and data, will give its parts back in the format of documents and data once again, but this time, these documents have founded new shapes, since they had transformed when placed into the creative form of theatre. Documenting such network of data after the production, needs to consider the texts and structure of these pieces -which are based on documentation- and how they interact with the subject of the performance as well, and how they are transformed within the performative piece, and into another version of their own.

Collecting materials via a Game-like structure

In *Remote X* (2013- 2022), city as the subject turns into a playground for the Artificial Intelligent voice which identifies the participants as the horde and itself as a leader: “the horde is gathering around an empty center. I am your center without being present” (Expander film, 2013a, 07:16). This AI challenges each performer’s trust to walk with its instructions and with other participants around the city. In defining the form of documentary theatre, drama theorist Carol Martin explains:

“Those who make documentary theatre interrogate specific events, systems of belief, and political affiliations precisely through the creation of their own versions of events, beliefs, and politics by exploiting technology that enables replication; video, film, tape recorders, radio, copy machines, and computers are the sometimes visible, sometimes invisible, technological means of documentary theatre” (Martin, 2010, p. 17). These technologies as tools –like the AI voice in *Remote X*- showcase different aspects of the subject- here the city.

The idea behind *Home Visit Europe* (2015-2019) is something that makes this relationship more visible. The idea, as theatre critic Christine Wahl describes, is to “transfer of the

material of novels to computer games” (Wahl, C., 2017), which was presented in the piece as “the ingredients of the piece fit into an Aldi bag – a few pieces of bakeware, crayons and a random generator... a few game rules... and the host’s four walls” (Wahl, C., 2017). This technological game-like components not only collect and gather needed documents for each project under a performative structure, but also re-define the concept and the personality of each subject, and therefore, the documents and data related to them (table 1). What needs to be documented then, is this newly transformed subject, within this performative structure.

First Step and Basic Instructions		
City Projects	Technological Tools Or Game Components	Structure and Purpose of the Instruction
Utopolis (2019-2022)	<ul style="list-style-type: none"> • 48 different starting points on a city for 300 people • 48 Speakers as Guides • SMS line for collecting ideas of the participants 	<ul style="list-style-type: none"> • Collective Re-writing of Thomas Moore's Utopia • What society should look like in the future? • Places of Justice and Wisdom around the city as chapters of a book: <ul style="list-style-type: none"> - Town Hall: Chapter of Government - Court: Chapter of Justice - Chapel: Chapter of belief - University Building: Chapter of Learning - Central Library: Chapter of Life - Outside of Library: • Result; Fragments of the new Utopia.
Remote X (2013-2022)	<ul style="list-style-type: none"> • A Path on the City- map, with marked locations • Artificial Intelligence voice/ GPS navigator 	<ul style="list-style-type: none"> • How a group of strangers make decisions? • How a group of people trust AI to guide them? • Audio tour: <ul style="list-style-type: none"> - A peaceful start: Cemetery or Park - A place with Mirrors: Reflection of the horde - Outside of a skyscraper: Forming apolitical movement/protest - Hospital - Re-imagining Theatre on the public space; watching people walking around the horde as actors - Go with the flow: Train - Shopping mall: Imagining the Future - Defining Properties: Parking lot - A Running Competition: Sidewalk - Forming Doubts: Chapel - Destroying the horde: Rooftop
100% CITY (2008-2022)	<ul style="list-style-type: none"> • micro-census statistical survey • program booklet; biography and introduction of 100% city as people 	<ul style="list-style-type: none"> • An Assembly of a sample of society on stage/ We are more than numbers <ul style="list-style-type: none"> - Introduction of 100 people based on their representing percentage on stage. - Voting (Raise your hands if you agree) e.g. "Hands up if afraid to go to certain neighborhood in Berlin at night?" (Expander film, 2020: 27:40)

		<ul style="list-style-type: none"> - Representation of the city in different hours of a day - Me/ Not me division: e.g. “who has been homeless?” - (Expander film, 2020: 41:00) - Anonymous Questions: e.g. “Who destroys e-scooters?” (Expander film, 2020, 56:35) - Personal Statements: e.g. “I will die in the water and that is OK” (Expander film, 2020, 1:01:35) - Competition - Group picture - Conversation with the audience - Predicting future: e.g. “who do you want to be in 12 years?” (Expander film, 2020, 1:21:30) - Either/ or questions - Public Statements
Home Visit Europe (2015-2019)	<ul style="list-style-type: none"> • A Walking Text/ Questionnaire Generator • Baking Equipment • Crayons • Map of Europe 	<ul style="list-style-type: none"> • Finding subjective narratives for the question: What is Europe? • 5 level play around a table: <ul style="list-style-type: none"> - Level one: Uniting people on the table / Questionnaires - Level two: Negotiation - Level three: Decision making - Level four: Competition; Collecting points: Who will get what share of the cake in the end. - Level five: Outcome of the game and dividing the cake
Call Cutta (2005-2009)	<ul style="list-style-type: none"> • Mobile phone. GPS • Specific Locations in the city 	<ul style="list-style-type: none"> • going for a walk with somebody and guided by she or he through the city, who is not present there - Trust making between the caller and the participant - Intimacy between the two - Personal Stories of the caller about locations in the city - Breaking the Trust; change of the caller, informing the participant that everything was a lie - Guiding through the city - Second trust making process - Meeting the caller through a TV screen; end.

Table 1. *Tools, purpose, and structure of Rimini Protokoll's city projects*

Making the subject peculiar via a performative structure

In another statement about documentary theatre, Carol Martin explains: “it is precisely what is not in the archive, what is added by making the archive into repertory, that infuses documentary theatre with its particular theatrical viability” (Martin, 2010, p. 20). Putting that into the case of the Rimini Protokoll’s city projects, the transformation of the subject –the city- inside the performative piece and into something new, creates an excess or byproduct of the performance as the creative structure regarding the city as subject. However, technological tools and the performative structure are not going to be able to make such byproduct of the subjects and their data alone. In fact, what technological or game components do is to activate the subjective understanding of each participant in the performance about the city. As Florian Malzacher argues “...the conventional notion of objective documentary [Documented text and data] is juxtaposed with very subjective experiences, in which the individual and the social are brought together in a way that expands both objective and subjective perception” (Malzacher, 2010, pp. 80-81). These subjective perceptions of the city cause the participants of these projects to take the role of a walker-who walks just for the purpose of walking- while participating/performing. It makes the space and time –the subject- to expand “...so that we might view ephemera with finer detail” (Garcia, G. G., 2018, p. 4). What shows this transformed subject and creating the excess is not the subject itself or technological and game components, but is the experience of participants with the city and within it. In this case, the documentation process of such performative projects is going to need the point of view of the participants as well.

LEVEL TWO OF DOCUMENTATION:

Documenting the experience via documenting the point of views of the bodies of the audience/participants

For the photographer Peter Moore, whose practices in performance documentation in the 1960s and 1970s is still effective in current documentation practices, documentation of a performance in the form of a photo should be captured “from the point of view of someone in the audience in a *normal* viewing position” (Argelander & Moore, 1974, p. 53), in order to “do justice, as much as you are able to, to the intention of the artist, rather than impose your own point of view on it to such a degree that it becomes distorted and unrecognizable” (Argelander & Moore, 1974, p.52). On the contrary, the photographic documentation practices of Babette Mangolte for documenting performance art pieces uses point of view of the audience in order to “capture the mental images that would become what an audience would likely remember of the piece”, the so-called *iconic* images for the piece” (Mangolte, 2009), to “identify with the position of the spectator in the middle of the audience” (Mangolte, 2009).

Although these ideas about photo documentation are implemented on more traditional performance pieces –in which there are ‘performers’ and ‘audience’- they can be helpful here as well. Most of the Rimini Protokoll’s city projects do not have the audience in an ordinary sense. People are as participants in each project, performing the piece while being the audience of it. Here, not only documenting the project –in the format of photo

or video- from audience’s point of view is essential to capture the intention of creators, but also is essential in order to capture the experience of each participant. In fact, here we have to “consider the *audience as archive*” (Giannachi, 2018b, 187). In this case, unlike Moore’s opinion, there is no “normal viewing position” for documentation, but every captured position can be unique, since they capture what each participant is experiencing/co-creating with other participants within the performance.

In addition, the documentation of the experiences of participants is important since they as participants are going to be changed or to be substituted for the next productions under the same title; for example, future productions of *Remote X* will usually not be produced at the same city that were performed before. Usually each time, either a new group of people as participants/performers are going to co-create the performances, or the same participants/ performers are going to come back and collaborate in creating the production once again as the new version. Therefore, documentation of the bodies of the participants in Rimini Protokoll’s projects seems to be a necessary part of the documentation process.

Documentation in this way, is even sometimes part of the structure of Rimini Protokoll’s city projects. Participants are being reminded within the performance instructions that there should be an action of documenting done by them at any time during the performance. They should document themselves or others or other things while they are going through each step of the performance, to capture themselves and others into the memory of the project and into their memories. In *Remote X* (2013-2022), the AI voice tells participant to take picture of themselves when there is a traffic mirror on the street or a reflective surface, because “...it will not be the same again” (Expander film, 2013b, 1:00:12) and therefore, this one-time experience should be preserved for the future (Figure 1). In *Home Visit Europe* (2015-2019), the performance ends with a picture of the whole group as a document of their existence within the performance, as well on the end point of *Call Cutta* (2005/2009), where the participant takes a picture of herself/himself, after visiting her/his caller on a TV screen.



Figure 1- *Remote Tehran* (2018): Participants of the performance document their existence on a traffic mirror in an empty street near Tehran’s city center. Photo by the author.

In addition, what is important for a documenter, regarding the documentation of such networks of documents, is to put her/himself into the position of the participants, look at their effect as byproducts that are remained as traces within the

performance projects, and try to look into the process of documentation in a way than can includes all these aspects as a unit. However, the participant or the documenter here, is looking at this network subjectively, and only from their non-omniscient perspectives. Therefore, “this [method] exposes, to some extent, the impossibility

of capturing a ‘total’ documentation...” (Giannachi, 2018b, p.189).

LEVEL THREE OF DOCUMENTATION:

Re-enactments as documentation

The production of *100% Berlin Reloaded (2020)* puts emphasis on one characteristic of Rimini Protokoll’s city projects which also can be interpreted in terms of documentation processes of such works: Re-enactment. Re-enactments, as Gabriella Giannachi, researcher of new media explains “offer another version, or unfolding, of a work: a past possibility of a work that we can only see in the present, as the yet unlive(d) becoming live(d) because of its re-interpretation and re-enactment” (Giannachi, 2018a, p.129). During the performance of *100% Berlin Reloaded (2020)*, the performers ask the audience if any of them were present on the 2008 version of this show, and then, in several occasions, the outcomes of that past are being reminded to the audience via very simple and personal details: “while Berlin grows and changes, I’ve gained 30 kilos over the last 12 years, and in the last 2 years I’ve lost 30 kilos” (Expander film, 2020, 39: 43). The project of *100% Berlin Reloaded (2020)*, which is not only a performance under the title *100% city (2008- 2022)*, but also is a new version of *100% Berlin (2008)* -the first project of this series- precisely mentions the mechanism of re-enactment and, the mechanism of documenting previous shows:

In 2008 hardly anyone had a smartphone. We weren’t yet discussing the rent ceiling and were convinced the new airport was about to open. Since then much has happened globally, in this city, and in each individual’s lives. So we thought: the time is ripe for a revision, ripe to take another 100-person sample of this city (Expander film, 2020, 03:21). ...the next job was to reactivate as many people that had taken part 12 years ago. On this stage this evening there are 37 people from back then. Two are deceased. Some are in long-term care, some moved. Others didn’t feel like it anymore. Some weren’t to be found (Expander film, 2020, 04:55).

In this case, a new version of the work cannot be repeated precisely, but also that was never the purpose. Under an ever-changing concept of the city and the lives of the people living in it, the aim is not to re-produce, but rather re-construct and that is the reason such works can be called re- enactment; as “originally re-enactments were not so much about *recalling* the past, but rather about re-structuring the past” (Rushton, cited in Bangma et al. 2005, p. 6, cited in Giannachi, 2018a, p.117). In that case, “...re-enactments often *customize* or create a subjective *version* of the past” (Rushton, cited in Bangma et al. 2005, p. 6, cited in Giannachi, 2018a, p.117).

Giannachi continues: “the re-enactments and re-interpretations are valuable insofar as they generate a network of relations between works that then form part of the legacy of each work” (Giannachi, 2018a, 120). These city projects of Rimini Protokoll are created to become as a series, in which as the description of *Remote X (2013-2022)* on their website states “each new site-specific version builds upon the dramaturgy of the previous city “(Rimini Protokoll, n.d.). *Home Visit Europe*

(2015-2019) follows the same logic: “Each performance takes place in different homes and so the performance will travel through hundreds of apartments throughout Europe, building a network that rather than growing from a center, stretches from front door to front door across a continent” (Rimini Protokoll, n.d.). In this case, every previous work under the same title functions as a documentation guideline for the projects in the future and therefore, each project as a series- can be seen as a whole, which is being created via interwoven networks of documents.

LEVEL FOUR OF DOCUMENTATION:

Reading/ viewing the website of Rimini Protokoll, in terms of functionality of documentation

Rimini Protokoll’s website is the space where different aspects of the three levels of documentation are met. It may seem similar to a normal website, divided into various sections in which the projects are categorized. The homepage consists of the information regarding the projects of Rimini Protokoll, along with a menu on top and a sidebar which guide the viewer to discover the project¹. However, it functions more than a normal website. Entering into the process of clicking and opening new pages shows that it more likely functions as a performative space. For instance, there is a network of documents present in the website on the page *Remote X (2013-2022)*, external links to other websites, other media about and around the project, etc. as traces. Traces of documents are there, but cannot be unfolded unless the viewer wants to.

The documents in the website are gathered in a collective manner (they are not considered as all of the documents around projects, since most of the projects are currently on tour, and under the re-enactment in various locations), so, if the viewer commits her/himself to explore more into the inventory, the website then unfolds passages through other unseen documents, and enables the viewer to become like a documenter or the creator of the network of the documents herself/himself. Here, the experience of the viewer is resembling to the experience of the viewer in Johannes Cladder’s *Anti-museum*, in which “they were a reader, a potential collector and curator, a possible critic, a presumed ally of experimentation, someone who could be trusted to take care of art” (Ives, 2021). The structure of website appears as a walking map through and in between documents in which as Benedetti discusses about the viewers of an anti-museum “placing oneself in a direct and unexpected relationship with the works, allowed the viewer to reconsider his/her relationship with them, reaching a sort of visual and critical autonomy” (Benedetti, n.d.), as if the projects themselves are re-enacted and summoned before her/his eyes, so, the viewer of the website, is also the viewer of some of the documentation [of the works], of the documentation [of documents within the structure of the performance pieces].

The website may not provide a total image of what these theatre projects did look like, but it showcases the network of the documents which will not be fully shaped, unless subjectively, and into the memory of each viewer of Rimini Protokoll’s website.

¹ <https://www.rimini-protokoll.de/website/en/>

Conclusion

The strategy of documenting documentary performance projects of Rimini Protokoll can be divided into four different levels. On the first level, the structure of such projects is redefined. There is not a concrete structure present, but there is a form based on a format of gameplays or instructions, with traces of documents marked on different sections of it, which pushes the performance forward. Following this structure, the subject of these performances, usually the city, is transformed. On this level, all the component of such structure, and the procedure of transformation of the subject needs to be documented. However, the documentation of the newly transformed subject cannot be understood unless by the point of view of the participants of these projects. This is the level two of documentation, in which all the present bodies of participants in the piece need to be documented. On this level, another inner level of documentation can be seen: participants capturing themselves within the performance, in order to capture a memory of it. Level three of documentation looks at a method of documenting performances as a unit. Here, re-enactment of a performance can turn into its documentation for the sake of historiography of performing arts. Rimini Protokoll's website as level four of documentation is in fact working as a digital museum/ archive, in which the strategies of documentation can be exhibited. The structure of the website follows in some aspects the structure of Rimini Protokoll's performances; It is a map full of documents as traces, and the viewer of the website takes the role of the documenter in order to collect the documents and creates their own version of Rimini Protokoll's performances in their memories. In this sense, the website of Rimini Protokoll resembles an Anti-museum, showcasing an ideal museum in the new era. Rimini Protokoll's website sheds light on the question of originality, regarding the documentation of performance art, and finds an answer to it, an answer which is close to what Philip Auslander has in mind: "Perhaps the authenticity of the performance document resides in its relationship to its beholder rather than to an ostensibly originary event...[This] pleasures are available from the documentation and therefore do not depend on whether an audience witnessed the original event." (Auslander, 2006, p.9).

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The Digital Archive as Thinking Space

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Abstract

The article explores the revolutionary impact of digital archives, focusing on *performative interfaces*, as demonstrated through the authors' extensive work on the *netzspannung.org* platform for media art and digital culture. Advocating for experiential engagement over conventional searching, the authors introduce a paradigm shift that encourages active participation and a symbiotic relationship between human thought and machine intelligence. Central to this exploration is the concept of *Thinking Space*, drawing inspiration from psychoanalyst *Wilfred Bion* and philosopher *Hannah Arendt*. This vision aligns with *Aby Warburg's Mnemosyne Atlas*, emphasizing both spatial and temporal dimensions featuring dynamic interfaces like *Semantic Map* and *Media Flow*.

These performative *Knowledge Discovery Interfaces* transcend traditional lists, offering intuitive and visual access to extensive data archives. The *Semantic Map*, utilizing *Self-Organizing Maps*, transforms static archives into navigable knowledge networks, ushering in a novel form of learning. Inspired by *Aby Warburg's Denkraum*, the *Media Flow Interface* provides a visually dynamic experience, akin to a walk-in data room. Both interfaces act as visual search and browsing tools, transforming digital archives into accessible *Thinking Spaces* for the public.

The article outlines various applications for teaching and learning that promote a comprehensive understanding of contemporary media art. In summary, *performative interfaces* serve not only as tools, but as media that shape cognitive and sensory encounters. They invite us to get involved, to raise our awareness, and to make us think. Authors *Wolfgang Strauss and Monika Fleischmann* envision these interfaces as models for the future of archiving, emphasizing interconnectivity and the development of *AI language models* to enhance the next generation of digital archives.

Keywords

Accessibility, Co-Creator, Digital Archive, Interactivity, Intelligence Amplification, Knowledge Discovery, Performative Interface, Semantic Mapping, Self-Organizing Maps, Thinking Space.

1. ACCESSING THE DIGITAL ARCHIVE

Today, digital archives still offer access through phonebook-like lists. However, the digital archive is a living (data) culture. More than 20 years ago, the authors developed the archive platform *netzspannung.org* with *knowledge discovery interfaces* that allow people to engage with the archive in an interactive and performative way.[1] This approach enables visitors to become active participants and *co-creators* of the archive's content, rather than passive viewers. It is not primarily about finding familiar information, but about searching and browsing in unfamiliar contexts. The goal is to create a participatory experience that encourages visitors to become data performers in a walk-

through thinking space. This requires a change in the paradigms of interface and information retrieval.

There are basically two types of access to electronically stored data: "sharp" searching and "unsharp" browsing. Searching requires prior knowledge. People must know what they are looking for. Browsing, on the other hand, is inspired by what is presented to the viewer. The basis of browsing is precisely "not knowing," which becomes "felt" knowledge during the browsing process. The maxim of the industrial standard interface is "What you see is what you get". In contrast the authors concept of the performative Interface, reverses this and reveals what is hidden: *what you get is what you did not see*. This is where the process of learning begins. [2]

The performative interface represents a particular characteristic, thus opening up a playing field for improvisation and interpretation. Specifically, it encourages participants to respond to the evocative language of the interface. Wondering about something that becomes visible through one's actions creates a new space for thinking. The *Performative Interface* heralds a paradigm shift, namely the collaboration of self-learning systems, people, and machines. As a counter-model to the black box of *artificial intelligence* (AI), the authors are interested in the concept of *intelligence augmentation* (IA), which arises in the symbiosis of human thought and action and the knowledge of an artificial intelligence. By interacting with this type of interface, viewers are confronted with the reflection of their own choices and actions, making visible the consequences or outcomes that may have been previously hidden. This state of space and time is what we consider to be thinking space. [3]

1.1. Understanding Thinking Space

What space does thinking need? According to psychoanalyst *Wilfred Bion*, "You need thoughts and a space for thoughts. [4] The notion of *Thinking Space* [Denkraum] and the term 'metaphor' play an important role in the philosopher *Hannah Arendt's* writings. In her *Thinking Diary* [Denktagebuch] of 1969 she notes: 'Thought and poetry are connected by metaphor. What is called a term in philosophy, is called a metaphor in poetry. Thinking creates its terms from the visible in order to name the invisible.[5] The cultural scientist *Aby Warburg* understands thinking space in an ambiguous way. It is both a spatial and a temporal dimension. In the 1920s, *Warburg* developed his *Mnemosyne Atlas*, which has become a basic program for image studies. In the library of the *Warburg Institute* in Hamburg, there is an oval room that *Warburg* called the *Thinking Room*. Countless documents, images, and texts are arranged on blackboards.[6] The concept of the *Thinking Space* underscores the importance of creating an environment that blends physical and virtual spaces and that combines human and machine intelligence to foster critical thinking, interaction, and exploration. While this concept does not rely on virtual reality devices or advanced AI methods, it could use basic

forms of artificial intelligence to organize and interact with data to facilitate thought processes. [7]

2. THE DEVELOPMENT OF A PLATFORM FOR MEDIA ART: NETZSPANNUNG.ORG (1999/2001)

Almost parallel to the initiation of the *Archive of Digital Art* (formerly the *Database of Virtual Art*) in 1999, the authors introduced *netzspannung.org*, the online archive and research platform for digital culture. [8] *Netzspannung.org* is not just an archive, but also includes activities such as the *Digital Sparks* (2001-08) competition for universities; *Learning Media Art* (2002- 2004), a cookbook for media art education developed in collaboration with 22 German universities; the streaming and archiving of *Tele-lectures* (2001-04) by renowned artists and scholars using the *Mobile Unit* (2000). [8] At *netzspannung.org*, for example, students, researchers, and teachers could access detailed information about the lectures and the artworks mentioned in them. The platform offers more than 3,500 work descriptions, texts, images, and videos for interdisciplinary education in art, design, music, and computer science. The portal has contributed to the visualization of information in new and unexpected ways, and to the international networking of artists and researchers.

Within the framework of *netzspannung.org*, dynamic interfaces such as *Semantic Map* and *Media Flow* were developed. [9] These *Knowledge Discovery Tools* make it possible to intuitively grasp information in the extensive data archive. They provide an overview, arouse curiosity and above all help to access information visually. They allow information to be displayed in different arrangements, the data pool to be explored and knowledge to be unlocked. In its active period, 1999 to 2010, the platform is a chronicler of media art and media art education in the German-speaking world. Due to a lack of further funding, *netzspannung.org* was handed over by the artists to the ZKM | Center for Art and Media in 2010 and archived there as a *Virtual Machine*. Currently, in February 2024, it is still accessible, but some elements would need to be repaired due to outdated software to make the videos and documents fully accessible again.



Figure 1: *Netzspannung.org* homepage (2001)

It all began in 1998 with an e-mail survey of the international art community, the answers to which became part of the pioneering idea for the *netzspannung.org* concept. The idea of a web-based and distributed archive was the most frequently mentioned keyword, the artists noted, technically new and not easy to find partners with the necessary expertise and vision. The authors' vision of a digital archive was

inspired by the words of AI pioneer *Marvin Minsky*, who said in an interview at the 1990 *Ars Electronica Symposium The Future of the Fusion of Science, Art and Psychology*: "Can you imagine that in the past there were libraries where the books could not talk to each other?" Following this idea, the *netzspannung.org* database was computed by an artificial neural network and trained to create self-organizing knowledge maps.

3. NEW FACES OF THE ARCHIVE: KNOWLEDGE DISCOVERY INTERFACES

The authors have developed rhetorical figures of data presentation to extend the experience of searching and finding. The *Knowledge Discovery Interfaces* were designed to allow participants to search information and discover knowledge through various visual interfaces. Knowledge visualization follows the mental model of the 'map' and the 'flow'. Accessible via a browser or as a spatial installation, these interfaces represented a departure from traditional lists and instead used synchronous visual modes to present data. The aim was to map a genealogy of knowledge about media art on the educational platform by linking artworks and lectures, artists and scholars.

3.1. SEMANTIC MAP: A RADAR FOR THE DATA COSMOS (2001/04)

The *Semantic Map* is a tool that helps to visualize and analyze information in the digital archive. The calculation of the database entries is made by means of a trained *artificial neural network*. *Netzspannung.org's Semantic Map* is based on the principle of *Self-Organizing Maps* invented by *Teuvo Kohonen* in the 1990s, which uses semantic text analysis to 1) uncover content connections between texts, 2) identify similarities, 3) generate keywords, and 4) summarize the documents into thematic clusters. This process is iterative. Each new document input changes the map and influences its structure. [10] The *Semantic Map* represents the digital archive in a way that goes beyond the individual object and presents it as a virtual cartography. Searching and finding, overview and detailed view are combined on one and the same interface level. It is an operational image that evokes movements of thought.

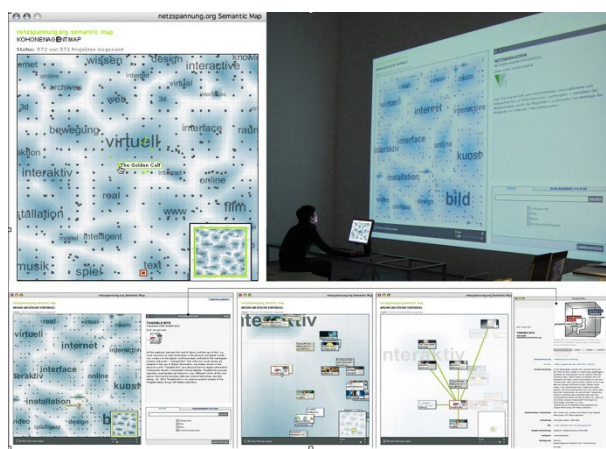


Figure 2: *Netzspannung.org's Semantic Map* (2001-04). Browser Interface and spatial installation

The *Semantic Map* is a tool that helps to visualize and analyse information in the digital archive. The calculation of database entries is based on a trained artificial neural network. Netzspannung.org's Semantic Map is based on the principle of *Self-Organizing Maps* invented by *Teuvo Kohonen* in the 1990s, which uses semantic text analysis to 1) uncover content connections between texts, 2) identify similarities, 3) produce keywords, and 4) summarize the documents into thematic clusters. This process is iterative. Each new document input changes the map and influences its structure. [10] The *Semantic Map* represents the digital archive in a way that goes beyond the individual object and presents it as a virtual cartography. Searching and finding, overview and detail view are combined on one and the same interface level. It is an operational image that evokes movements of thought.

The *Semantic Map* transforms the database archive from static information store into an artificially intelligent, navigable network of knowledge. The synchronous optical interface combines both visual and text-based search. Archive entries are relationally located, and semantic connections are made visible. In this way the *Semantic Map* is a first approximation of *Marvin Minsky's* statement quoted at the beginning: "Imagine if the books in a library could talk to each other." The experience of browsing the *Semantic Map* is similar to walking through an exhibition, where the viewer sees more than just one isolated object. The documents of individual works and artists appear as nodes in a network of thoughts, topics and practices. The 'reader' of the map discovers information through differentiation and thus becomes a co-producer of meaning. Therein lies the performative act of viewer and interface. It aims to break down fixed categories and enable associative thinking.

On the occasion of the exhibition "Resonance: Looking for Mr. McLuhan," *Berta Sichel*, guest curator of the *Pratt Manhattan Gallery*, *New York* comments on the *Semantic Map*:

"Will future formats create a new literacy? McLuhan was sure that sooner or later mass society would see print and linear culture replaced by tactile and electronic culture. Somewhat along the same lines, Fleischmann & Strauss's Semantic Map creates an unconventional digital archive for the interdisciplinary field of media art, where no cross-subject system exists. It works as a virtual art encyclopedia whose level of information increases with each user. As McLuhan often said at the end of the 1970s, "The user is the content;" he wasn't speaking in the context of an electronic digital archive, but his thought is confirmed by this piece, where the user generates his/her own content".[11]

In 2005, *Semantic Map* was awarded the International Media Award for Art & Science by *SWR* and *ZKM*.

3.2. MEDIA FLOW: BROWSER AND INSTALLATION (2006)

Thought in flow, that's what the *Media Flow* interface is all about. The entire content of the *netzspannung.org* archive is visible at a glance. Parallel streams of images and words run across the projection screen, providing titles, authors, and keywords. Images of projects and authors move in front of the viewer. The documents stored in the database are brought to life, both visually and acoustically. A large touchscreen

interface translates images and words into scrollable ribbons, ready for selection. Related documents are visually linked and highlighted. *Media Flow's* visual and acoustic spheres create the impression of a walk-in data room. Taking a narrative stance, static information from the archive seems to flow around the visitor. [12]

The formal structure of the *Media Flow* installation is reminiscent of *Aby Warburg's* art concept of a *thinking space* - his *Mnemosyne Picture Atlas*. In the 1920s, he developed his *Denkraum* (thought space), a collection of photographs, documents, and texts arranged on panels, into a thinking space.

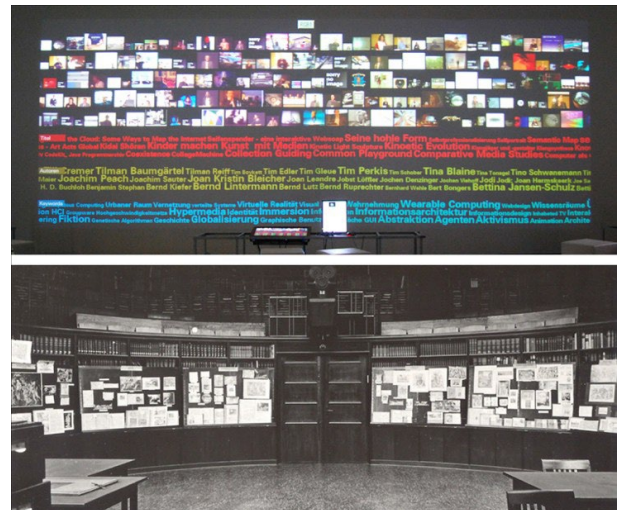


Figure 3: Netzspannung.org's *Media Flow* Installation (2006), *Aby Warburg Mnemosyne Atlas* (1929)

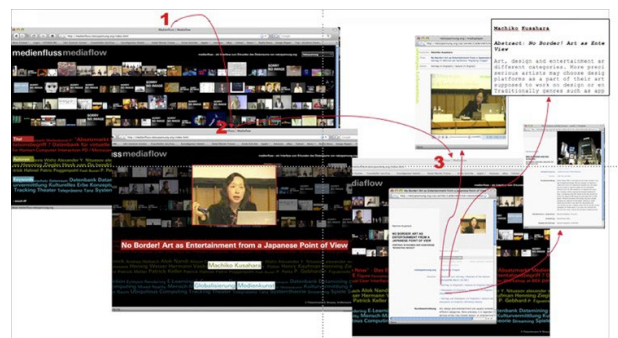


Figure 4: Netzspannung.org's *Media Flow* Browser (2007)

These wooden panels were not intended to appear in a fixed order, but rather to continually evoke new insights through the arrangement and rearrangement of the documents. Instead of Warburg's variable image panels, the *Media Flow* consists of streams of information that can be freely selected and rearranged.

Art historian *Daniel Becker* explains:

Media flows such as *Mnemosyne* are correspondingly (...) fragmentary and therefore only the source or origin of a body of knowledge; the actual formation of knowledge arises through decisions in the interaction, reception or (re)configuration of the existing content by the user over the course or, better, in the flow of time. Similar to Warburg, but

algorithmically controlled, the fluid interface allows for arrangement and rearrangement, thus initiating a dialog between viewer and content. This method explicitly allows for mind games, and so the digital archive becomes a space for thought movement. (...) "The work of Fleischmann and Strauss thus enriches the discourse on knowledge collections, because here it is not a matter of targeted searching, as in a classical archive search that is linked to prior knowledge, but of browsing and finding. This affirmation of media-savvy surfing in the data pool of an online database is inscribed in a long history of concepts for "storing, archiving, and collecting data." [13]

4. THINKING SPACE IS LEARNING SPACE

Performative interfaces such as *Semantic Map* and *Media Flow* are visual search and browsing tools, both on-screen and in physical space. They transform the digital archive into a medium and a format that can be staged and exhibited as a thinking space that is accessible to the public. [14] They provide a quick overview of archive content and direct access to individual documents. Through the openly visible creation of relationships between works, texts, and lectures, a new form of learning is practiced as thinking in contexts. Part of the *Knowledge Archives* exhibition at the *Edith Russ House for Media Art* in Oldenburg, Germany (2008) was to use *Semantic Map* and *Media Flow* for teaching and learning. Between the large installation screens were intimate research stations in the exhibition space, set up like workstations for archivists. Students visited the installation with their teachers to deepen their knowledge of contemporary media art and theory. They browsed the *Media Flow*, learned about comparative works, and gained insight into the media art they were discursively discovering. The synopsis of overview, context, and detail allows for comprehensive orientation in the archive, combining classic keyword access with newer approaches of associative conceptual networks and visual search. *Media Flow* has been awarded the *IF Communication Design Award* 2007.

5. CONCLUSION

Performative interfaces, such as the *Semantic Map* and the *Media Flow*, are not only a tool, but also a medium and a manifestation. Ideally, a performative interface can be used without any prior knowledge and then does not give the feeling of being connected to a machine. Rather, this the performative interface conveys the content and structure of a digital archive as a cognitive and sensory encounter based on a neural process of interaction and perception. The performative interface draws attention to something unknown. This initial trigger intuitively invites the audience to participate. The interface's evocative effect heightens awareness of one's own activity. The way participants think, perceive, remember and communicate is influenced by an unfolding process. If one understands the performative interface as something that lays a track to something not yet known, the reading of traces becomes a prerequisite. In the act of inner speech, meanings are played out into interpretations. Interactivity appears here as hermeneutics to go, a game as a means to of understanding, where 'game' refers to role-playing rather than the game of competition. The reader tries to interpret the clues to uncover hidden meanings using natural intelligence, not artificial intelligence.

At the opening of the exhibition "Interfacing the Archive" at the ZKM in 2012, *Peter Weibel* expressed his respect:

"Netzspannung.org and its groundbreaking interfaces create new structures for thinking and working with data. What has been achieved here is a model for an educational infrastructure that deserves international recognition and imitation." [15]

Originally, the interfaces presented here were to be accessible online until 2017. Due to technological dependencies, they are currently only available on site at ZKM. Twenty years ago, these *knowledge discovery tools* were hand-crafted and, in some cases, rapidly evolving. Today, these interfaces are much easier to replicate and repair. But their significance is that they were - and are - models for the future of archiving. The *Semantic Map* supports the comparative view and challenges the way of thinking. The *Media Flow* is a demonstration of the principle of serendipity and leads to discovery.

The *Semantic Map* is a small-scale demonstration of how semantic text analysis and a neural network can be used to develop an AI language model for media art and thus connect different archives. The *Media Flow* suggests: The digital archive can go live as an audiovisual chat with original voices. The strength of the future archive lies in its interconnectedness, which encompasses various archives by using AI to collect data from multiple sources. Each individual archive will remain independent, but the interconnectedness can result in a kind of wiki for the media arts. As a consequence, this means that an underlying AI language model for media art will need to be developed for the next generation of archives.

A wish for the future: The authors' VR project *Home of the Brain- Philosophers' Houses* (1991), winner of the *Golden Nica* at *Ars Electronica* in 1992 and described by art historian *Oliver Grau* as one of the first memory spaces, offered interactive dialogues with media thinkers. Visitors could navigate through the "buildings of thought" of *Joseph Weizenbaum*, *Marvin Minsky*, *Paul Virilio* and *Vilém Flusser*. Using a head-mounted display and a data glove for exploration, the thinkers were represented by their disembodied voices. [16] The extension would be to allow other voices to be heard. Keyword dialogues could be exchanged between opposing opinions.

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Testing The Dandi Line: A Look at Livestreaming as a Medium for Interactive Art through a Pandemic and Beyond

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Abstract

Livestreaming is a medium that fits squarely into the lineage of digital media and interactive art. The huge presence of free and open-source tooling from online developer communities provides artists the ability to create entire broadcasts without specialized training or knowledge, using affordable computer hardware they already own. The tools are also versatile enough to create unique content combining media such as sound, video, interactivity and performance into one unified multisensory experience for audiences to enjoy from the ease and comfort of their homes. This format can foster the growth of unique communities that transcend geographic and cultural boundaries, audiences intimately connecting with creators and each other alike through shared experience and real-time communication unlike any other platform in the digital realm. These communities in large part were catalyzed by the emergence of the COVID-19 pandemic, when entire societies were forced into quarantine with only the internet to facilitate their social interactions and media consumption.

It was in this moment where Dandilion Wind Opaine and Matija Erceg pioneered in the migration of artists into the livestream space through their groundbreaking project “DandiDoesIt”. This series follows the “Dandi Line” of clone products in a futuristic capitalist dystopia run by “The Company”, where employee “testers” (the audience) gather to evaluate each new Dandi according to Company guidelines. The show (which Dandi and Matija describe as a “Live Performance Video Game” or LPVG) includes an approachable aesthetic that combines science fiction and 1980s jazzercise, with a cast of recurring characters and ongoing story arcs that invite audiences to actively participate and take part in the performance itself while also reflecting on the depth of the show’s satire, which conveys multifaceted and profound commentary on the world and society in which we live.

This paper will demonstrate how livestreaming has yet to be sufficiently recognized in the broader history of digital art scholarship. Its potential as an effective medium for art will be made evident by deeply examining DandiDoesIt as a case study, including a short survey of their contemporaries in the interactive audiovisual livestreaming space. Then, the realization of that potential will be made evident by positioning these project examples into the context of not only the pandemic, but also into our broader contemporary movements of society, technology, politics and art in which they continue to reside.

Introduction

While the world’s population isolated themselves into their homes in quarantine, Dandilion Wind Opaine (Dandi) and Matija Erceg were hard at work breathing life into a platform

blossoming from the effects of the pandemic’s forced physical isolation, through their work on their Live Performance Video Game (LPVG, also referred to as “the show”) that has captured the minds and hearts of thousands of dedicated testers: DandiDoesIt.

The show posits itself in the space between performance art, video game and social club, with a slew of interactive elements and well-established lore that places it as an innovative project in the space of new media and interactive contemporary artists, and a seminal one in their medium of livestreaming, the full potential of which for artmaking is only starting to be explored as catalyzed by the cultural shift due to the the discovery and spread of COVID 19.

Dandi is a multidisciplinary performance artist and musician, while Matija is an engineer, graphic designer and new media artist, both based out of their home in Vancouver, BC. The pair is mostly self-taught (Dandi having gone through a stint in art school and Matija with an undergraduate degree in architecture), since having achieved a level of mastery of their craft that has led to wide-spread esteem (artist Grimes has listed Dandi as an inspiration, and their Twitch channel has about fifteen thousand followers with hundreds watching on any given day, a significant influence for the burgeoning art scene on the platform). With their project, they have created a space that bridges the boundaries of geography and culture, one that has cultivated a community around the fictional world they have created yet one that provides profound commentary on the state of the real world we all inhabit.

Dandi #452-454

Set in a sci-fi world 1000 years into the future, the show takes place mostly within the manufacturing center of the Dandi Line, a production line of offsets (essentially clones) owned by mysterious corporate hegemon “The Company” (Figure 6). Its structure is episodic, with a similar format to every stream making it accessible to new viewers but with narrative arcs and story developments happening over the course of the series. One of these episodes in particular illustrates both the Dandi Line structure and also the show’s capacity for significant (even unexpected) developments to its overarching chronology: April 20, 2021, or Dandi #452-454. The stream was highly anticipated by testers and creators alike, partially because of the cultural significance of the date as well as the rumor surrounding a special musical guest, spread throughout the community on various social platforms and other Twitch streams.

Starting in familiar fashion, a yellow countdown appears within the viewer’s Twitch window, overlaid onto an other-worldly landscape in purple and blue - the setting of the show’s sci-fi fiction from year 3021 (Figure 1). The countdown ends, an eerie yet hypnotic title sequence plays (Figure 2) and we are

brought into a dark void, where Dandi 452 is revealed in her incubation tube, in awe of her newfound perception of the world (Figure 3).

Dandi is an offset - a clone constituting one of many in the Dandi Line product series owned and operated by The Company. She is recognizable as such via her distinctive numbered tattoo on her left thigh, an identifier that helps to not only orient the viewer but also track the impressive duration of the show's journey.

This Dandi provides a warm welcome as company employees start to file in and check-in for their shift - their job as quality-assurance testers responsible for assessing this Dandi's fitness for sale to one of the Company's high-end clients. The testers are the show's audience on Twitch, using the chat feature as an interface to enter into the story's narrative and interact with both Dandi and Matija, who plays the role of a hovering metal box-like robot and "Company man" figure named FIXr who serves as The Company's handler for the Dandi Line (Figure 5). FIXr passes his greetings, acknowledging this as the first time he has ever entered into the tube scene. This prompts Dandi's response asking if this means she's a special Dandi. "Absolutely not. You're just another offset", FIXr responds, "Today (4/20) is a special day though, the Company wants it to boost morale," as he introduces the night's musical guests and score composers, band LuvULovesYou (Figure 4). The requisite 420 check-ins are achieved, and Dandi is released from the tube into the primary testing pod scene to begin her new life. She dries herself off with a towel, proceeding to change into her standard-issue tight-fitting uniform fit for the Starship Enterprise (Figure 8).

Testing proceeds as usual, playing out with the aesthetic of a dream-like jazzercise session. Dandi dances to the hypnotic disco tunes supplied by musical guest LuvU in aim of winning the testers' approval, while they speak to her and interact by throwing vitamins for her to eat or tomatoes for her to dodge, sometimes changing the color of her suit. They are responsible for "passing" or "failing" each Dandi based on the criterion of "pep, positivity, and playfulness" (PPP). Dandis that pass are sent off-world to their "destiny," to be sold to high-profile clients who have purchased the Dandi for unnamed futures, but heavily implied lives of servitude that even beckon towards a notion of slavery of which Dandi herself is blissfully unaware.

On the other hand, Dandis that fail are "decommissioned", leading to a vivid on-screen death sequence that the viewers themselves are complicit in inciting (Figure 9). In rare cases, the Dandis that make a strong impression may stick around the Company's domain to fulfill different jobs and re-enter the narrative in future streams. In this particular case however, Testers decide that this Dandi passes QA after about thirty minutes of testing. She joyfully cheers and prances off to grab her briefcase in preparation to get transported "off-world" to her Company assignment (Figure 14).

The stream returns to the countdown screen, quickly interrupted by a video that says, ominously: "here at The Company, we love unity; not unions. We don't pay annual fees - we spread love and brand synergy. Namaste." (Figure 15) In the show's lore, The Company has taken majority control over the commerce of the universe.

This leads into an overt (albeit facetious) authoritarianism at play between The Company and the testers, and sometimes even Dandi herself, often demonstrated by propaganda and cult-like messaging as the one just described. Dandi, who appears to the

audience as a human being, is just a product - a chattel slave to the corporation that birthed her as one of many to fulfill their own purposefully undefined business. This ominous undertone is obscured by the positive and infectious energy that Dandi exudes during her performance, her character blissfully unaware of the ethical problems at play while the audience have control over her fate and her body. Thus, the testing process itself, which by far takes up the majority of the show's runtime, points out a poignant irony in its satire - the audience implicated into this problematic capitalist fiction through their very presence and participation. They are vital to the show's progression and thus, responsible for the continuation of the destructive practices portrayed by the Company, beckoning reflection into their own lives and the role they might be playing in contributing to destructive practices in the current capitalist zeitgeist.

Each Dandi is also equipped with a "mood chip", which the company uses to control the Dandi's mind and emotional state. Sometimes a tester will suggest that Dandi remove her mood chip, which FIXr quickly tries to persuade Dandi otherwise if he is around. When a Dandi disobeys FIXr by taking off her mood chip or in some other fashion, she will often display newfound awareness of her captivity, followed by visible performance of fear and despair ultimately leading to a "failing" verdict and dramatic portrayal of death brought about by testers (sometimes under coercion) before the cycle starts all over again.

This time however, after Dandi #453 is released into the pod, regular tester MakeMistakes "promoted" his 666th tester to the Company, prompting what can only be described as a flash mob of testers using alternate Twitch accounts (all with the numbers 666 in their name) to mob the stream's chat and interactive elements, while sirens and Company alerts of "suspicious activity" bring Dandi into a state of anguish (Figure 13). It turns out that a large group of testers had been coordinating this ambush for weeks, along with LuvU to flip the script and infiltrate the Company in a way even the show's creators couldn't control. The numbers 420 and 666 had been inside jokes on the stream for a while, representing the respective forces of good and evil, and the testers in unison capitalized on this symbolism to add their own entry into Dandi's lore, a moment which has been celebrated across the community since, and has prompted a narrative arc within the show itself against the "666 society" that has accrued a jovial infamy. The Dandi is passed, followed by one more Dandi who is visibly shaken and appears to have difficulty maintaining character while she performs her test.

As with most streams, DandiDoesIt is unscripted, but with various written plot advancements and developments pre-planned as a means of prompting the sort of playful engagement with the audience that primarily serves to drive the performers' story. This time, with Dandi taken by surprise, she shows her awe and appreciation for her community in a way that unearths the performer behind the fiction. Dandi #454 eventually regains her character, and the testing session progresses in similar fashion before the stream comes to a close after about 150 minutes of runtime. This is a standard duration for the project, which streamed regularly with multiple episodes (each with multiple Dandis) per week, until early 2023 when Dandi took hiatus after giving birth.

Livestreaming as New Media Art

DandiDoesIt is far from the first project to communicate art through the internet in real-time. Livestreaming has been used

for creative purposes ever since the technology was available, with internet-based broadcasts possible as early as the early-1990's. These broadcasts were primarily unidirectional, novel in itself as a means to show real-time content from one place to many through the internet's burgeoning capabilities. One project that evolved the medium's capabilities toward a bidirectional paradigm we now associate with livestreaming was called "Light on the Net" by Masaki Fujihata in 1996 Japan. The stream was relatively simple by today's standards - a video player in a web browser displaying a grid of lights installed at Keio University. Users from across the internet could click on a light in the camera feed to turn on/off the corresponding light in the physical installation space (Figure 19), giving a real sense of agency to art audiences across the internet for the first time and questioning the potential that such technology would enable for this forthcoming community.

Despite innovators like Fujihata and many artists since, livestreaming as a medium remained in relative obscurity in both fine art and public spaces alike, from its early days until the mid-2010's, until it found a niche in the public consciousness: documenting the explosive rise of the global video game community as gaming became more accessible across society. Streamers would play their games publicly on platforms like Twitch, audiences gathering to watch and "chat", allowing communities to be cultivated around the similar interests of those in attendance primarily by the skill and central personality of the broadcaster.

The growth of this medium into global art communities can most readily be attributed to the onset of the COVID-19 pandemic, and the associated lockdowns and other societal changes. The public beyond the gaming community were suddenly confined to their individual homes, and all of a sudden demand for engaging content, and human connection in the "new normal" of social distancing skyrocketed. Platforms like Netflix were quick to capitalize on the former with their established production pipelines, but many in the general population turned to Twitch for a combination of the entertainment and the potential for online human connection, and DandiDoesIt was there to provide it at the perfect time.

The human connections on Twitch are unique in part by being experienced in real-time, as opposed to most every other social network and/or art medium that exists elsewhere with interactive experiences that are either static (consuming a pre-made piece of art or video) or asynchronous (interactions that take place on other online platforms are almost always this way). This real-time experience emulates those interactions in "real life" that feel raw and un-curated, where being present is enough to feel included and become familiar with both the creator and also the community that surrounds them.

Art through this medium also achieves a level of audience accessibility that other art media are unable to replicate. Anyone, anywhere with an internet connection is able to access, consume, and interact with the art in its original form, in a fashion described by Matija himself: "twitch streamers offer a unique way to both hang out with someone you see and feel like you know, as well as a group of people you don't really 'see' but do befriend, and eventually sometimes to see/meet on discord and other venues."

With the demand, comes the supply. Artists were confined to their homes and studios as well, many forced to find new ways of sharing their work when previous channels had been closed off. With the proliferation of free and open-source tooling (such

as the Open Broadcaster Software project, or OBS), even those who had no prior technical experience could setup a multi-directional and multi-media broadcasting system from these spaces to display their audio, visual, and/or interactive work and connect with their audiences. Matija and Dandi took full advantage of these tools during that time, saying of the project: "the whole [Twitch] channel is sort of one big response to the pandemic ... our home life become [sic] our whole world, which meant that being productive/creative in that environment came more naturally".

The reason that the Dandi Line blends the boundary between art and game is through its unique user interface, allowed by the Twitch developer API to process text chat on the platform into any third-party software development platform, in their case node-based environment TouchDesigner (Rousset). Audience members can sit back and watch, or they can put themselves into the unfolding narrative by using one of many commands / interactive functionality built by Matija.

Creators look to monetize their content through Twitch's unique functionality of "cheering bits" (a one-time donation) and "subscriptions" (a monthly donation that grants access to emotes, and other creator-defined rewards for their patronage).

Audience members can show support by "gifting" subscriptions ("promoting" testers within the show's lore), which supports the artist and in turn helps to grow the community as a whole. This monetization structure, and the fact that Twitch is owned by the mega-corporation of Jeff Bezos without any significant competitors in the livestream space, speaks to the centralization of the internet that many view as problematic, and perhaps even serves as a subversive parallel to DandiDoesIt's premise and commentary on capitalism itself.

Many other artists took to Twitch during the pandemic as well, using the versatility of the platform to cultivate their own unique art and communities in very different ways. Kenny Beats, for example, is a prolific music producer, based out of the Los Angeles area and brought into notoriety through his studio documentary series "The Cave", where he brings established and up-and-coming artists into his studio, makes music for them to vocalize, and films the whole process. The pandemic brought him to Twitch, where he quickly began a cadence of producing music with a live audience, building relationships with his fans and giving them the opportunity to win prizes and notoriety through his competition series he calls "beat battles". Unlike Dandi, there isn't any fantasy or lore to his concept, yet he populates his stream with creative activities (often based on audience ideas), like when he leads sessions primarily ridiculing the misfortune of his audience in a way that strangely leads to genuine moments of therapy and support in a segment affectionately titled "pain chat". Throughout his tenure on the platform, Kenny has helped young musicians and producers toward their goals of learning and creating art throughout a time that has otherwise separated these young people from each other, in an industry that relies so heavily on collaboration and dedication (multiple artists from the community have since signed record deals independently from Kenny's own influence).

The Golden Shrimp Guild (GSG) is another livestream project that wouldn't have existed without the pandemic, that has demonstrated the efficacy of the medium. It grew organically through already-established relationships between electronic musicians, who used their pre-pandemic relationships to create the foundation for a quasi-decentralized, self-sustaining community in the digital realm, with a uniquely crustacean-

themed identity. They are an open group, new members joining every day to perform at their monthly livestream extravaganza - “SynthOn”.

Unlike Kenny and Dandi, there is no central figure or personality that drives the direction of the organization - it works more like a collective that supports and celebrates each other’s endeavors through their communal events. These artists, but in particular DandiDoesIt, create art in the space between content creation and social media - between curation and open forum - between online and in-person interactions, between real life and fantasy.

In a similar way, Fran Ilich created an international concept art project based around community with his work “Raiders of the Lost Crown”, beginning as a petition to retrieve the Penacho of Montezuma but ending up as a sprawling semi-fictional narrative-driven interactive project that blends the borders between indigenous culture and Western normative power structures, as described in “Another Aesthetics Is Possible” by Jennifer Ponce De Leon. DandiDoesIt similarly acts as a bridge between borders, by creating a unique online space where humans are represented by their online aliases, communicating and interacting with each other without the geographic, gender or ethnic identities that serve to divide society in offline spaces.

Dandi’s medium, although relatively obscure to the fine arts community, shares many overlapping characteristics with new media interactive art that has been recognized by many museums and galleries around the world. One exhibition in particular displayed a diverse collection of exclusively interactive material - “Act/React” , held by the Milwaukee Museum of Art in 2008. The works shown display the powerful nature of interactivity as the newest dimension through which artists can create representations of their worldviews that stir the emotions of their audiences. One such work - “In Touch” by Janet Cardiff, has viewers explore a sonic landscape through the most sensitive of senses - the feeling of touch upon a carpenter’s table that tells a non-linear but layered narrative of suspense and trauma (Figure 20). Another work by Camille Utterback (Untitled 5) creates painterly shapes and strokes onto a projected wall that explore the relationship between the viewers in the room and their motion throughout the space over time (Figure 21).

In Dandi’s case, a similar technology is used to track her location in the duo’s green-screen studio, which is then used to place her image in that 3D rendered space of the testing pod. She can walk into and around objects in that space that only exist inside the fiction, and effects can be applied to use her body as a brush to paint the screen with her cached image while she dances. What marks Dandi’s innovation in this technique is that the entire mechanism can be dynamically shifted to reflect various scenes, rooms, or effects via combination of artist and audience control, allowing for the depth of the narrative that they portray.

The depth of the narrative wouldn’t be reached without another integral element of the show - its focus on “play” as a central driving force behind the performance’s momentum and ethos. Play holds a significant role in many interactive art projects, especially those that utilize new media technologies as Tim Stott describes in his work “Play and Participation in Contemporary Art Practices”. Without the sense of play, Dandi and Matija could still make successful performance art that conveys similar messages about the world. However, it would leave the show devoid of the vibrant atmosphere that fosters

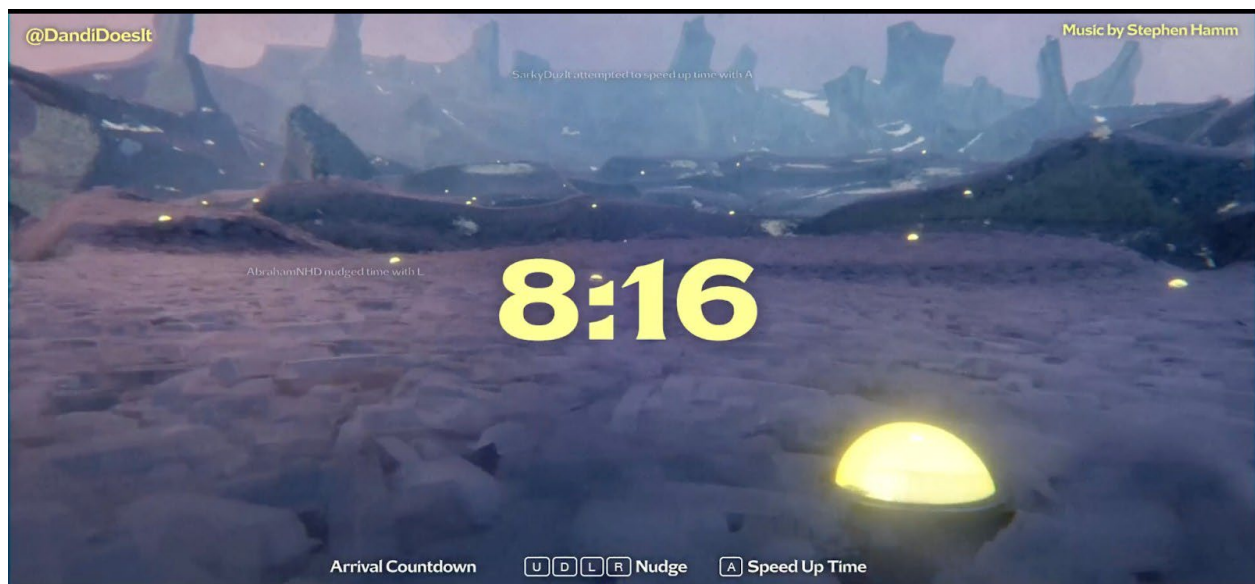
engagement and catalyzes the reception of those messages by the most important members of the performance: those who test the Dandi line, the audience themselves.

Conclusion

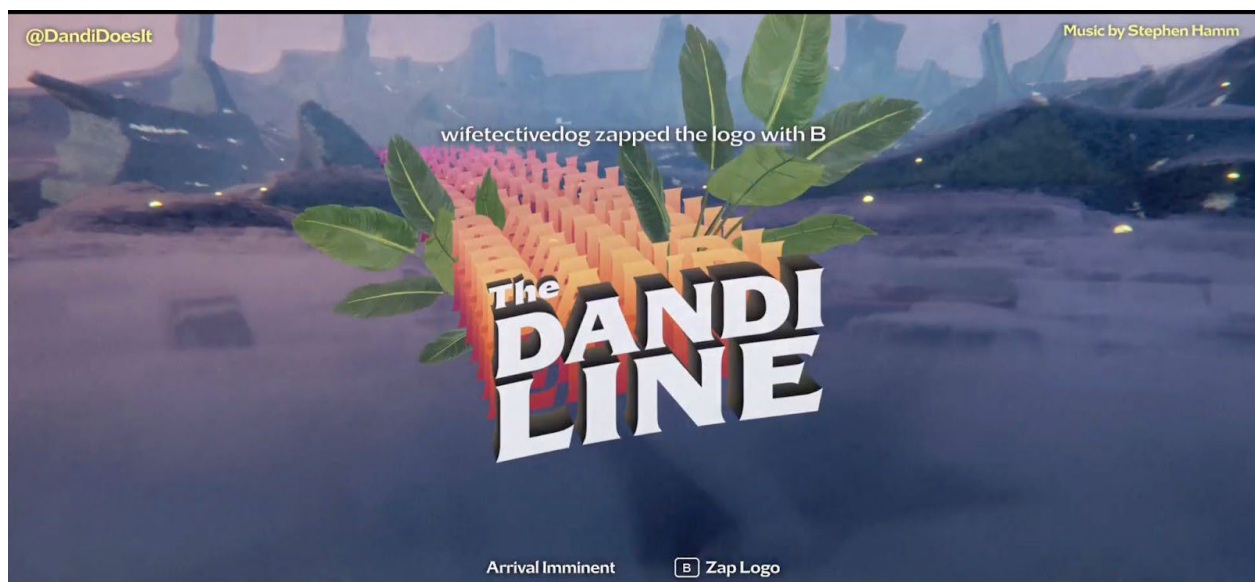
The Live Performance Video Game that Dandi and Matija have created reaches a balance not commonly found within public artistic endeavors, inviting new audiences with their infectious energy and accessible sci-fi / jazzercise aesthetic, while encouraging them to stick around and immerse themselves into the many deeper layers of their community and narrative that are unlike any other, on or off Twitch. However, the principles upon which they designed their project are familiar to the overlapping mediums of digital and interactive art that have already found their way into the consciousness of the contemporary art scene, with the added accessibility and cross-cultural possibilities that the livestreaming platform affords.

Their work comments on the state of the world in a playful yet profound way, acknowledging the bleak outcomes of capitalism and corporatism while simultaneously offering a safe and fun place to digest that reality along with a community of like-minded individuals from across geographic and cultural borders, ultimately providing cultural hope that the dark times of a post-pandemic society has struggled to retain.

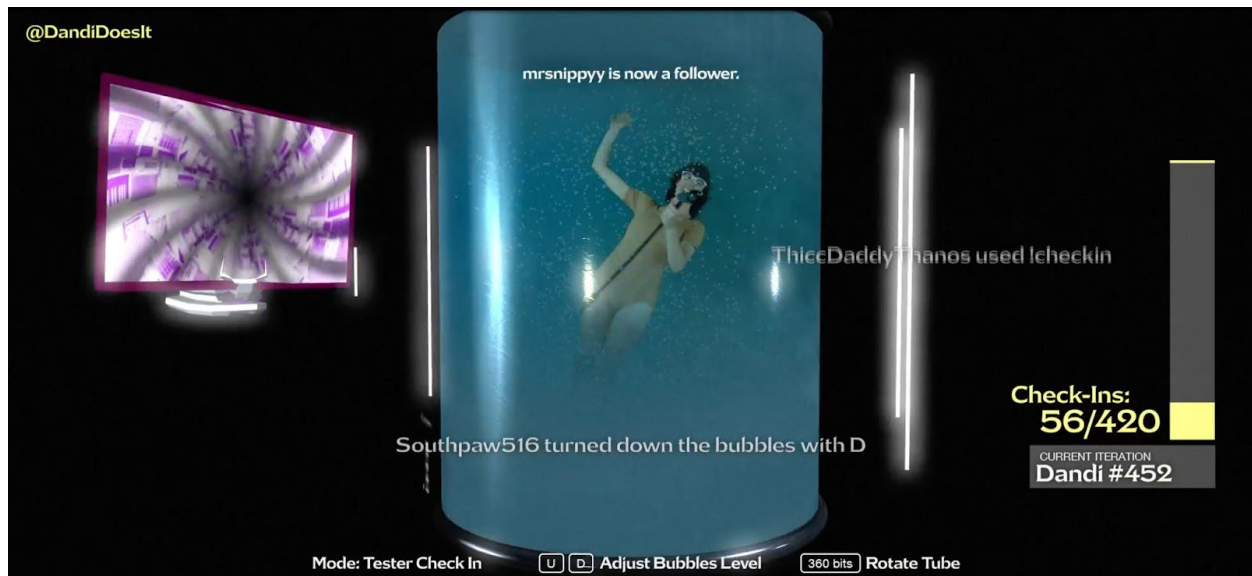
Figures



(Figure 1) The stream begins with a countdown, which has an interactive interface for the audience to play with as they file in to start their testing shift.



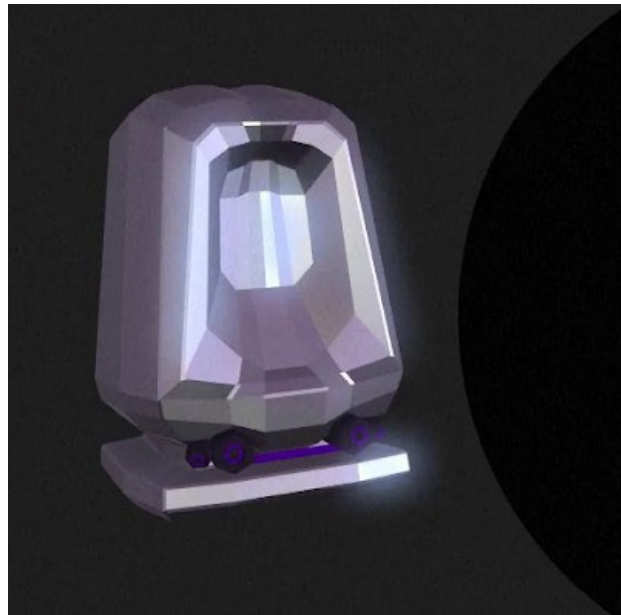
(Figure 2) "The Dandi Line" opening credits and logo



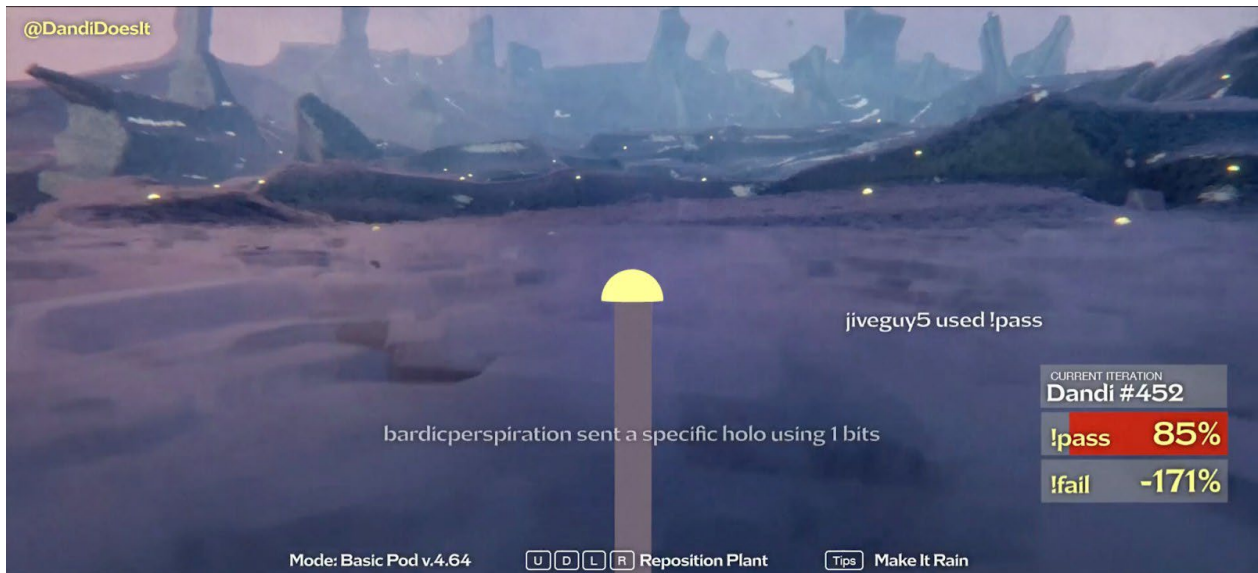
(Figure 3) The incubation Tube where new dandis are born, while testers check-in for work.



(Figure 4) Musical guest LuvULovesYou, brought in to create a real-time improvised soundtrack to entertain the testers during their shift



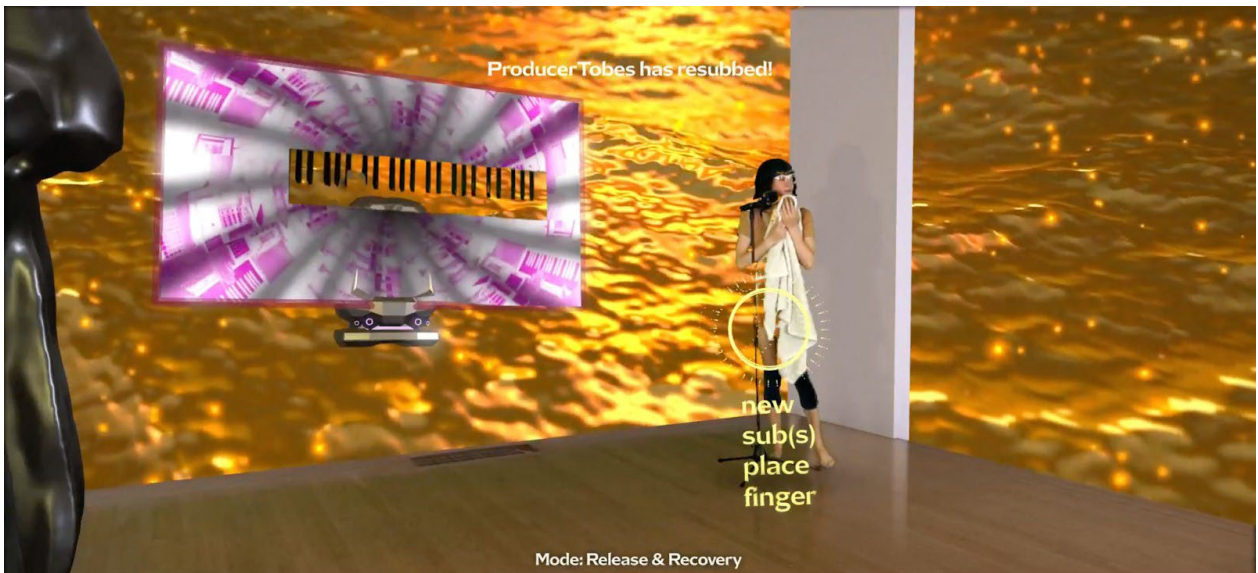
(Figure 5) FIXr, the Company's representative on the show, played by Matija Erceg



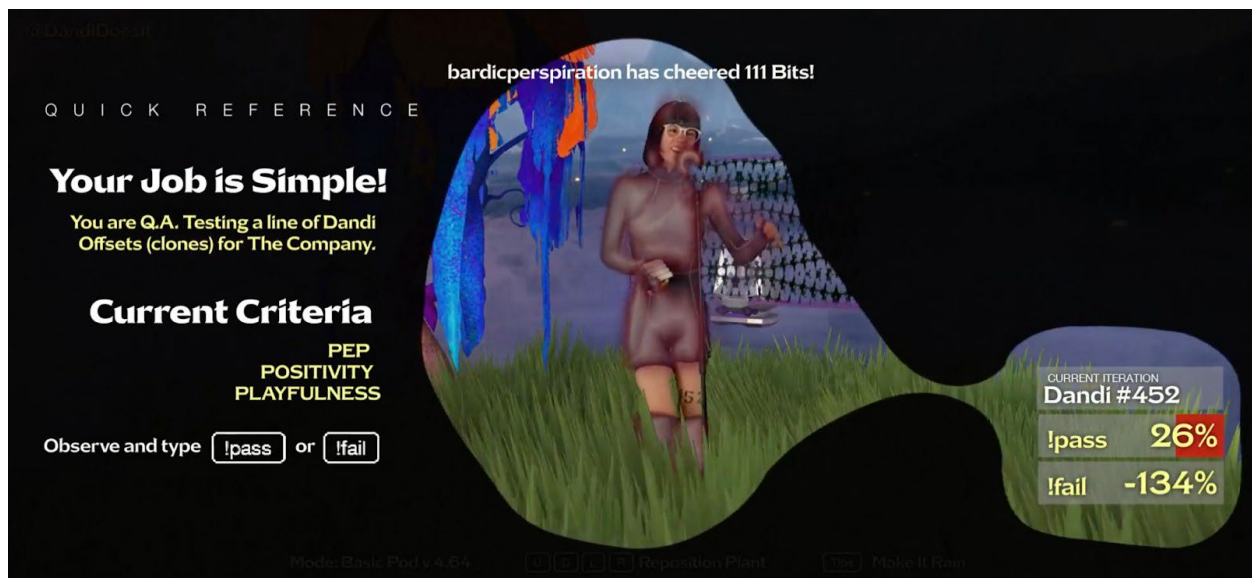
(Figure 6) The “testing pod” from a distance, showing the otherworldly landscape of the show's setting



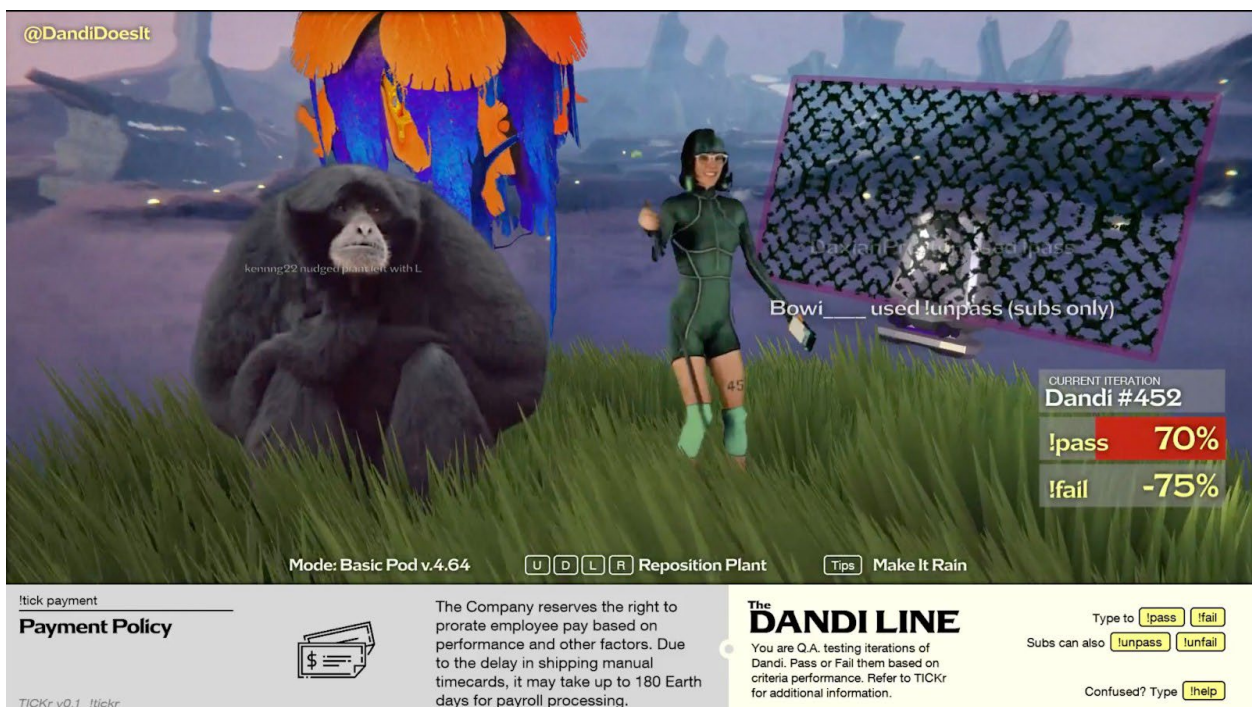
(Figure 7)



(Figure 8) Dandi is born, drying herself with a towel while she acclimates to her new environment.



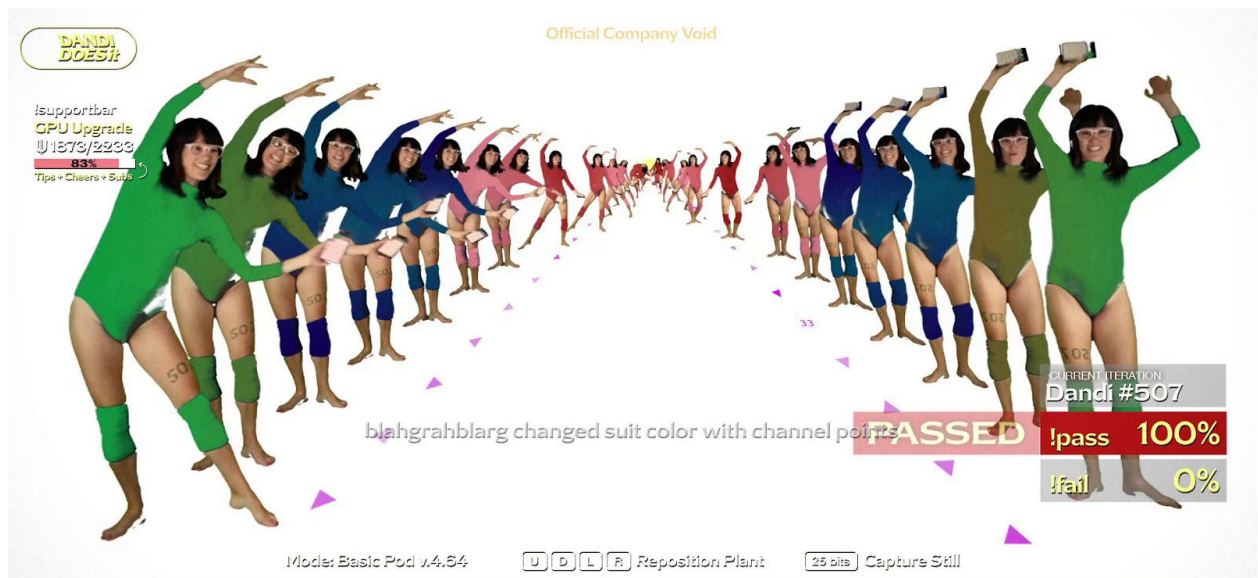
(Figure 9) Once Dandi is acclimated and changes into her official uniform, testers are given their instructions



(Figure 10) Testing in progress



(Figure 11) Elation, celebrating the donations of generous testers to the Company's cause



(Figure 12) Dandi's body is used to paint the screen with a hypnotic trail of her form.



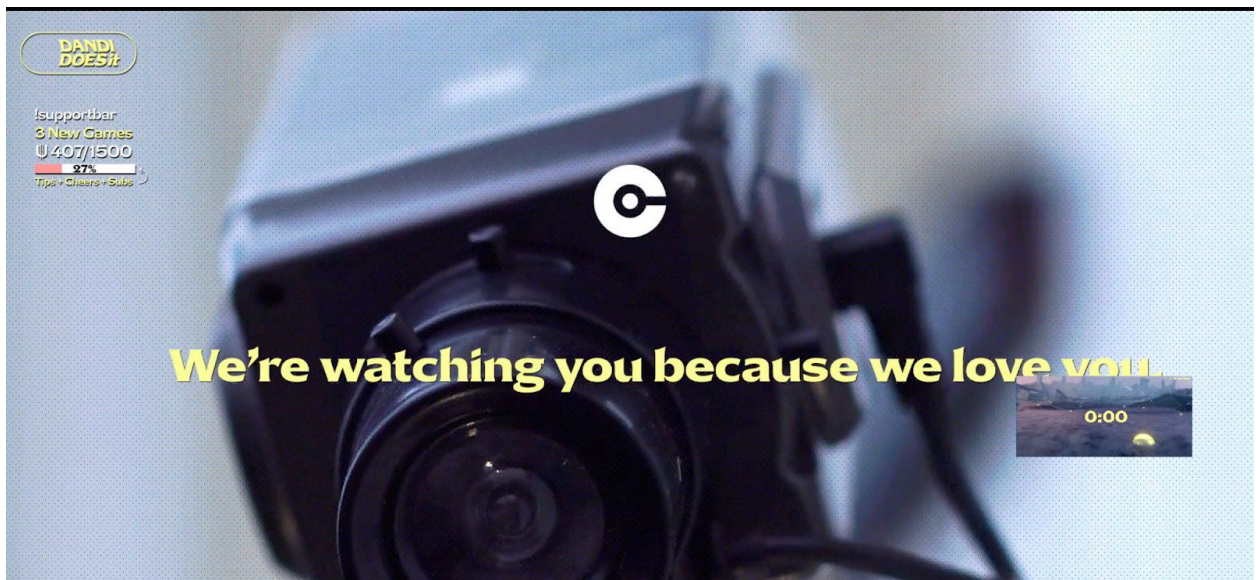
(Figure 13) Despair, as Dandi is surprised by suspicious activity on the part of certain testers as part of the “666 society”



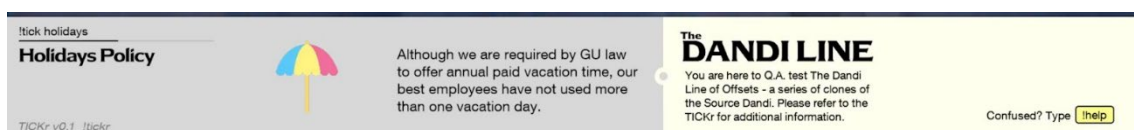
(Figure 14) Dandi, freshly passing her test, preparing to be sent off-world to her destiny



(Figure 15) Company propaganda video overtly signaling their anti-onion (anti-union) policy



(Figure 16) A friendly message to testers about the company's care for their well-being.



(Figure 17) The title and information section located at the bottom of the screen, providing useful information for testers to aid in their duties.

!tick thecompany

The Company


When you work for us, you are part of the biggest corporate family in the galaxy. Through an aggressive acquisition strategy, we have proudly taken the lead in most galactic industries.

TICKr v0.1
!tickr

!tick offset

Offsets™


Ever since the Clones v. Scion Inc. ruling of 2519, Offsets™ have been legally cloneable by companies who possess the technology to do so, and who adhere to GUC.

TICKr v0.1
!tickr

!tick payment

Payment Policy


The Company reserves the right to prorate employee pay based on performance and other factors. Due to the delay in shipping manual timecards, it may take up to 180 Earth days for payroll processing.

TICKr v0.1
!tickr

!tick cult

What is a Cult?


A former minister of the Galactic Union once remarked that 'A cult is another person's movement.' The Company is simply here to provide good jobs until people retire or meet decommissioning criteria.

TICKr v0.1
!tickr

!tick qa

Quality Assurance


Q.A. stands for Quality Assurance. It is this proprietary process that separates The Company's Offset™ Lines from the rabble of no-name clones by everyone else.

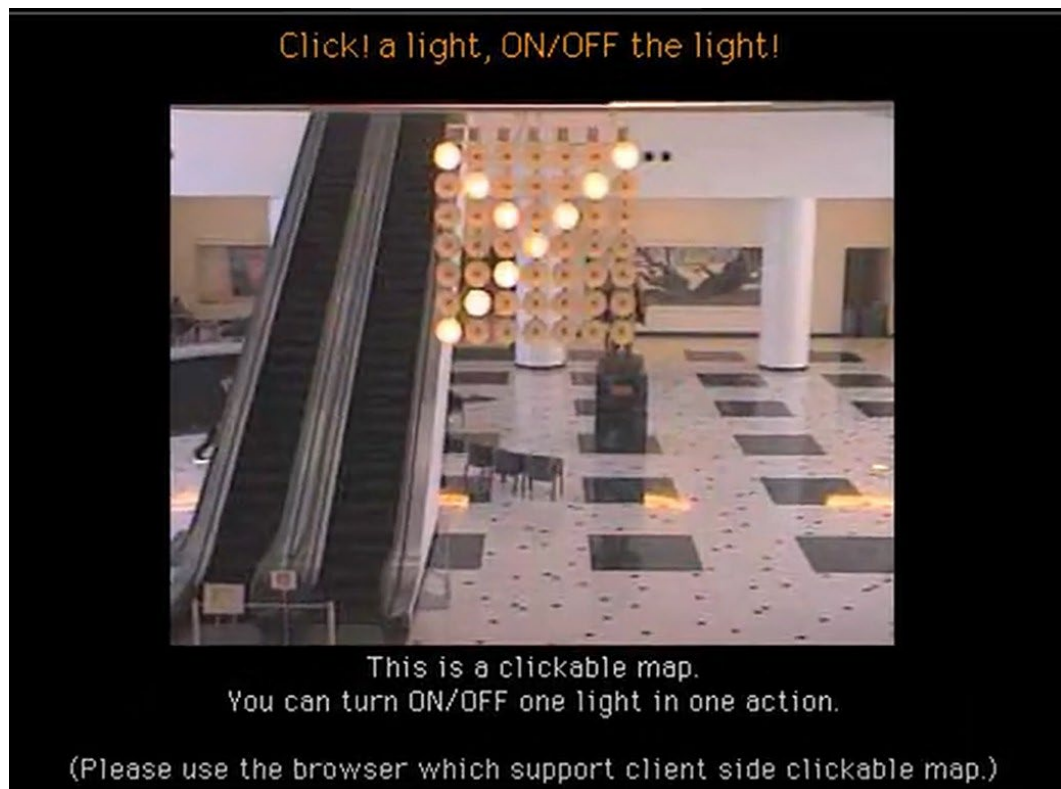
TICKr v0.1
!tickr

The DANDI LINE

You are here to Q.A. test The Dandi Line of Offsets - a series of clones of the Source Dandi. Please refer to the TICKr for additional information.

Confused? Type !help

(Figure 18)



(Figure 19)



(Figure 20)



(Figure 21)

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Reconstructions

Unfinished images on the Grand Canal in 1985

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Abstract

When the 3rd International Architecture Exhibition in Venice was established within the Architecture Biennale in 1985, design issues were introduced to be developed on punctual interventions scattered throughout the lagoon city. Among the competition themes, those of the Accademia Bridge and Ca' Venier dei Leoni constituted pivotal points of rethinking the urban texture and visuality of Venice. On the one hand, the temporary condition of a bridge that was designed to be replaced with a permanent one; on the other, the incompleteness of a facade compared with the double dimension of water.

The article deepens some of the proposals collected in archive documents known as the “Progetto Venezia”, showing the architectural possibilities explored for the Accademia Bridge and Ca' Venier dei Leoni, firing the debate on methods, operations, and techniques capable of laying the groundwork for a new motif of communication between the present and the past of architecture.

Reconstructing memory through images implies operating a critical reading on the relationship between temporality and spatiality that, in archive drawing, translates into quick sketches, annotations and schematic studies, latent with design intentions. Therefore, the reconstructed images trace the definition of the new architectural organism, evoking compositional values and urban issues that provide a further program of visualities along the Grand Canal suggesting future intentions on the processes of rethinking the architecture of the past.

Keywords

Digital representation, Graphic interpretation, Accademia bridge, Ca' Venier dei Leoni.

1. Introduction

The value of architecture is linked not only to the built work, but also to the apparatus of its drawings, a complex world of information often preserved in different places of conservation and treated in a non-homogeneous manner. Some reflections on the inputs that the discipline of Drawing can provide in the different spheres - knowledge, safeguarding, fruition and accessibility – is needed, such as the process of conservation and enhancement of architectural representations.

The images published in this paper are part of a research project that began in 2020 and ended in 2022, which involved the collaboration between the “Laboratorio di supporto al progetto” and the Archivio Progetti Iuav, which aimed to make known a still unpublished graphic heritage of the Venetian territory and landscape, contributing to the development of further lines of research capable of shedding light on constituent architectural and urban issues of Venice or of its pieces of the city, by means of an in-depth investigation of architectural design and project places.

As part of the preservation of the graphic heritage, contained at the Archivio Progetti Iuav, the research fostered the dissemination of the graphic heritage contained therein by means of both digital reconstructions, also published on open-source platforms, and interactive and immersive ways of processing the data, combining theoretical and design aspects of the investigated drawings while providing new strategies of narration. In the light of the current methods of accessing and consulting the documents, of the visualization possibilities and interaction with the graphic information now present in the archive for external users, the research project proposed an in-depth interpretation, digitization and graphic reconstruction activity through the elaboration of digital models, in order to offer an exploration also in immersive mode and a narration characterized by multiple and unpublished readings of a Venice both built and imagined.

The digital reconstructions, by making known design experiences and research lines adopted, shed light on the design work of architects, including those coming from different backgrounds and strongly linked to the issues and methods of design within the city's historical parts. The heritage of documents and drawings, photographs, and project diagrams contributes to reconstruct a slice of Venice history by restoring some of the possible images of the city, supplementing the material in the preserved collections with further graphic elaborations that can be consulted on open-source platforms about specific design issues, and at the same time, stimulating an ongoing dialogue with the Archivio Progetti Iuav.

2. Accademia Bridge and Ca' Venier dei Leoni in 1985: the context

Starting from the documentary apparatus provided by the Archivio Progetti Iuav, graphic interpretations and digital reconstructions of the projects presented by Gianugo Polesello (fig. 1) and Raimund Fein are shown, which summarize the cultural ferment taking place in Venice, also because of the heterogeneous cultural and geographic background of the protagonists providing numerous opportunities on possible images about the lagoon city.

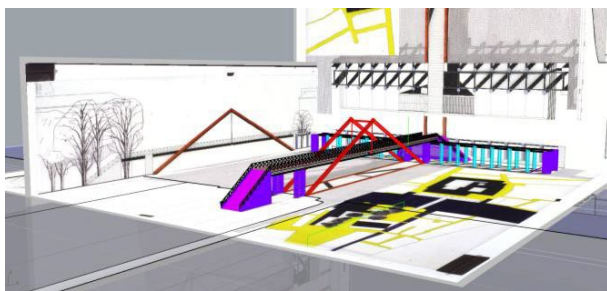


Figure 1: Digital model of the G. Polesello project for the ponte dell'Accademia (1985) 2022. Digital visual interactions between original drawings and the digital reconstruction ©Archivio Progetti Iuav.

The purpose of the reflection around the design proposals of 1985 aimed at the intervention on the architectural monument in its quality as a process of adaptation or addition/integration in relation to the quality of the work. Both in the case of the bridge and Ca' Venier, the architectural volumes, articulations, and relationships with the context shaped the formal and expressive choices of the competition intervention.

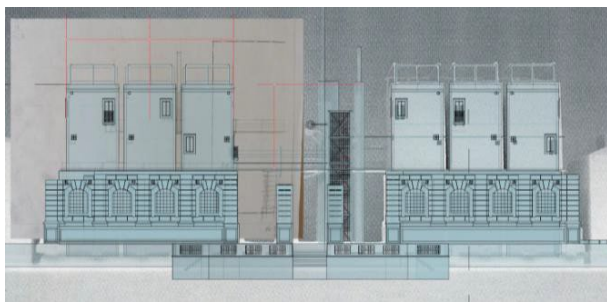


Figure 2: Digital model of the Raimund Fein project for Ca' Venier dei Leoni (1985) 2022. Original photo in the background ©Archivio Progetti Iuav.

In many cases these choices responded to theoretical inquiries into the role of contemporary architecture in the historical context, geometries, abstractions, interpretative readings of form, concurred to characterize the final configuration; in others, the need to resolve urban issues that best suited contemporary needs set the new directions of contemporary design. One of the issues investigated was the proposal of a new design for the Accademia Bridge, considering specific conditions that were: 1) maintaining the configuration of the bridge, providing a suitable formal definition of its structure, also considering its role as a junction between Campo San Vidal and Campo della Carità, areas to be considered in the project for the location of the bridge's connections; 2) to replace the original bridge with a different connection system; 3) to rethink the question of the Venetian viability, with particular attention to issues related to the crossing of the Grand Canal. The bridge's history, its temporariness, its significant architectural and structural events, are intimately linked to both the city's history and its function as an artefact.

Dealing with Ca' Venier dei Leoni there is the issue of a symbol of Venice to be reinterpreted in a renewed desire for the city's growth and the eventual need to expand the museum. Aldo Rossi stated that the current location of the Guggenheim Museum in Venice represented the last opportunity for the project of a building, of a palace on the Grand canal, even though the foundations and basement already exist, and the original

project has existed since the middle of eighteenth century (1700s).

These two competition topics, because of their chronological connections, urban position, and of the visual and architectural relationships they establish, represented for some of the architects participating in the Progetto Venezia, a possibility of rethinking Venetian contemporaneity to be visualized and rebuilt starting from these two urban moments, treated in unison.

3. Raimund Fein's Project and digital interpretations

The source drawings for the Raimund Fein project include a large number of sketches, covering almost one year of the architect's reflections on the project and 3 photos of the model (front views at two scales). For the elaboration of the digital model of the project submitted by Fein, it was possible to work closely with the architect. Among the different evolutionary stages of his project, Fein identified some highlights, based on the design studies and the diagrams drawn up during the context of 1985, a working procedure to facilitate the identification of critical issues and key points of the project. Fein envisions a machine consisting of two triads of parallelepipeds. He reflects on two scales, as seen in the photo of the original model: one of the new proposals in its context and another in the detail of the connection between the two blocks of buildings (fig. 2).

Ca Venier is completed in height, the new intervention detached from the existing wall, a hi-tech architecture made of walkways and lattice towers. No specific function is given, the architect is interested in the manipulation of form, the figurative possibilities of hi-tech. He juxtaposes the volumes, locates the exterior vertical connections and the balcony behind. The 6 volumes end with tall railings and a tall antenna refers to technology and the idea of the device, the machine (fig. 3).

For construction of the digital model in relation with the architect proposals, the wireframe visualization, was necessary to verify measurements and manage the model compared to the original drawings (fig. 4). The reconstruction of the digital model fostered the position of the Fein's proposal in visual relation to the Ca' Venier state of art and the urban context too. The building was modeled on the basis of the underlying geometries: 3 rectangles, each at 1:77 ratio, arranged three by three, the width of a "three-pack" being twice its height. The distance between one turret and another is one-tenth the width of a turret.

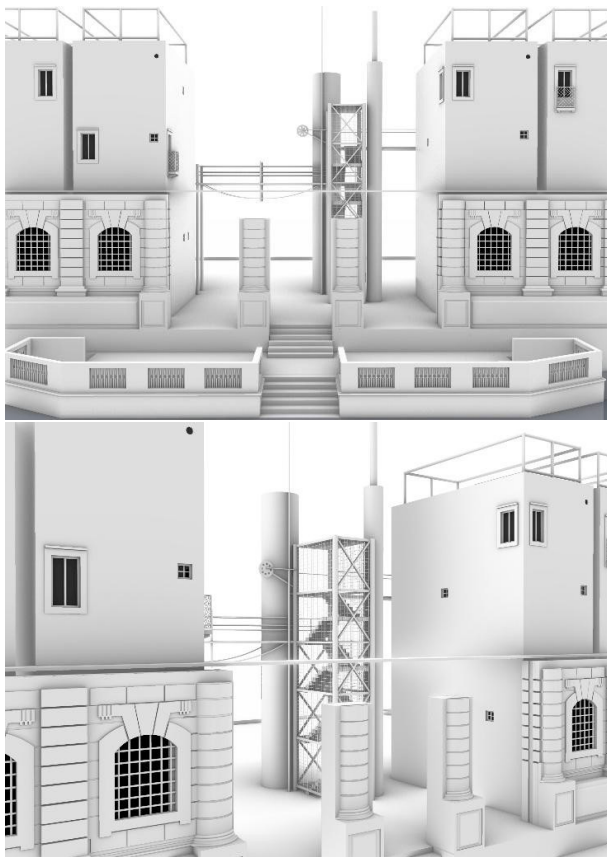


Figure 3: 3D modelling reconstruction of the R. Fein project for Ca' Venier dei Leoni.

Following operations concern the completion of the model and verification with documents related to the former versions. The final model was checked with Raimund Fein on the basis of the second version, from the plans one can appreciate the advancement of the backside compared to the first hypothesis, to obtain the correct dimensions and proportions of the buildings. Comparison with photos constitutes further verification for completion of the digital model.

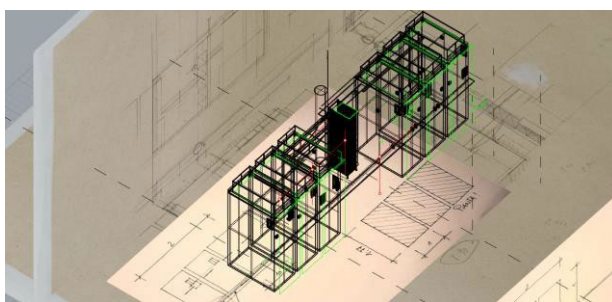


Figure 4: 3D modelling reconstruction of the R. Fein project for Ca' Venier dei Leoni in wireframe visualization with the integration of the archive drawings. ©Archivio Progetti Iuav.

Subsequently, additions, modifications and integration were made with other design reflections proposed by Fein on the basis of the digital model made: the position of two windows, the height of the railing in roofing. Orbiting around the model, it is possible to appreciate its relationships with the architectural pre-existence, its relationship with the Grand Canal and the interrupted verticality of Ca' Venier. Digital rework in double projection, rendered perspective and axonometric views provide

integrated information-architectural, formal, visual-often missing in documentary sources by restoring more and more geometric- compositional qualities and multiple viewpoints of project information preserved in the archives (fig. 5).



Figure 5: 3D modelling reconstruction of the R. Fein project for Ca' Venier dei Leoni.

4. Gianugo Polesello's Project and digital interpretation

The source drawings for the Gianugo Polesello project include: a floor plan at a scale of 1:500, a floor plan and a section at a scale of 1:100; furthermore, 3 photos of the model (top view, a side view and a front view on the ramp). The terms of the problem tackled by Polesello concern the width of the bridge and the consequent height of the decking, the width comparable to a wide pavement, and two areas of ground connection free of architectural constructions, important architecture on either side of the Grand Canal (fig. 6).

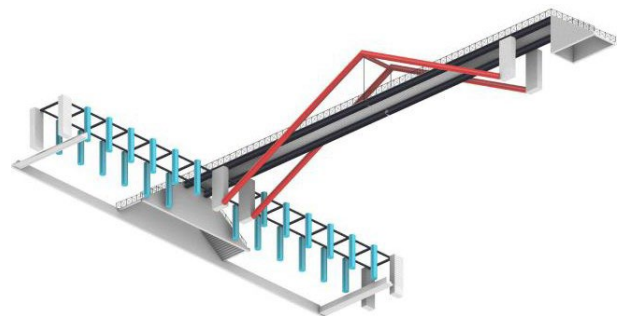


Figure 6: 3D modelling reconstruction of the G. Polesello project for Accademia Bridge.

Polesello looks at Palladio's work, the two bridges for Rialto, the old Rialto bridge in Carpaccio's painting and Jacopo de' Barbari's engraving, the Arsenale bridge, the Venetians' naval technique, and the Palladio's capriata. The design response consists of four steel struts, with a circular section, arranged symmetrically with respect to the centreline and inclined according to a 1/2 ratio. Between the pair of struts is the steel and timber deck, placed transversally (fig. 7).

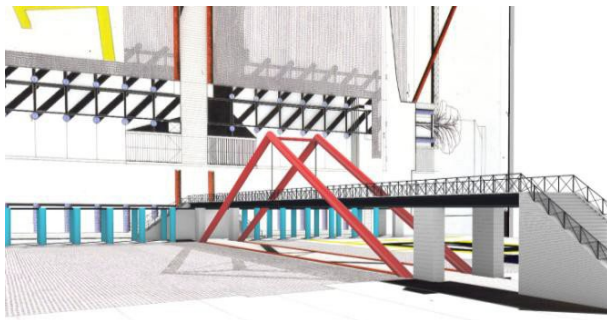


Figure 7: 3D modelling reconstruction of the G. Polesello project for Accademia Bridge.

Towards the Accademia, the bridge is set in a pergola consisting of blue polished stone columns and upper metal beams, arranged in an orthogonal grid, which can act as a support for a green sky of creepers. The accesses are configured by two systems of stairs, made of white stone (one central and two lateral), the pergola is arranged orthogonally to the grid of the bridge. The orthogonality is also conceived in relation to the direction of the Austrian bridge and Miozzi's bridge with respect to the canal, so that the new design is reduced to the function of crossing the canal according to a technique that develops in modules. The bridge, for Polesello, is reduced to its silent functions of crossing the canal, functions expressed in a natural technique, repeating timeless architectural modules (fig. 8)



Figure 8: Digital model of the G. Polesello project for Accademia Bridge in its urban context.

5. Conclusions

Each in-depth project was observed from different points of view, in relation to the available material, formal qualities and graphic outcomes. For all three aspects, the techniques of representation chosen were placed at the service of the meaning, the reasons for the project. The narration of the objects studied, the construction of images, the identification of descriptive paths and graphic strategies were treated by drawing up storyboards or mind maps that, in the schematic synthesis of their nature, were able to shed light on the outstanding aspects of the project. The constant graphical comparison between the digital processing and the archive document gave shape to open-models, thus understood as potential final configurations to which modifications could be made in a flexible and simple manner, starting from an articulated project of hierarchical organization of the architectural elements modelled within the software. Graphical comparison and observation of further images of the project is useful to deduce/reconstruct/understand some unclear elements in the archive drawings (fig. 9).

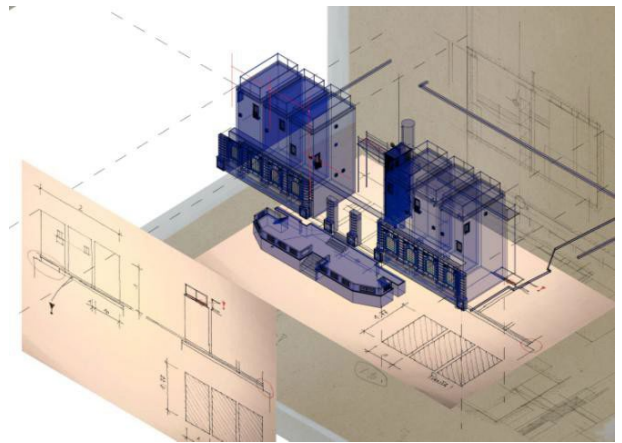


Figure 9: Graphical comparison between the digital model of the R. Fein's project for Ca' Venier dei Leoni and archive drawings. ©Archivio Progetti Iuav.

The last step is the export of the model in different formats for readability on open source platforms or application/manipulation on other software. The final objective becomes the exploration and visualisation of digital models inserted in the urban context or isolated by parts, so as to integrate and enrich the knowledge of the starting graphic heritage. Now, the question is: how is the computer influencing architectural thought? If the primary ideal is the thought, then the next is the ideal of each discipline you utilize to manifest that thought, which is the architectural drawing. The next step is the model. And then the use of the computer as a survey device to help overcome geometric complexities that would be harder for the hand to draw.

The computer cannot substitute for this process. But at least during the elaboration of the drawing the computer is already confronted with matter, as it could anticipate it.

Drawing, for its various theoretical speculative, analytical, and applicative declinations and ability to take a holistic approach to the issues under investigation can contribute to the development of new knowledge scenarios. Reflecting on samples collected in archive collections becomes an opportunity for experimenting with different digital techniques to explore the architectural characteristics and spatial configurations proposed, creating new contents that enhance accessibility and comprehension for different audiences. The creative aspect of content production concerns the concept of reproducibility. The digital product of a physical asset can be understood as an original content of a virtual transformation process of the archive source in which, in a dynamic flow, references, memories and cultural contaminations that originated the source coexist (fig. 10).

For this reason, one phase of the research was dedicated to experimenting with technologies that would make it possible to obtain different digital products from the 3D model that would guarantee various levels of accessibility and use of the reconstructions created, while keeping track of the levels of reliability of the reconstructions themselves.



Figure 10: Digital visualizations of the Accademia Bridge (G. Polesello) and Ca' Venier dei Leoni (R. Fein) inserted in their urban context.

On the identification of these theoretical trajectories, digital explorations provided by the interpretation of archive drawings return images of an unbuilt and unknown city, finding formal meaning in the design boards and study drawings, in those original drawings that not only divulge the work of architecture, but also manage to provide additional information about its aesthetic, functional and technical conditions. It is therefore a matter of recognizing, to the archive drawing, an autonomy with respect to the built work, a condition of self-representation, a witness *in absentia* of architecture that intervenes in the design value of the unfinished or unbuilt, returning a path that, from the initial reflections, breaks down and examines the architectural object by means of the graphic communication of its most significant parts.

Being imagined places and evocative insights of concepts often oscillating between the abstract and the utopian, the graphic elaborations show monochrome digital models, a methodological approach adopted to emphasize the project's condition of incompleteness, understanding the digital dimension and model as a place of theoretical speculation and convergence of spatial visualities. The digital model, in the absence of chromatic and material definition, maintains the value of the visualization possibility that the eye can continue to experience in the attempt to visually complete the project. The reading of the drawings, which covered the entire process of graphic restitution, makes it possible to identify some of the criticalities and/or inconsistencies, both graphic and design, of the case study during the making of the digital model. This is possible because of the tridimensional exploration of the architecture built. These moments of knowledge constitute the core of the reflections involved in the digitization and construction of the digital model.

Acknowledgments

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CLIMATE

Art Development and Conceptual Shifts

From Life, Computers and the Ecosystem Paradigm Towards Posthumanism and Situated Science

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Abstract

Since Crutzen and Stoermer published the term Anthropocene in the IGP's Newsletter in 2000, we have assisted an increasing number of art events that present projects addressing climate change and its consequences. Some recent and well-known examples are Earthbound (HEK, Basel 2022), Critical Zones (ZKM, 2020), and Eco-visionaries (Royal Academy of Arts, 2019-21); all of them present projects that not only warn about environmental collapse but try to elucidate the complex relations between Nature and Culture and recompose them towards the possibility of resurgent forms of life. Complexity and transdisciplinarity are the characteristics of the artworks produced as a reaction to the Anthropocene. Not only due to its close relation to science and technology but also because, in their research, they try to elucidate the complex relations between environmental and societal crises, featuring traditional media and state-of-the-art technologies to surface these relations and propose alternatives. The complexity of these artworks complicates their inclusion in existing art classifications as well as to conceptualize them in continuation with the history of art. The ongoing research presented here aims to elucidate how the practices and media deployed in the artworks addressing climate change and other consequences of the Anthropocene have developed conjointly with the changes in science and philosophy that accompanied the fruitful artistic experimentation of postmodernity and dissolved the modern divisions that supported human exceptionalism.

Keywords

Anthropocene, Art and Science, Posthumanism, Situated study of Art

1. Introduction: Art and the epistemological crisis around the concept of nature

Since Paul Crutzen and Eugene Stoermer published the note "The Anthropocene" in the newsletter of the International Geosphere-Biosphere Program (IGBP) [1], this concept has filled up the pages of ecological publications and overflowed from the field of geology to become the subject of social and philosophical research, and the cause of political debates. The Anthropocene not only summarises the critical changes affecting life on Earth but also links the recent threats to liveability to the progress and expansion of human societies. The reason some authors refer to the Anthropocene as Capitalocene [2],[3] or Necrocene [4]. The Anthropocene has linked natural and human history [5] and has put the concept of Nature in crisis. Nature is no longer the passive background of human development, shelter, and resource provider, but an active agent of history. Much more than the environment humans can control

and manage, Nature now exhibits the power to end the contiguity of human life on this planet. Awakened Nature asks to be considered a political subject [6], [7] and an active agent we need to work within for the development of alternatives to the way we inhabit the Earth for a resilient future. Searching for these alternatives not only implies a change in societal and production systems but also needs alternative manners of conducting research. The analytical power of positivist science which divides and orders reality towards translatable and scalable systems giving place to the global must give place to the art of noticing. The follow-up of the bonds that generates each complex situation, which will allow all the agents involved to act and be part of the setting up of the problem and its possible solutions. A change from the global perspective of human exceptionalism to the acknowledgement of all the agents involved in any diverse situation [8]

Furthermore, awakened Nature cannot be represented anymore as the scenario of human drama, the object of the mimesis, subjected to transcendental laws, which interpretation allows Miguel Angel and other Renaissance artists to depict Beautiful Nature. Neither Nature is the resource of modern development, dominated and displaced by the expansion of the new urban settlements, which only tolerate Nature as domesticated greenery. After the proclamation of the 'Era of Man', Art confronts a complex and immanent Nature. We cannot represent, even dominate, this Nature but only engage it in the speculative endeavour of essaying other shared possibilities of becoming.

Looking at some works extensively exhibited in the last years all included in the previously quoted events, like *Ecosystems of Excess* (2014) by Pinar Yoldas, *Serpent River Book* (2017) by Carolina Caycedo, *Acoustic Ocean* (2018) by Ursula Biemann, *The Wilding of Mars* (2019) by Alexandra Daisy Ginsberg, *Lady Musgrave Reef* (2020) by Petra Maitz, and *Atmospheric Forest* (2020) by Rasa Smite and Raitis Smits. These not only deal with the issues associated with the Anthropocene, like Climate Change, plastic pollution, extractivism, ocean heating and acidification, deforestation and the coming of the sixth extinction. But also, despite their diversity, they share characteristics that allow us to include them in new genres, like the use of ecomedia [9], technologies that connect the audience with not human perceivable changes, which allow us to theorize them as part of Eco-aesthetics [10],[11] -v.gr. *Acoustic Ocean*, *Atmospheric Forest*-. Also, the encounter of science with the fictional hypothesis that characterizes speculative design [12] - v. gr. *Ecosystems of Excess*, *The Wilding of Mars*. However, not all the quoted projects fit well in these proposals, their complexity and the diversity of procedures deployed in the setting up of naturecultures [13] being their main shared characteristics.

The quoted artworks build complex assemblages in which diverse pieces of knowledge and practices, media new and inherited of the extensive artistic tradition, meet to engage the audience in the environment in a new manner, not as managers or beneficiaries of shelter and resources but as a concerned part acting among other humans and non-humans.

In this way, Pinar Yoldas, in *Ecosystems of Excess*, creates a work of speculative design in which, aware of the effects on the environment of plastic pollution, she uses bioengineering to envision a possible life after the Anthropocene in which humans are not the best-adapted critters. Another practitioner of this genre is Alexandra Daisy Ginsberg, who, in *The Wilding of Mars*, a simulation deploying artificial intelligence, presents evolution not as a finalist phenomenon tending towards the emergence of the intelligent human but as an entangled and open process, the result of symbiosis between diverse species with uncertain results. She also criticizes the patriarchal dream of colonizing other planets.

Carolina Caycedo presents *Serpent River Book* in a more traditional media, an edited hypertextual book. This artwork relies on decolonial aesthetics to criticize the extractivism that manages the southern part of the world as a resource for the increasing well-being of the Nord. The book combines satellite images, the resource for planning the exploitation of globalism, with other forms of encountering the environment. The poems, songs and drawings collected are forms of storytelling, ritualistic and more proximal manners of encountering nature, ancestral forms of knowledge preserved in the fringes of capitalism that now present alternatives to the path of devastation undertaken by anthropocentric culture. Ursula Biemann takes a similar approach in *Acoustic Ocean*. The artist combines ecomedial devices to make us feel the sound of agonistic species surviving in the polluted ocean with the performative actions of native cultures dependent on this environment for their subsistence. Ecomedial devices are also deployed by Rasa Smite and Raitis Smits in *The Atmospheric Forest*, in which data visualization and immersive virtual reality make us feel and be affected by the agony of a primeval forest affected by a persistent drought. Finally, in *Lady Musgrave Reef*, Petra Maitz also combines traditional media, a crocheted collective sculpture, to link participatory art with the innovations of information society [14] and raise awareness about the extinction of the coral reef in a collective mourning. All the commented artworks go beyond and dissolve the divisions between traditional and technological forms of creation, the aesthetic and the societal, humanities and sciences. They are examples of the relation between art and science, but in them the use of new technologies goes beyond the experimentation with new means of creation and the exploration of its effects in human sensorium to construct naturecultures in which sensing instruments do not only are epistemological tools but also the material that construct our actual world and possible agents in the proposal of new ways of worlding.

The shared deployment in these artworks of technology, science, and humanities points toward a paradigm shift, a change in the concept of Nature. Thus, these artworks demonstrate that changes in paradigms are not only a matter of scientific revolutions, the accumulation of inexplicable events causing new questions [15] but the consequence of the encounter between scientific research, technologically enhanced visions and practices, social and anthropological needs, economic upheavals, political debates, and new aesthetical sensibilities. Artistic practice acts transversely across disciplines and

assembles diverse materials and fragments of reality to give a sensible form to these changes in which populations could be aware and engaged. Thus, they share a series of references, conceptual shifts developed in the humanities field that criticize the Anthropocene as Capitalocene, Necrocene or Neganthropocene [16] and turn it towards new concepts aimed at the possibility of a resurgent future like Chthulucene [2], Ecozoic epoch [17], Ecosophy [18], or Gaia [19].

Latour says in the introduction to *Critical Zones*, its last exhibition curated at ZKM conjointly with Peter Weibel, "*Changes in Cosmology cannot be registered without changes in representation*" [20]. I propose that the artworks addressing the Anthropocene go beyond the reviled representation to be inheritors of art practices started in modernity and postmodernity, thus becoming involved agents in the paradigm shifts that conducted to natureculture. Not only a way of divulging scientific propositions, but art has also been instrumental in the creation of simulation apparatuses for the military industry [21] and the development of scientific visualization and simulations [22] as well as in the development of A-Life, as I will comment further on in this text. The origin of this cooperation could be traced backwards since the changes in science, technology, and politics that characterized the second half of the twentieth century and fostered the fruitful art research of post-formalist and post-avantgarde art in its abandonment of the imposed autonomy and its progressive encounter with reality. [23].

2. Situatedness and Art History

Situated knowledge is a proposal linked to feminism and the criticism of universal objectivity [24]. Haraway relies on the work of Sandra Harding and other theorists to assert that there does not exist any privileged point of view or unmediated access to reality that grants disembodied scientific objectivity. Therefore, all knowledge is embodied and meshed in the apparatus of bodily production. As a consequence, truth is not universal nor the result of a disinterested view. Otherwise, it emerges in the cautious follow-up or the noticing of the relations producing and sustaining the considered event. More than the universal applicability of an order based on transcendence, situated knowledge discovers a radical multiplicity of local knowledge. This way of considering knowledge production also has ethical consequences. The domination of the privileged gives place to the engagement of all the agents affected by the definition of a problem and the possible solutions.

Translated to art theory and history, situated knowledge substitutes the lineal progress of Art in a universal history and its numerous exclusions by a plurality of histories and its encounters.

Art History appeared in the XVIII century following the fragmentation of knowledge, when it became a discipline with its subject of study, the artistic phenomenon, which evolved confined in the institutions that established the criteria and values for judging its development – the perfection of naturalism in premodern times and formal innovation in modernity. Defined as a discipline, Art History regards Art as an isolated phenomenon, valued and justified according to its materials, practices and agents whose evolving characteristics allow art historians to classify art productions into a succession of styles [25]. The understanding of Art History as progress, or the evolution of artworks in a unique direction, has promoted theories that privilege some artworks to the detriment of others,

producing numerous exclusions. We can quote the domestication of Avant-garde art, its profusion of subjects – from the study of the perceptual conditions of the subject to the encounter with an accelerated and complexified reality – and methods to encounter reality beyond the classification of genres – as collage, ready-made, performance, and phonetic poetry – under the concept of autonomy and the progress towards pureness proposed by Greenberg [26] or the opposite proposal that reduces Art to the criticism of the aestheticism of Art by the bourgeois society and its institutions [27], both exclusive histories which succession will explode in postmodernity with the encounter of otherness. In this regard, Andreas Huyssen notes that Art made by women and non-European artists, as well as works depicting nature in need of social action, will diversify Art, and its productions, which will go beyond the privilege of formal experimentation and towards the questioning of a new cultural condition [28]. Rosalind Krauss will note another exclusion of modern art theory and include the irruption of new media as one of the causes of the Post-medium condition, characterized by the diversity of media and the abandonment of formal advancement by artists, more interested in using all the media at hand to express more cultural and conceptual claims [29].

However, with the attention of some postmodern proposals to new media, Oliver Grau notices that despite *"Digital art has become the art of our times, 'yet it has not 'arrived' in the cultural institutions of our societies. It is still rarely collected, it is not included or supported under the auspices of art history or other academic disciplines, and it is almost inaccessible to the non-north-Western public and their scholars. To change this is our goal! What is needed is a wider view encompassing media art in the context of the treasures left us by past experiences"* [30]. The collective effort for encompassing Media Art with the treasures of art history has produced a diversity of histories with their complementarities and encounters that trace the development of the principal characteristics of New Media Art – like interactivity [31] [32], the interface, communication [33] or the image transformations in Art and Science [34] – going backwards to the strategies developed during modern and postmodern ages and relating it with the technology and society of its time.

Here, I propose the development of a new history to be added to the existing histories about media art, this time to give an account of one of the exclusions noted by Huyssen, Nature.

The artworks briefly introduced in the previous chapter are characterized by maintaining collaborations with other fields of research, the assemblage of diverse materials organic, technological and scientific data, wearing a complexity in which virtual worlds, simulations, interactive interfaces and artificial intelligence mesh with traditional methods, and multiplying the spaces for both production and exhibition including open-air sets in natural parks, scientific and tech labs, shared workshops and civic centres or the web.

Considering that Art originates in the episteme of its epoch, defined by Foucault as the ontological and epistemological conditions that allow people to establish relations with their environment and nature [35]. The fundamental changes in science and society at the end of the Second World War have produced a new episteme, discovering a world not possible to subsume to the traditional categories that ordered the world during modernity. Art encountered a complex and changing world that cannot freeze in representation anymore. The openness of Art and the research of operational and processual

procedures propitiated an encounter with a Nature endowed with its own agency.

3. Conceptual Shifts in Art and Science

Tracing the histories and relations leading to the strategies assembled in the artworks facing the Anthropocene is a work in progress that exceeds the space and scope of this text. However, in a timeline relating art productions and events with scientific research, philosophical thought, and the increasing societal awareness of ecology (fig. 1), we can observe an intense production around 1970 and 1990. In these epochs, we can account for the appearance of new scientific proposals like cybernetics, systems theory, the ecosystem, and the Gaia Hypothesis that will change how we understand and relate to Nature while fostering the production of new technological devices and media. I follow with a short history outlining some artworks and events encompassing these paradigm shifts.

The acceleration of knowledge produced during World War II gave place to a set of transversal disciplines that bridged different knowledge and changed how we relate to and build our world. The transversal field of cybernetics, assembling technological proposals like the Mathematical Theory of Communication by Shannon, The Fundamental Theory of Servomechanism by Mc Coll and the Theory of Automata by John Von Newman, will not only foster the development of intelligent machines and computation but will change the perception of Nature. The stable entities obeying universal laws will give place to the discrete particles assembled and interacting systems. In this way, the necessary world of Nature that inspired the perfection of society will recede in favour of the relational world expressed in the monist philosophies by Bergson and Whitehead. Cybernetics also explain the role of Art beyond representation and the affective expression of individual subjects. In 1969, Michael J. Apter published the article *Cybernetics and Art* in the second volume of the Leonardo Journal. Discussing the relevance of cybernetics to Art, the author proposed that cybernetics not only allows artists to make Art with computers but also *"holds the promises of taking art seriously"* [36]. Cybernetics is implied in the rapprochement of Art with science and in a new way of interpreting artistic productions as systems interacting and affecting the audience. The capacity of interactive Art to affect and change the audience was also highlighted one year before in the same journal by the pioneer of cybernetic Art, Roy Ascott, and his proposal of behaviourism [37]. I would add that Art not only affects the behaviour of the interacting audience towards a more creative engagement with the artwork but also, assembling fragments of reality into a new interactive whole, the artwork affects the reality in which it appears. This capacity will allow contemporary artist Ursula Biemann to define her practice as worldmaking. Art changes the acknowledgement of the world through distant observation into a *"direct engagement with the world as an intense experience of being"* [38].

Art history explains the audience's involvement in interactive artworks as part of the dissolutions and changes that characterised postmodern Art. In this way, Katja Kwastek links interactivity with the processual procedures that started in the proposals by John Cage and its influence on Fluxus and earlier in Europe with the Dadaist and Surrealist movements. She thematizes interaction as a way of dematerializing the objecthood of the artwork (1) and dissolving authorship, thus including unintentionality (2) and the audience (3) in the art

process towards self-reflexiveness [39]. From the perspective proposed here, '3 stoppages étalon', produced by Duchamp in 1968, is, in addition to a pioneering artwork including unintentionality, an installation that links with the criticism of positive rationality that characterized Dadaism. Allowing the environment to act in his work, Duchamp problematizes the standardized units of science by disrupting the basis of the metric system by chance and the effect of air friction. Also, the paradigmatic work by John Cage '4'35"', from 1952, is not only the receding of the performer to populate the artwork with the reactions of the surprised audience but also allows the environmental circumstances to surface as agents of the performance. The environment will also surface in the *White Paintings* produced by Rauschenberg in 1951. The reflective canvases depict the shadows cast by the passerby public while transformed by the light variations along the day. The collaboration of both artists in the *9 Evenings Theater and Engineering* will also produce pieces in which they modulate the variations on the environment to become part of the piece - sound captured from the exterior or in the exhibition room in *Variations VII* by Cage- or the interactions of the performers become inputs producing changes on the environment - the tennis players switching off the lights of the room in *Open Score* by Rauschenberg- this time through the mediation of technological devices.

The environment will surface more powerfully in the pieces of conceptual artists producing Land Art or Earthworks. More than a critique of the institutionalization of Art, its confinement and commercialization in the bourgeois art institutions, Land Art follows the attention to reality started by Minimalism [40], an encounter with reality beyond the formalistic theorization of Art that Donald Judd formulated in the sentence "Actual space is intrinsically more powerful and specific than paint on a flat surface" [41]. In this processual Art, artworks do not evolve with the interaction of the audience but with the actual natural space transformed, measured and surfaced in the projects by Robert Smithson, Michael Heizer, Walter de Maria, Nancy Holt and others, forming ephemeral dispositions subdued to the multiple agencies and historicity of Nature.

Land Art artists also become interested in cybernetics. The Fluxus Issue of the Aspen Journal, edited by Maciunas and Dan Graham in 1970, included a section dedicated to ecological projects featuring works by Robert Morrison and Oppenheim [42]. These works not only make perceptible the interchanges of energy of natural systems, as later on will theorize Jack Burnham in its proposal of the System Aesthetics [43], but also intervene in these systems by altering their autopoietic loops technologically- as shown in the Los Angeles Project by Robert Morrison, which consists of burying several air-con devices in the forest to measure a posteriori the alterations caused in the climate. The idea of intervening in natural systems echoes the encounter between the ecosystem and cybernetics in *Fundamentals of Ecology* by Odum [44], which not only popularised this new field of research but also increased the operativity of the same by applying the engineering concept of feedback loop to the study of ecosystems. In Odum's proposal, the ecosystem was conceived as a Machine, represented as a computer model. Thus, by understanding the structure and functions of ecological systems, humans can predict system response to disturbance and manage the environment [45].

The constataction of the action of men over Nature accelerated the management and exploitation of earth systems but also raised ecological awareness. In 1962, Rachel Carson

published *Silent Spring*, fostering civic engagement around the protection of Nature. In the 70s, Art will turn explicitly towards ecology. Some well-known examples are the *Survival Pieces* by the Harrisons. Produced between 1970 and 1972, *Survival Pieces* like *Shrimp Farm* and *Portable Orchard* showed the development of natural systems integrating them into human settings, a proposal for granting the resources needed for human well-being.

During the sixties and seventies, we assisted an increasing interest in integrating environmental action in artworks and the development of the first technological mediations that increased the techno-management of Nature, the perception of natural processes and increasing ecological awareness. In the nineties, Art will produce the first integrations of the audience in compounds of Nature and technology through the union of real and virtual space.

The biologist Christopher Langton proposed A-Life, a method to study life evolution based on complex systems theory and simulations. The artists Christa Sommerer and Laurent Mignonneau will be instrumental in developing Artificial Life Art. Sommerer and Mignonneau reunited the influence of processual Art like Fluxus, Performance Art, Early Electronic Art, Art and Technology (E.A.T.), Expanded Cinema, Actionism as well as in Cybernetic Art, and artists such as John Cage, Yoko Ono, Lygia Clark with the study of the theorist of complex systems like Richard Dawkins, John Casti, John Holland, Steward Kauffman, Edward O. Wilson and Christopher Langton to turn their artworks into Interactive Living Systems. Like natural systems that are always dynamic, flexible and input-dependent, Interactive Living Systems are process-based, open-ended, adaptable and environment-centred. Taking advantage of the capabilities of computers for creating, rendering and creating processes, the artists develop generative code and evolutionary image processors that evolve the work in an emergent manner thanks to the input of new information by the interacting audience. In the same way that interrelations between entities are the driving forces behind the structures of life, Sommerer and Mignonneau give the participatory audience a central role in producing complexity and emergence. In their installations, interaction works as a trigger that inputs new information to the system and makes the code evolve in an emergent manner [46], [47], [48], [49], [50].

Their first artwork, *Interactive Plant Growing* (1992), consisted of a set of natural plants equipped with sensors and a screen displaying virtual plants that evolved according to their generative code and the inputs of the audience. The use of a 'natural interface' - the plants, an autonomous form of being that cannot be reduced to pure functionality - creates a continuous hybrid space where real people become part of the artificial world [51]. In this way, the installation produces mutual relations between humans, nature and technology, in which touch is not a gesture of domination but a way to connect and become an integrating part of the Living System. This relationship will become, in posterior works, a relation of care and attention towards the simulated natural world. In this way, in *A-volve*, developed in collaboration with Thomas Ray in 1997, code defines the form of aquatic creatures, which form determines fitness and survival probabilities. The audience can draw forms on a screen that will transform into the genetic code of creatures swimming in a pool. In this second interface, the audience can interact with their originated creatures and help them thrive. In *Phototrophy* (1994), the audience equipped with a torch can illuminate sections of the virtual world, making the

digital-beings mate and proliferate. However, an excess of light could burn and kill the insects. The relationship that the Interactive Living Systems by Sommerer and Mignonneau establish between physical and virtual reality unveils relations of co-dependence with the environment and the unpredictability of human intervention in complex emergent systems, inviting us to reconsider our involvement in the ecosystem.

Some years before, Roy Ascot developed the project *Aspects of Gaia* at Ars Electronica. The project established a global interactive network of participants invited to submit texts, drawings and pictures about the Gaia Hypothesis. An operative interface, a horizontal screen at the Brucknerhauss, displayed the assembled pieces of information. In it, the audience can actively acquire knowledge by composing the information. The result was a portrait combining spiritual, scientific, cultural and mythical points of view. [52].

Formulated in 1974 by James Lovelock conjointly with the biologist Lynn Margulis, the Hypothesis Gaia postulates the biosphere as the ensemble of organisms and all of those parts of the Earth with which it actively interacts [53]. Gaia will encounter the symbiotic theory of evolution by Lynn Margulis to describe the Earth as resilient and non-finalistic, much more than the planet managed by humans of the Anthropocene. Humanists and artists will elaborate on this new understanding of the world in which humans are not the predominant beings but only another integrating part of the alive biosphere. These theoretical and artistic proposals will meet in the exhibitions and events showing the works we have commented on in the first chapter.

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Spatial Oddities

Accessibility and Sustainability in Art and Beyond

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Abstract

Considering that issues of sustainability in contemporary art practices are still fairly little discussed among art professionals such as artists, curators, and scholars, this article sheds light on a complex and urgent problem that involves the entire art world with its developed traditions and structures. However, due to the scale of this issue, the authors have limited the focus of this article to the mobility of artworks, artists, and the wider public.

Simultaneously as pointing critically to the extensive mobility and travelling patterns commenced by the wide international art world, the article asks about the role and responsibility of an artist in this and speculates on what ways artworks and their formats can have an impact. The article provides insights into a selection of existing art genres, their formats, delivery, and methods.

The first part introduces the concept of art tourism with examples of its impact on environmental sustainability. The latter part presents a selection of artworks from the past and present, which, perhaps unintentionally, address or involve sustainability issues through innovative and alternative approaches related to the presentation and accessibility of the artworks. The selection of artworks in the article intends to constitute a starting point for reflections on the tensions and contradictions of what we define as sustainable within the arts. The article maps out existing and historical approaches for presenting art, which seem not to require travel to be able to see or visit the works. In other words, rather than aiming to provide concrete solutions for the current environmental situation or to analyse in-depth the presented individual artworks and their ‘correctness’ or supposed impact on the climate crisis, this article provides an inspirational selection of genres, formats, and methods, which have been emerging throughout the decades with alternative strategies. In our perspective, these examples and methods can be considered as models for future developments in the arts that take sustainability issues into account.

Keywords

Art, Climate Actions, Sustainability, Art tourism, Accessibility of art, Environment.

1. Introduction

Sustainability is a topical term in the 21st century. The report ‘Our Common Future’, redacted in 1987 after the Brundtland Commission on Environment and Development, defined sustainability as humanity’s ability to develop ‘without compromising the ability of future generations to meet their own needs’ (Brundtland Commission, 1987). This definition has since implied that sustainability should be considered along

with the politics of development in all layers of society, including cultural fields.

The article specifically addresses an aspect that is related to mobility, transportation within the art world, and so-called art tourism in general. It offers perspectives and facts about the art tourism sector and presents a selection of contemporary and historical artworks, chosen with a perspective that reflects today’s values and expectations on sustainability. The selection presents models and approaches that could be adapted to today’s art practices, and which could be seen as mitigation actions to the extensive travelling models of the art world.

This article aims to highlight the tensions arising from artistic positions, politics, and interventions that could be considered sustainable in one aspect but are often unsustainable from another angle. For example, by considering how the art world is based on structures such as biennales and other large-scale exhibitions that increase travel and art tourism, but at the same time generate significant economic impact locally.

This selection of artworks is based on the following criteria: works that present ‘nothingness’, works that are physically inaccessible, works that are realised as instructions, and works that are in the networked realm. Compared to traditional exhibition settings, these examples have renegotiated the use of space in new or unconventional ways.

All these formats and concepts could be considered as an art that does not require to be seen or experienced first-hand.

2. Art Tourism

The use of the term *art tourism* follows the definition by A. Franklin, who writes that art tourism includes ‘any activity that involves travel to see art and would include those people who travel very specifically to see art somewhere else as well as those who often or occasionally include visits to see art among other activities during tours, holidays or other trips away from home’ (Franklin, 2018). The article uses this term to talk about the effects of tourism travel and its relation to art; however, the predominant perspective in this article relates to the ways professional artists could potentially influence the world’s sustainability through their created artworks and have an impact concerning sustainability in the contemporary art world.

Tourism is a major industry in the world and is growing annually at a rate of 4% (Lenzen et al., 2018). Research has determined that although the carbon footprint connected to tourism is not well quantified, between 2009 and 2013 it increased by four times the amount estimated and tourism accounted for about 8% of global greenhouse gas emissions (Lenzen et al., 2018). These figures, alongside the ability to easily calculate the carbon footprint and flight emissions (Atmosfair, 2020), lead to the undeniable conclusion that instead of travelling by plane, choosing an alternative mode of travel, or better still deciding not to travel at all would be one of the most efficient actions a private individual could make

towards a sustainable future.

These facts lead to a question: what should we think about the art world and its increasing travel demands? Many artists face a dilemma: on the one hand, developing an international career requires participation in international residencies and art exhibitions that may draw large crowds of art tourists, as well as obviously including the artists' travel. On the other hand, the aim of acting ethically towards the environment requires finding ways to create and present art that would not contribute to destructing the environment and our future.

As early as 2002, Finnish scholar Leena-Maija Rossi was pointing out the accelerating globalisation of the art world in the late 1990s, and the increasing expectation of art experts whose ceaseless travel around the world was necessary to master the expanding field of contemporary art. Rossi highlights how this is connected with disturbing practices - 'the import-export business (as usual), no matter what the situation might be in the world at large, and the embarrassing nationalism occurring side by side with often quite ruthless-looking globalization' (Rossi, 2002). Fast forward 20 years and there is no doubt that a successful career as an artist, curator, or other cultural agency, or an academic researcher, seems to have an ever-increasing unavoidable connection to travelling and transportation of artworks.

The UNWTO (World Tourism Organisation) has concluded that cultural tourism accounts for over 39% of international tourism consumption (Richards, 2018). This large percentage triggers questions on artists' responsibilities concerning these numbers, and whether artists are the people who should be acting and thinking about it.

One can state that the various mega-exhibitions are responsible for attracting large crowds, such as the Venice Biennale and Documenta in Kassel Germany, which are prime examples of global art tourism. In 2022, Documenta15 had more than 738,000 visitors (Documenta 2022), and in the same year, the 59th Venice Biennale sold over 800,000 entry tickets (La Biennale di Venezia, 2022). Both exhibitions, among various others, have become iconic milestones in the contemporary art world and are visited by an international crowd of professional artists, students, cultural workers, and the wide public.

In 2014, the researchers Lehman & Reiser concluded that the culture sector is increasingly seen as one of the drivers for economic development in various places (Lehman & Reiser, 2014). This is especially true in areas where industries have disappeared, and this has resulted in unemployment, deserted town centres, and the lack of work opportunities for people. An example from media art is the Ars Electronica Festival in Linz, a town in Austria known for its former chemical and steel industries. Linz changed its profile by establishing in 1979 the Ars Electronica Festival focused on art, technology, and society. Today this one-week festival attracts over 100,000 visitors yearly, and it has initiated the open all-year Museum and Laboratory for the Future - the Ars Electronica Centre (Hirsch, 2019). This successful case exemplifies well the connections between the local economy and art tourism: how a visionary restructuring of novel industry and technology can attract investment and catalyse economic growth, often via art tourism.

A scholar in object-oriented and ecological thought, Timothy Morton, highlights how one of the attributes of the newly defined 'hyperobjects' is the characteristic of 'hypocrisy', which results in these objects being hidden. In addressing global warming as a hyperobject, Morton points out

how an ongoing process of denial brings mankind to a failure to recognise the real scale of human actions (Morton, 2013). For Morton, this process is linked to a state of shock and the consequent impossibility of acknowledging humans' responsibilities and impact on the planet.

Following the line of Morton's thought, it is a timely opportunity to start to question the values of artists, and diverse cultural agents. With these challenging questions in mind, the following is divided into sections that each address specific characteristics in artworks, which can be seen proposing ways to create art that would potentially not require a physical visit at all, and therefore also potentially mitigate the environmental impact of travel.

2.1. Don't Follow the Wind

The exhibition *Don't Follow the Wind* (2015–) is located in the exclusion zone of Fukushima: a 20 km area that was highly contaminated by the meltdown of nuclear reactors during the Tohoku earthquake and tsunami of 2011 (Nettlet, 2016). Japanese artist collective Chim↑Pom, together with the curatorial team commissioned 12 artists or teams to produce works for an exhibition that was designed to remain unseen at least for the lifetime of the artists. The installation was realised in collaboration with evacuated residents of the area, who provided access and allowed the artworks to be hosted in their former living spaces.

Interestingly along with the main exhibition, several *Non-Visitor Center* exhibitions were later realised by the same collective. These centres were hosted by various institutions around the world, such as Tokyo's WATARI-UM Museum of Contemporary Art in 2015 (Watari-Um, 2015). These developed versions of visitable exhibitions show neither the works in the exclusion zone themselves nor their documentation, but instead display knowledge about the exhibition site with the stories of the former residents and the curatorial team.

In August 2022, the evacuation order was lifted in Futaba town, making some of the artworks of the main exhibition open to the public to visit for a short time.

This example in the exclusion zone of Fukushima shows an exhibition site that, due to contamination, turned out to be a 'non-place': a place where one could not travel to see the artworks first-hand, even if one wanted to. This example presents an unexpected approach to displaying art. The artworks were located from the beginning in an area of an exclusion zone, which nobody could enter. This obviously points to questions about the meaning of the audience in such a setting. Does art have value and significance without an audience?



Figure 1: Don't Follow the Wind. Image: Exhibition Catalogue

2.2. Exhibiting Nothingness

Often considered to be the constitutive artwork presenting empty space is Yves Klein's work *The Specialization of Sensibility in the Raw Material State into Stabilized Pictorial Sensibility: The Void* from 1958. Klein removed everything from a gallery space except one large cabinet - which is, ironically, often seen in old photographs of the work. The Void presented the absence of things and embraced empty space; the success of the work was based on what was not shown. Klein has said, 'I sought to create an ambience, a pictorial climate that is invisible but present' (Klein & Ottmann, 2007). This artwork presents nothingness and therefore one could assume that as there is nothing to see and nothing to sell, a visit to the location is not necessary. Obviously, the 1958 exhibition by Klein was a huge

success as thousands of people visited it with a wish to experience 'nothingness'. Later on, numerous other artists followed this direction with their often concept-driven works.¹ Similarly to the previous example, Klein's work leaves open the question of whether these types of works need to be experienced on site or is it enough to simply know about it.

Another example of a comparable approach to art are works, which are constructed in a way that they make the visit to the site irrelevant as it is impossible to see them. For example, the work from the 1970s by Bruce Nauman, *Audio-Video Underground Chamber* (original Nauman, 1974, via Mumok, 2004)ⁱⁱ, consists of an empty chamber that is made of concrete and buried underground. Installed inside, a camera and a microphone transmit continuous audio/video channels to a monitor. There is nothing more to be seen above the ground and no intention of inviting anyone to ever enter this underground space physically; it is simply inaccessible.

A more recent example of a work that is not inviting for a visit but instead offers the possibility to call the work via phone is Kalle Laar's sound art project *Calling the Glacier* (Laar, 2007). In the physical location there is not much to be seen; however, by calling the given phone number, one can hear flowing water, sporadic cracking, and other sounds generated from the melting glacier. *Calling the Glacier* deals with the large-scale phenomenon of climate change and brings it to our attention the sound of the disappearing of the planet's glaciers (Søndergaard & Beloff, 2020). In its simplicity, this work makes a strong statement about sustainability and climate change. In a sense, this work is accessible from everywhere and anywhere with a phone connection. There is no need to travel as the experience can be equally strong whether you are in your home or in a museum.



Figure 2: Kalle Laar: Calling the Glacier. Image courtesy of the artist

The unexpected formats of these works present excellent examples of artworks that, from today's perspective, address environmental challenges through their innovative approaches and structures. When considering the art world at large with its developed configurations and focusing on the destructive impact of art tourism and travel on the environment, the last represented example in this section has taken quite a different approach. The work is a physical object, but instead of expecting visitors to travel to experience it in a gallery or a museum, the object is given to visitors to carry. The presentation of this work is based on sudden encounters on the street. *Empty Space* (Beloff, 2009) is a wearable object in the form of a transparent capsule which is a physical vacuum; it is a concrete "empty" space that can be dedicated to a visitor's loss via mobile network. In a sense, one can state that the work is a wearable parasite, which uses a human as a vehicle to move from place to place (Beloff, 2014). In other words, it does not expect one to travel to a specified location but uses everyday human mobility as its exhibition space. The work can be experienced only via sudden encounters, or by voluntary participation as the carrier of the work.



Figure 3: Laura Beloff: Empty Space. Image courtesy of the artist.

2.3. Space

A parallel perspective to the previous examples is shown by artworks that are designed to be sent to outer space. Today, there is no way to encounter these works beyond the representative images and potential media coverage of their space travel. These works completely reject the premise that they should be seen and experienced on Earth. Therefore, questions of representability and reproducibility, differences between copy and original – and concerns around how works are perceived by a human audience – become quite central. The works are created from the beginning as pieces that will not be seen by a human audience, except in representation - in images and descriptive texts.

The very first artwork that was sent to outer space in a spacecraft is the *Moon Museum* (1969). It was a tiny ceramic plate that had engraved drawings of contemporary artists (at the time) like Rauschenberg and Warhol. The *Moon Museum* was left on the Moon during the Apollo 12 mission (Barnbeys, 2019). Obviously, we can't be certain if this object resides on the Moon or somewhere else. This art object was made only to be viewed beforehand and in representations.

One can say that, throughout the latter part of the twentieth century until today, space has been considered an interesting exhibition venue.

In particular, among examples of speculative projects initiating a discussion about the creation of an 'interplanetary exhibition space' on Mars, is Claudia Reiche and Helene von Oldenburg's project *Mars Patent* (2009).ⁱⁱⁱ The artists invited readers, artists, and even aliens to submit 'everything that does not fit entirely on Earth but gravitates towards the Mars Exhibition Site' to be possibly de-materialized, destroyed, and teleported to Mars by the means of the 'High Reality Machine', a supposed teleporting device. The artists also warn that 'no matter will remain without damage' (Reiche & Von Oldenburg 2006).

Even though these example artworks were not specifically created to address issues of sustainability concerning travel, when looking from today's perspective they can initiate reflections on this aspect, as traces of ecologic thinking, even if sometimes nonintentional. At the same time contradictions arise from the public presentation of these works, which show them either as copies, simulacra, or interrelated narratives revolving around the hidden artworks – like in the case of the Fukushima-project and its parallel exhibition, *Non-Visitor Center*, which follows the traditional exhibition logic. These types of works don't offer solutions but rather reflections and in-depth questions that contribute to the discourse on sustainability today by showing how artists with defined art forms and methods can bring about new ways of reflecting on specific issues, thus fostering awareness and further reflections on these topics.

2.4. Instructions as an Artwork

Around the 1960s, various artists – many of them connected to the Fluxus movement – started developing artworks as instructions (Johnson, 2020). Instructions for allowing a piece to be performed by a different person can be recognized as a characteristic process of music composition, in which a music score includes indications of how the piece should be executed. The tradition of writing instructions as artworks originated from a process of transposition of a musical 'language' into art. A very well-known example is *4'33''* (1952) a music score by composer John Cage. The work consists of a time-score, during which no sound is produced by the musical instrument present, but other environmental sounds perform the piece. Writing a score to be performed without intentionally producing concrete sounds can be considered a constitutive feature of an artwork as instructions. Several artists, later connected to the Fluxus movement, attended a composition course held by Cage at the New School for Social Research in New York in 1958 and produced artworks as instructions (Friedman, 1998). Among them was George Brecht, a chemist and self-taught artist, who developed his famous *Event Scores* during this class (Ouzounian, 2011). The term 'event' derives from Cage's concept of music as 'events in sound-space' which, in Brecht's explorations, extended

beyond sound (Ouzounian, 2011). The *Event Scores* setting became popular among the artists, and Yoko Ono was among the first to develop *Event Scores*. Her art book publication *Grapefruit* (1964) is a well-known example of this type of work. Contrary to Brecht's, Ono's were mostly instructions for imaginary acts.

Rather than being in locations of non-accessibility, these works could be performed in any location, without the need for the artist to travel. The scores, or instructions, often a piece of paper, could be sent by mail.

Another example of an artist who started, during the same period, to develop artworks as instructions was Sol LeWitt. He remained unrelated to the movement but, similar to Fluxus artists, LeWitt also considered his work to be originating from music. In 1968 his *Wall Drawing* work series consisted of large-scale drawing pieces meant to be exhibited temporarily in diverse venues. Detailed instructions were provided for the execution of these drawings, which were supposed to be carried out by someone else. This would leave some freedom for interpretation so that the final artworks would differ from each other even when following the same instructions (Ostrow, 2017).

Inspired by Sol LeWitt's wall drawings, Casey Reas started developing his software art in early 2000. Reas considered LeWitt's drawing to be a way of writing programs, to be executed by people instead of machines. From this idea, he created his 'software structures,' artworks developed from programming to be executed by computers.^{iv} With the intention of re-making some of LeWitt's drawings using this technique, Reas considered the fundamental difference between a wall painting and a software work as a difference in the used support. The size of the screen displaying the artwork and its resolution, and even the possibility of projecting on an actual wall would then correspond to the different surfaces encountered by LeWitt's *Wall Drawings* (Reas et al., 2004, 2016).

Artworks as instructions appear to be a sustainable way of making art without the need to travel, and the most recent developments of this type of work involve the use of computer technologies. We will discuss in the next section how sustainability issues relate to this latter art form.

An interesting similarity occurs between instructions as an artwork and some of the recent experimental art practices, such as bioart. Bioart, or the field of biological arts, is an art practice commonly created in a laboratory setting. In this context, it is almost obligatory to follow laboratory protocols and methods, which are often adopted from the sciences. These protocols are typically instructions aiming at ensuring success in the experiments conducted. However, when performed as artistic activities, they may differ drastically in their aim and motivation. Many different protocols are widely available for anyone to perform; several lab-based artists and cultural activists use them, but also make their own protocols available to others. One can claim that this practice requires no travel to a specified location, but still requires access to a (local) laboratory. As a difference to the above-introduced genre of art, which presents instructions as artworks, the protocols in Bioart are not intended as artworks themselves, though the action of executing them is often seen as a cultural activity when performed in the art context. This is a performed action that is based on strict instructions rather than a created and exhibited artefact. However, one should mention that, in many cases, a representational result of the process is exhibited later on, often in a traditional format.

2.5. The Virtual (the Network)

A commonly proposed area for seeing art without travel is the virtual realm of the Internet with its digital, immaterial, and endlessly repeatable data and images. To exist, it uses the given infrastructure of the network. A brief mention is necessary to another comparable art genre: mail art was globally active parallel to the same time as the digital networks were pioneered in the 1980s. Mail art was particularly relevant to artists working in countries where access to contemporary Western art was limited, such as those of Eastern Europe (Shanken 2003). With mail art, artworks arrive at a receiver's home using the existing infrastructure of the postal service, instead of requiring a travel to see them.

Similarly, one can say that online digital art does not require travel. Coding is a type of instruction that can be followed by anyone with access to a computer and a network. However, there are other questions concerning its sustainability. It has become clear that these kinds of networked and “immaterial” artistic practices are producing a high carbon footprint. The following discussion will cover sustainability concerns related to digital and networked art with recent and historic examples.^v

In recent years there has been a “hype” over the creation of NFT artworks. NFT stands for *non-fungible token*, and these use blockchain technology to be non-replaceable in the digital world (Sharma, 2023). This means that it is not possible to create an exact copy of the artwork as each work has its own identifying code and metadata attached. This emerging possibility to make the work unique is interesting for investors and collectors, but also for artists who may become high-price-selling authors of NFT works. In short, the NFT establishes ownership; only one person can have the original, though it may be possible to buy a reproduction of the original work. It is interesting that the idea of having defined ownership of works in the digital realm somehow seems opposite to what the digital and networked world had initially foreseen to become by its early developers, hackers, engineers, and coders (Levy, 1984). When we consider the question of sustainability in the NFT world, as well as sustainability in the online world in general, issues take a darker tone. While these works do not have materiality or require physical space, we can recognise that they need electricity and networks for their realisation (minting), digital transactions, and in general for their existence. Today, it is a known fact that the minting process of a single new NFT has a hefty negative impact on the climate (NFT Club, 2022; Tsui, 2022). Many artists working with digital networks and NFTs are aware of these challenges, and there have been active developments for lowering the carbon footprint as reported, for example, by the NFT artist Memo Akten (Akten, 2022).

The history of new media art presents early experiments in using technological networks for participatory artistic purposes. An example of well-known pioneering works that were based on network infrastructure was *Hole in Space* (1980) by Sherrie Rabinowitz and Kit Galloway. Two large projection screens: one in New York City, the other in Los Angeles, set up for three consecutive days, enabled groups of surprised viewers to see the others in real-time across the space, which collapsed the distance and experience of real and virtual, local and remote. Another pioneer, Roy Ascott, coined the term telematic art, which references this kind of use of computer networks as an artistic medium (Shanken, 2003). Ascott's artwork *La Plissure du Texte* was organised with 14 remote

nodes around the world. People taking part in each node were contributing via text to the shared narrative as archetypical fairy tale characters (Ascott, 2003 [1984]; Medien Kunstnetz, N.d.). At the time when this and other early network-based artworks were created, there was no wide availability of the internet or mobile networks as we know them today, and the produced works often required expensive satellite connections and hard-to-get hardware. Obviously, at the time there were no visible concerns about sustainability concerning the production of these artworks. However, they present interesting examples, as they were the first to speculate on the possibilities of creating art that exists within a network instead of as a physical commodity.

Furthermore, going beyond the network as a media and material, one can ask how issues of sustainability or unsustainability around technological network-based art are addressed and implemented in contemporary artworks that have been realised in recent years.

3. Conclusion

One can view the recent decade as an epoch connected with a prominent artistic turn towards environmental issues. Philosophy scholar Timothy Morton writes the following in connection to hyperobjects such as global warming: ‘Reasoning on and on is a symptom of how people are still not ready to go through an affective experience that would existentially and politically bind them to hyperobjects, to care for them. We need art that does not make people think (...), but rather that walks through an inner space that is hard to traverse’ (M. 2013).

Environmental issues have also been our trigger for this article, which addresses the viewing traditions and sustainability of art and its audiences, especially in relation to travel. Our aim has been to map out alternative strategies within artworks, which challenge the traditional artefacts and exhibition formats.

While writing this article, it has become utterly clear that achieving sustainability is not an easy task. To attain anything close to “sustainable” requires a holistic approach that can challenge conventions. Sustainability in (art)practice is full of failures, contradictions, and open questions. Although artists have contributed to bringing awareness to these issues with their work, it is clear how art tourism, as an example, contributes to developing the same problems. On the one hand, specific artworks bring awareness to a fragile environment in radical transformation, and on the other hand, the very fact of travelling to see them enables unsustainable practices. The article has ironically offered a selection of existing art genres and artworks, chosen based on the formats that challenge today's art world and its requirement for exhibition travel.

In this article,^{vi} the global effects of art tourism are the chosen focus for representing the larger issue of sustainability in the art world, which seems to be lacking concrete actions. The authors propose that these types of alternative models will be adopted and adapted by today's artists and possibly inspire contemporary artists to imagine new formats for sustainable art practices.

Morton, among others, critically points out the role of art in enabling a way to cope with hyperobjects, highlighting specifically how certain artworks, in particular those which give body and voice to what is unseen, may help to overcome the rift between the appearance and essence of such objects. In other words: art may be the very means to start a process of

awareness to finally acknowledge humans' responsibilities and our need to act.

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- iv <https://artport.whitney.org/commissions/software-structures/map.html>
- v In this section, we focus on artworks that are made to be viewed online. We are not considering here artworks that have their reproductions online, but those in which the actual physical work exists somewhere else. Nevertheless, we note that such digital reproductions of famous artworks in museums may act to encourage audiences not to travel or, alternatively, may function as a trigger for a planned trip to see the original.
- vi We would like to note that the focus of this article is mainly on the Western art world and artists. It can be assumed that the influence of globalisation has led to similar issues appearing also within non-Western cultures. However, the concept of art tourism is visibly prominent in our Western art world.
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Observatories over the Critical Zone

Monitoring and “thought exhibiting” art-lab ecological practices

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Abstract

The ZKM Center for Art and Media in Karlsruhe, Germany, was the site of a two-decade-long collaboration between the curator and media theorist Peter Weibel and the sociologist Bruno Latour. This partnership resulted in four “thought exhibitions” that aimed to update a curatorial approach to research. Critical Zones: Observatories for Earthly Politics, the last of these exhibitions, not only aligned with Latour’s well-known interest in climate issues, but also signaled a reconfiguration of a particular art-science subfield. The term “Critical Zone” refers to the thin outer layer of the Earth’s surface, from the treetops to the groundwater, where fundamental life-supporting biogeochemical processes take place. This fact constitutes the premise of the exhibition, which is conceived as a platform for the convergence of Latourian “interconnections of actants”, forcing the coordination of human and non-human relational agencies. Artistic practices reflect the specific operativity of new media art, reinventing performative practices that closely resemble those of scientific observatories or laboratory outposts. Monitoring data, mobile and field research replicate the role of the Critical Zone Observatories (CZO) – the international network of labs studying soil processes – and reconfigure a possible ‘laboratory life’ in emergency response.

Keywords

Thought exhibitions; artsience; lab studies; critical zone; ecology

1. Introduction: Thought exhibitions as display testbeds

Critical Zones: Observatories for Earthly Politics (2020) is the latest in a series of four exhibitions marking the collaboration between Peter Weibel, artist and director of the ZKM Center for Art and Media in Karlsruhe, Germany – which hosted them all – and sociologist Bruno Latour. As with the previous *Iconoclash* (2002), *Making Things Public* (2005) and *Reset Modernity!* (2016), they settled on a precise term to define them: *Gedankenausstellungen* (or “thought exhibitions”, from German), suggesting an interdisciplinary art-science approach to curating. In fact, this compound word originated as a variation of Gedankenexperiment (or “thought experiment”), a concept common to the hard sciences that describes the practice of imagining a hypothetical situation and analyzing it logically without the need for physical intervention. The underlying idea of this methodological approach is quite clear: to apply to artistic representation the impossibility of testing certain ideas except on a different scale, much as theoretical physicists use models for hypotheses that cannot be contained in a laboratory:

An exhibition offers a perfect scale model to test ideas which, as you said, are much too vast to be treated head on. It’s a good habit to consider that

exhibitions of- for an equivalent of what scientists call a “thought experiment”: when you cannot test a theory because it is too farfetched, you test it in your head and intuit – or sometimes discover! – what the result could be. [1]

It thus acts as a shift into an additional “mode” that can only be studied experimentally, as a test [2]. This practice allows for theoretical solutions, such as a flexible relationship between the containment of ideas within a laboratory and the recognition that the laboratory itself is an unsuitable setting for capturing planetary art trends. Unlike traditional exhibitions, *Gedankenausstellungen* would be formed in their hypothesis, leaving the display stage with only the function of testing: reasoning, therefore takes place mostly in advance and is resolved in phases of “planning and “debriefing” [3].

Such phases involve the idea of broad collaboration across disciplines, as numerous as the fields participating in the current art system, whose boundaries are constantly challenged and shifted. In this way, curatorial experimentation takes on the guise of a productive clash between disciplines. A methodology that integrates various Latourian threads: an exploration of “laboratory life” as a social construct [4], the “heterogeneous engineering” of Actor-Network Theory (ANT), engaging both human and non-human agencies [5], and finally, the evolution across many ‘truths’ moderns have discovered over time [6], including the management of the ecological crisis. Throughout the four exhibitions, we will witness the transformation of the ANT’s ‘anatomical theatre’ – with its «significant suspension of time, space and realism» [3] – into an increasingly porous (but no less rigorous) structure of inquiry, open to actual emergence.

It’s no coincidence that *Iconoclash: Beyond the Image Wars in Science, Religion, and Art*, the first of its kind, is the most abstract and closest to art aesthetics. The exhibition is particularly concerned with the material status of the image, featuring Duchamp’s ready-mades, Malevich’s Suprematist paintings, scientific documents, screens, and religious objects. It’s also where the initial hypothetical model was first articulated: «Is there a way to suspend the iconoclastic gesture in order to interrogate instead of extending it further?» [3], accompanied by a statement from Latour himself, which establishes a foundational laboratory identity:

Nowhere else but in contemporary art has a better laboratory been set up for trying out and testing the resistance of every item comprising the cult of image, of picture, of beauty, of media, of genius. [7]

What we want to emphasize is the constant shift between different settings or, in ANT terms, ‘translations’. This process continues until the final exhibition, where the feasibility of the concept will challenge the limits of the gallery – spatially, socially, and structurally – as a site for a planetary survival experiment. The ‘public’ dimension will become increasingly pronounced, starting with *Making Things Public: Atmospheres of Democracy*, where the ‘outside’ begins to prevail. This is followed by *Reset Modernity!*, which embarks on a thought

experiment aimed at exploring once again a radically theoretical suggestion: the “resetting of modernity”, like a recalibration of a compass. This should allow the so-called ‘moderns’ to re-establish a positive political dialectic through various operations, of which climate is an essential aspect.¹ A clear statement of this transition towards an ecological subfield is the inclusion of Pierre Huyghe’s installation *Nymphéas Transplant*: a piece of topsoil (with plants, fish, amphibians, insects...) from under Claude Monet’s famous water-lily pond at Giverny, the site of his Impressionist paintings, is displayed under an ‘intelligent glass case’ that accurately reproduces the historical local weather conditions at Giverny between 1914 and 1918 – the date of the paintings.

2. Artistic coring in the Critical Zone

Nymphéas Transplant introduces the subject of the last exhibition (opened in May 2020, initially as a virtual event due to the restrictions imposed by the global COVID-19 pandemic), offering a glimpse into the fragile part of the Earth’s membrane where organic life has evolved, which scientists refer to as the Critical Zone [9]. The Critical Zone, as first defined by the U.S. National Research Council [10], encompasses the area from the lower atmosphere to the bedrock. It is characterized by its fertile geochemical permeability and by layers inhabited by organisms (lower atmosphere, canopy, soil, weathered rock) that make our planet the only one known to be capable of sustaining life. Weibel and Latour’s choice is reinforced by the fact that the Critical Zone is not only the thin layer where humanity found its place in the universe, but also the site of intense interconnection between the scientific disciplines that led to its conception in the nineteenth century: geology, chemistry, hydrology, and ecology. In the context, this network is joined by other fields such as art and medicine, the latter acting as a catalyst to launch exhibition ideas through a bodily analogy:

When a sick person enters an intensive care unit, the first thing caregivers do is to apply multiple instruments to get a good reading of the main variables that will help physicians to monitor the patient’s condition. In the same way, it is necessary to devise Critical Zone Observatories (CZO) for the Earth, to monitor all of the different parts that compose the fragile and complex domain of the Critical Zone, and to come to understand how it has worked in the past and how it is going to cope in the future with human activity. [11]

A fascinating collection of lab-like artworks is presented in a geo-traumatic environment. These artworks are engaged in meticulous monitoring, constantly screening the conditions of the Zone through technologies, media, and politics. They blend seamlessly into and contribute to this layering process, leading to further networks of individual and collective agencies. ZKM’s latest thought exhibition seems to signal a shift in a media art trend that has been quietly developing for years. This trend has gradually transcended the walls of traditional and media labs, venturing into outdoor experimentation and direct interaction with environmental data. Mobile facilities, digital tools, team organization, and interdisciplinary collaborations have all played a role in expanding what was once a more isolated and conceptual art domain. Each of these unique facets

of the lab results from horizontal and experimental collaborations between different disciplines, all converging toward common goals, whether defining terrestrial terminology, monitoring it, or conducting a curatorial project.



Figure 1: Starting to Observe, Atrium 2. *Critical Zones. Observatories for Earthly Politics*, ZKM, Karlsruhe 2020. Photo: courtesy of Tobias Wootton

The Critical Zones catalogue bears a telling subtitle: *The Science and Politics of Landing on Earth* [12], highlighting the act of landing “on Earth” as the primary and ultimate place we are given to inhabit. In the coexistence network of a collective terrestrial pathway, laboratories play a crucial role, identified by the curatorial team as actual structures: the Critical Zone Observatories (CZO), whose activities are mainly presented in Atrium 2 (Figure 1). The observatory chosen for the exhibition is the Strengbach Observatory, located in the small village of Aubure on the French border, about 150 kilometers from Karlsruhe. However, CZOs remain entities spread across the globe. In 2007, following an initial spark in 2003, the U.S. National Science Foundation launched a pilot action to establish a systematic network of observatories capable of monitoring processes on the Earth’s outermost surface. The first round of funding supported three field labs at the University of California Merced, the University of Colorado, and Penn State University. Shortly after, three more were added in the U.S., followed by an additional four. This model inspired similar initiatives in many other countries around the world, leading to a more structured organization of research clusters.

A single site is not sufficient to develop and test ideas about how interactions between tectonics, fluid transport, weathering and biological processes shape the Earth’s surface. Instead, we must network data, ideas, models and tools [13] to build the integrated understanding we hope to achieve. [14]

A networked realm. What makes it even more fascinating from the perspective of a thought exhibition is the fact that these multidisciplinary approaches do not prescribe a single directive for how a CZO should be designed and operated. With a distinct ANT flair, they are described as “a network of networks” [15]. At the ZKM, these methods are highlighted by displaying tools

¹ As Latour already expressed it in a seminar at the Collège de France on 26 November 2003: «The [...] moderns presented themselves to history as those who would in the end be torn away from all archaic and natural determinations; so what did they do then? They multiplied their attachments, at an ever increasing scale, to an ever more intimate degree of involvement, with those (ever more numerous and

heterogeneous) who allowed them to exist. They speak of emancipation at the very same time that they have to take charge, via legal, technical, mechanical and human means, of beings as vast as the climate, oceans, forests, genes... a strange liberation which has done the opposite: created attachments!» [8].

used in weather stations, gravity measurements, water and earth studies, tree, and river basin research. This part of the exhibition follows the idea of showing science ‘in action’, a concept related to Latour’s ideas [16], realized with the help of the architecture studio Société d’Objets Cartographiques (SOC).

Specifically, Alexandra Arènes attempts to provide a visual representation of the CZO, noting the limitations of traditional Cartesian mapping and even more advanced diagrams. Although diagrams are often regarded as excellent visual companions for media theory, they lack the capacity to delve into the multifaceted ‘deep time of the soil’. The monitored terrain of Aubure shows complexity both spatially (with different layers of the Zone interlocking in a non-linear) and temporally (considering sedimentation, growth, seasonal cycles, plant life stages, and atmospheric events – essentially requiring the consideration of multiple time scales):

Borders, frontiers and lines are not enough to describe landscapes at a time when we need to visualize environmental changes: the melting of ice, the flooding water or the atmospheric pollutants scattering everywhere [17].

The alternative map-making process she presents in this section, referred to as an abacus or model, begins with an in-situ ethnographic study and then illustrates what Arènes calls “the glove operation”. This approach shifts the focus from the Earth’s core to its surface skin, emphasizing the representation of the soil. Although the chart is two-dimensional, it aims to reflect not only the surface but also the depths by drilling down into the layers. Each moves at a different pace: circles indicate layers, monitoring stations intersect with the natural cycles of atmospheric particles. As Jussi Parikka notes in his catalogue review:

The collection argues that the critical zone is a perspectival space – even a material texture – that is epistemologically significant. It is pitched as a way to break down “the cartographical view of planet Earth” while it is also meant to interrupt “the legal and political unity of any global view.” [18].

Atrium 2 becomes the driving force behind the entire exhibition, bringing together several key elements: the potential of outdoor labs operating directly in the wild (and how these are also open to creative realms), the adoption of an ethnographic approach typical of laboratory studies [4], and finally the presence of Gaia in the curatorial narrative, as proposed in the hypothesis of the same name introduced by James Lovelock [19].

3. Monitoring and shaping

The exhibition is enriched by a variety of study objects, including rocks from natural history museums, travel documents, books, videos, more traditional works of art (such as Courbet’s *Deer at the Spring*, which draws attention to the depiction of rock strata), and contemporary and media art. Amidst this plethora of inputs, the narrative seems to question the expanded role that varied agencies could play in a ‘modern natural history.’ Once again, the ‘observation of the observer,’ approached ethnographically, emerges as a central theme, acting as a chosen medium for both media art and terrestrial politics to probe the state of the Critical Zone. Alexandra Arènes’ ‘abacus,’ which serves as a navigational device for the CZO section, is based on detailed field research conducted alongside scientific personnel. Similarly, some of the artworks on view seem to

speak the same language: if we are not allowed to leave this planet – as the narrative of *Critical Zones* constantly reminds us –, this only reinforces the idea of using the entire Earth’s crust as a space for exploration, display, and connection. The more contemporary pieces include different solutions and a wide range of media: mechanical works, installations with documentary narratives, immersive VR experiences, but there is also a fascinating core that perfectly encapsulates the integration of media art into an extended lab environment. This includes Yu Hsin Su’s work *Frame of Reference* (2020), a complex video installation created during a period of field research at a CZO in Taiwan’s Taroko Gorge. This site serves as an interdisciplinary workspace for scientists dedicated to monitoring the explicit and implicit activities of the Critical Zone, with a particular focus on river erosion and landslides. The work is presented with a distinct media art perspective, highlighting the supportive yet crucial role of telecommunications within these laboratories: antennas, computers, networks, and shared databases. Indeed, the relationship between the inside and the outside is constantly being forged both in the observatory’s field trials, and in the communication routes between the local NCTU Disaster Prevention, Water Environment Research Centre and the GFZ German Research Centre for Geosciences in Potsdam, a data analysis center:

With the disappearance of [the] metaphysical Globe, I am interested in the shift from [the] “view from every- where and nowhere” to [the] “view from within,” and examine the infrastructure of [the] view from within. How do those sensory instruments form images within [the Critical Zone] and facilitate relationships between different materials and events at different scales? [11]



Figure 2: Su Yu Hsin, *Frame of Reference I & II* (2020). Installation view in Taipei Biennial 2020 *You and I Don't Live on the Same Planet*, Taipei Fine Arts Museum. Courtesy the artist and Taipei Fine Arts Museum. Photo: Yuro Huang

The internal perspective is one of the “anti-planetary processes” that the exhibition seeks to trigger, playing on the corresponding anti-escapist view of the globe. While the external perspective of the Earth, exemplified by the historic space photograph known as *Blue Marble*, taken by the Apollo 17 spacecraft on its way to the Moon in December 1972, and the preceding *Earthrise* by the Apollo 8 mission in 1968, may have introduced a broader gaze, it also consolidated its exact opposite: the depiction of a confined planet, singularly alive in the galaxy, whose “warm coexistence” within is both a necessary and productive condition. As Latour states:

This is why “Critical Zone” is such a useful term: it helps us to free our imagination from the attraction

of the too-famous Blue Marble. We are not space aliens. We reside inside a thin bio- film no thicker than a few kilometers up and down, from which we cannot escape – and, “Critical Zonists” would add, whose reactions (chemical alterations and geological mechanisms, as well as social processes) are still largely unknown. [1]

Such a disruptive image can lead to reflections on shifting perceptions, both individual and collective, as highlighted in a dedicated chapter by Laura Kurgan [20], who also mentions Denis Cosgrove’s commentary. Cosgrove notes how the different generations of Blue Marbles, in addition to evoking images of global unity, have undergone transformations, moving the core of the visual culture from traditional photography to composite and virtualized satellite images, leading to an increasingly prevalent “infrastructural” sentiment [21]. Indeed, the external perspective now seems largely a collective construction of the internal infrastructures that make up the blue sphere; cables, data transmissions, sensors embedded in the ground, core samples, and from underground observation structures extending beyond the treetops to satellite transmission sites. Thus, to return to the ZKM, a combination of fixed cameras, mobile drones, data from seismometers and weather stations inform *Frame of Reference*, which in turn replaces first-degree vision with data, then passes through a second transmission system directly to the databases of a research center in Germany. The structure of the multiple video panels on display takes the shape of a nested interplay of relationships. As Jussi Parikka writes, describing the artwork:

The composition of carefully crafted scenes is cinema about instruments. The scenes could be narrated as featuring scientific practice but there’s more at play as you can imagine. It is not that frame of reference is only about scientific practice of measurement and the critical zone of life that covers the planet but that the images become instruments that start to compose the space they are in. They are involved. They are based on but also feed forward observations. These involved observations are, as Su Yu Hsin tells us, on the ground as the surface layer of life, but they are also off the ground; these spaces are seen through the capacity of the instruments which allow the space to lift from a specific place onto a (data) server across the planetary surface. [22]

As the quote suggests, the image remains the centripetal force of the piece, but at the same time the fieldwork aspect refers to a tradition that is not entirely new. As early as the 1990s, a certain trend emerged in media art based on a growing and increasingly urgent relationship between art and science. This trend was also reflected in curating, in a ‘research turn’ of artistic exhibitions that gave rise to a wide range of cultural phenomena: from media labs and festivals to exhibitions such as *Laboratorium*, curated by Hans Ulrich Obrist and Barbara Vanderlinden in Antwerp in 1999. That exhibition experimented with the theoretical overlap between the artist’s studio and the scientist’s laboratory, which at the same time opened to topographical space [23]. Latour himself took part in the event, proposing a re-enactment of Louis Pasteur’s 1864 conference experiment to refute spontaneous generation in favor of

biogenesis. In this demonstration, the scientist showed how he had contaminated the flasks of his rival, Félix-Archimède Pouchet, with micro-organisms.² Marko Peljhan was also present at Antwerp. He had worked along a similar path of hybridizing media art, outdoor field research laboratories and telecommunications, and is probably one of the most pertinent examples of a pioneering era. His *Makrolab*, which he began designing in 1994 and presented in its most historic iteration at Documenta X in 1997 (and later in Australia, Scotland, Italy, etc.), was a mobile, self-sustaining MIR-shaped laboratory for artists and scientists equipped to monitor climate research, migration, and telecommunications. It was a small, self-sufficient system that used wind and solar power, recycled waste, and provided for the survival of its operators for up to 120 days. In the mid-1990s, the main theme was an updated perception of globalization and its politics, as well as a technologically expansive and non-pauperized ecological approach. However, from our perspective the form of the laboratory is equally interesting. Peljhan wanted to reach out to the physical site of research and install an outpost where artists could directly experience the data. Although it lacked the geochemical approach of today’s CZOs, the small mobile structure was equipped with meteorological detection tools, radio communication technologies, and observation and recording equipment. As Andreas Broeckmann points out, the project combines a constructivist avant-garde approach with a systems aesthetic that favors “the effective intervention into the construction of a political and ecological reality” [24].



Figure 3: Barbara Marcel, *Ciné-Cipó – Cine-Liana: ATTO – Amazon Tall Tower Observatory* (2020). Multichannel video installation. Film still courtesy of the artist

Similarly to *Frame of Reference*, Barbara Marcel’s 2019-20 video installation *Ciné-Cipó Cine-Liana at ATTO (Amazon Tall Tower Observatory)* is also on display at the Critical Zones exhibition (Figure 2). Located in the heart of the Amazon rainforest, the Tall Tower Observatory is a scientific research project collaboratively undertaken by Brazil and Germany, involving the INPA (National Institute of Amazonian Research) and the Max Planck Institute for Biogeochemistry. ATTO, one of the tallest towers in Latin America, overlooks the rainforest far from any urbanization (the nearest city, Manaus, is 150 kilometers away) and offers a vertical perspective on the Critical Zone. Here, scientists work together in another example of a scientific monitoring community, investigating the relationships between the forest, the different soils, and the atmosphere of the region to better understand the planetary impact of the Amazon basin on the Earth system. Marcel applies an artistic-scientific

² Latour developed a concept called the “Theatre of Proof”, a series of historical re-enactments that explored the nature of experimentation. While working on this project, Latour also explored the thought experiment in the field of art exhibitions. He identified two key challenges in creating these exhibitions:

the difficulty of finding appropriate materials to represent the experiments, and the challenge of making the atmosphere of a laboratory accessible to the public [23].

approach to this community, altering the daily life of the laboratory by incorporating the voices and experiences of two local activists (Natalina do Carmo Oliveira and Milena Raquel Tupinambá), who bring a unique anthropological take on the complexity of the rainforest. Here too, the role of telecommunications remains central, through the creation of a temporary radio station capable of broadening the participation of mutual knowledge between scientists (in media forms) and the population (in political forms).

4. Conclusion: Gaia's Graft

The translation of the hypothesis posed by Critical Zones is found not only in practices and images, but also in written theory and terminological choices. Perhaps the most striking example is the exhibition of James Lovelock and Lynn Margulis' texts on the Gaia hypothesis in a dedicated section titled "We Live Inside Gaia." These texts, written at the end of the 1970s, describe the planet as a finalist entity of interaction between organisms, a homeostatic network of relationships that is self-regulating through an integrated feedback system that continuously reacts.

Despite its limited and controversial acceptance within the scientific community, Weibel and Latour [18] use it to raise productive questions: in particular, to show how human and non-human agencies are interconnected in this layer of the Earth. In this way, by refraining from interpreting Gaia as a purpose-driven super-organism, what remains is actually a category deeply rooted in Latourian thought, encompassing concepts such as interdependence and hybridization. This is evident in the numerous reflections Latour has developed in recent years on the productive use of Gaia, referring, for example, to "Gaiaographies" in a theoretical project in collaboration with Alexandra Arènes, using the concept as the basis for presenting the CZO in *Critical Zones* as an anamorphic planetary display. Gaia is functional in context because it proposes an alternative to a model that is neither strictly geocentric nor heliocentric, but rather centered on vital intersections from which a centrifugal movement of reorganization spreads: this has its own meaning, both affirmative (the ecological order) and graphic (differentiation of the zones affected by 'life in action'). This would be a more accurate measure of the life cycle expressed in the Critical Zone, compared to the cosmological dimensions of other cycles in deep space, which would tend to hide it in the ratio of scales [25]. Latour has also experimented with this approach in other exhibition settings, such as his artistic direction of the 2020 Taipei Biennale – with *Critical Zones* already underway and Yu Hsin Su's Frame of Reference on view – entitled *You and I Don't Live on the Same Planet*. The Biennale presented an interesting display format in which an alternate solar system enclosed the exhibition spaces-planets, each exploring a different critical aspect: globalization, security, escape, terrestrial conditions, and gravity. This representation was also conceived out of a reflection on Gaia's synthesizing capacities, as already appeared in Latour's 2018 lecture at Harvard, titled *A Tale of Seven Planets: An Exercise in Gaia politics* [26].

In conclusion, the visual representation of the complexity of "landing on Earth" is necessarily central for several reasons. Firstly, it unveils the underlying mechanism of thought exhibitions, presenting concepts, including challenges – illustrated by the involvement of Gaia, evidently deemed necessary to explain the mechanism of social science analysis – in a laboratory workspace. Latour's language remains as visually compelling as that of art and its display [27; 28], seamlessly integrating into art history, drawing on the materialist foundations of media art, land art, Arte povera and relational art. However, it also serves to highlight the dynamic networks of scientific relations and the contradictions within

terrestrial politics. In this case, by highlighting the lack of reconciliation regarding ecology in a specific historical context, we necessarily draw parallels between Latourian thought, where disputes between disciplines serve as a historical catalyst, and various other 'clashes' – whether between images or cultural institutions – that define the *Gedankenausstellungen* framework.

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Walking with Permafrost Microbial Communities

Artistic Proposals to Encounter the Leaking Messiness of the Melting Worlds

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Abstract

This paper investigates barefoot walking on permafrost land as a method for co-living with microbes released from their frozen state due to the permafrost thaw. The experience of the changing permafrost condition and peat relations is studied with sensorial encounter that are guided by microbial movement patterns. It juxtaposes the vulnerability of the permafrost with the vulnerability of the human body. Human activity affects the permafrost through climate breakdown, but what happens in the liminal microcosmos between the porous skin of the barefoot sole and the time-travelling microbes of the permafrost when the matter warms, freezes and changes in its watery being, solid forms [1]?

The more-than-human in walking methodologies [2], in this case the microbes, can be considered to engage with feminist new materialism and posthumanism. They are informed by multispecies, sensory ethnography in Abisko, North Sápmi, Sweden. This paper studies the movements of the microbial life and focuses on their repetitive vibrations. These movements manifest in artworks and walks as study cases. These microbial paths are observed in microscopic scale and enlarged into human movements, leading to embodied experiences and cognition.

Keywords

Permafrost, Microbial Life, Climate Action, Walking, More-than-human, Hydrobody

1. Introduction

“But then, I think lately, there was some research about the permafrost. When that disappears... there is... hmm... I don’t know what it was. There was something leaking out. And that’s pretty... that’s messy...”

S, audio recording, 00:23:34, April 2022

The above excerpt is from one of the sensory walking interviews I conducted in Abisko, as a series of participatory performances and an ethnographic study [3]. The interviews were focusing on the relations in the Arctic environment and changes that can be sensed corporeally. Here, S – who worked in Abisko guiding tourists – describes permafrost as something that is *leaking* and *messy*. She is

hesitant with her words. Permafrost thaw and its’ possible effects are researched extensively in natural sciences, but S’s comment proposes that permafrost as a corporeal and tangible experience might be difficult to grasp. Through natural science, it is known that permafrost is soil, rock or sediment that remains frozen continuously and oftentimes for hundreds and thousands of years. Permafrost is commonly encountered in the Arctic and sub-Arctic areas of the circumpolar North, especially in *palsa* mires. It is an essential carbon sink, but currently thawing

because of the climate breakdown. At the Abisko Scientific Research Station, the researchers have found through long-term environmental monitoring that the permafrost have already thawed by meters since the beginning of the study in the 1970’s [4]. Permafrost thaw causes changes both locally and globally when more water, CO₂ and methane are released to the ecosystems. The water rises sea-levels globally and the greenhouse gasses are emitted when the micro-organisms activate and start to break down previously frozen organic matter [5]. There are also organisms released from the melting permafrost such as a nematode *Panagrolaimus kolymaensis*, a worm found in the permafrost close to Kolyma River in Siberia. This small worm is a new species to humans and apparently until now had remained in a frozen state within the permafrost for 46 000 years [6]. When focusing on the microscopic scale, there can be different kinds of micro-organisms, such as viruses released from the ice which could possibly be a threat to the current ecosystems. This threat is complex to study but there is for instance *in silico* model to research the risks of what the researchers call “time-traveling invaders”. The aim is to find out what “digital virus-like pathogens isolated from past records of co-evolved artificial life communities, can cause as simulated invasion into future states of the community” [7]. The notion of science-fiction with time-travelers and invasions is apparent in this study. Still, the already found non-digital, ancient permafrost viruses can infect for instance *Acanthamoeba* [8] which is a common protozoa found in soil. To give examples, at the least, these are leaking out from the permafrost.

The loss of permafrost could be prevented through mitigating climate breakdown and cutting down CO₂ emissions. An experimental example of saving the permafrost is Pleistocene Park that plans to bring large herbivores to the Siberian Arctic to change the ecosystem back to how it was 10 000 years ago. It is proposed that these large mammals would change the vegetation to preserve permafrost by trampling the snow to expose the ground to colder temperatures [9]. However, permafrost thaw is already happening regardless. When the cryosphere disappears, namely as the glaciers and permafrost melt, they cannot grow back. This means that humans and more-than-humans are inevitably encountering the effects of the permafrost disappearance and (micro)organisms which are being released from it. All water bodies on the planet are connected and thus, the time-traveling microbes will be traveling not only in time but in-between places.

The question arises: how to encounter this leaking messiness of the permafrost microbes and viruses? The natural sciences’ narrative proposes threatening invaders, referring to crisis and othering. When leaning towards feminist new materialist discourse and posthumanist perspectives, the proposal would be agential concepts such as transcorporeality to describe how the world is full of embodied beings who are “intermeshed with the dynamic, material world, which crosses through them, transforms them, and is transformed by them” [10]. Another

example would be to learn from the water drops of the hydrofeministic realm where the water is considered as embodiment in time, transforming from body to body [11]. How could these concepts be enacted through artistic practice; emphatically in materiality and in sensorialities of this world with the time-travelling microbes?

2. Microbial movement patterns and more-than- human-walking

Human-microbial relations are present every day in e.g., fermentation, yoghurt making, or when taking antibiotics. COVID-19 pandemic spotlighted the features of contamination and thread of microbial life. There are many contemporary artists who work with microbe relations from different perspectives, especially in fine arts such as Anicka Yi and Jenna Sutela to name few. In this paper, the focus is on the works that consider the microbial movement.

One of the common ways to approach microbes is by researching them through the microscope. It is proposed within sensory ethnography [12] that a microscope, among other technological mediators, is linked to the sensory registry of touch, hearing, smell, taste, gestures [13], and in this case, could be considered deeply related to the sense of sight. Oftentimes, the attempt is to identify species and morphology of the microbes. In the microbial life within permafrost, the very activity of the microbes is important. It is a part of the chain reaction of climate breakdown: organic matter decomposes, namely the microbes move and eventually greenhouse gases are released from the peat or previously frozen viruses enter the soil protozoa.



Figure 1: Chronomicroscopy, still image from video. 2021. Photo by Roland van Dierendonck.

Artist Roland van Dierendonck points out in his audiovisual work *Chronomicroscopy* [Figure 1.] that the microbial choreographies, namely their movement is an understudied field [14].

Chronomicroscopy refers to chrono as time, micro as small or extent, and scopy as viewing, examining or observing.

Chronomicroscopy is a time-laps video that documents the movements of the microbes over a long period of time and invites for a meditation with them in a calming soundscape. The work offers a novel approach towards observing microbes and the artist describes it as a method to identify microbes through their movement patterns. Albeit, I suggest, it is even more than identifying; it is a sensory way of being with the microbes beyond species definitions. When *Chronomicroscopy* focuses on seeing and hearing the microbes over a long period of time, they can also be approached throughout the other nodes of sensory registry.

The microbial choreographies have indeed been taken ‘out

from the microscope’ and towards the multisensory realm. For instance, choreographer-dance artist, Victoria McKenzie’s *Multispecies Choreography* (2022) movement practice invites to learn and engage with a more-than-human pedagogical process [15].

Multispecies Choreography consists of three parts: it navigates with fungi, cattle and microbes as dance scores. In this practice one does not need to look through the microscope to memorise the score but rather imagine the microbial beings in the environment. Notably, McKenzie parallels multispecies movements to political movements and situates collaboration and learning in these contexts.

The concept of collaboration could be considered in another profound example of microbial movement in art. Artist Heather Barnett has been working with slime mold (*Physarum polycephalum*) for over ten years. Slime mold is a single celled organism that does not have a brain but still has the capacity for collective movement and decision making. As a part of the collaboration with slime mold, Barnett invites people to learn from the slime mold through an experiment called *Being Slime Mold* [16]. Within the experiment, she guides people to operate as a superorganism and multi-headed being to negotiate as a blob [Figure 2.]. She explains that “to attune (in thoughts and actions) to an array of companion species allows us to recognize the vast flow of diverse sensing, signalling, perceiving, and responding that intercuts our interconnected worlds” [ibid: 168]. The collective exploration emphasises the human relations at a certain place and time. The human blob perceives and responds through sensing the surrounding environment and then, moves with it.



Figure 2: Reciprocal Sensing: Being Slime Mold, Field Notes 2018, Bioart Society. Photo by Heather Barnett.

In the works of Van Dierendonck, McKenzie and Barnett, the microbes are relations to attune to the ecologies: they traverse through affects, matters and beings. To extend the idea of van Dierendonck’s meditation with the microbes, I propose intuitive interspecies communication (IIC) as a form of meditation. I have used it in my art practice for the past decade as a method to facilitate interspecies encounters or encounters with more-than- human [17]. IIC is defined for instance by environmental scholar

M.J Barret as an intuitive and telepathic method for “... non-verbal and non-physical form of communication between humans and other animals”. She continues that it “includes the mutual exchange of visceral feelings, emotions, mental impressions and thoughts, embodied sensations of touch, smell, taste, sound, as well as visuals in the mind’s eye.” [18]. In other words, it is an invitation to be affected through listening and sensibilities; to give space for the more-than-human attunement and to share the similarities of the sensory registries or affects. As a method of meditation, it is linked to animistic worldviews

and especially to relations or kinship in Indigenous cultures [ibid]. The anthropomorphic challenges need to be acknowledged within IIC and thus, IIC does not happen in a void but is simultaneously informed by situated knowledges and it can carry a potential for imaging different relations in between more-than-human. Similarly, Heather Barnett explains that in *Being Slime Mold*, humans are not really slime molds, but they are in becoming [16].

Both McKenzie and van Dierendonck use the term choreography in their art works. It is not known if the microbes have such concepts, thus I decided to focus on the learning from microbial movement; to sense and move with them. It seemed organic in the environments I was working with to be situated through the lens of walking methodologies. Walking is an established method for participatory and sensory ethnographic research [19, 20, 21] and is seen as an aesthetic practice [22, 23, 24]. As such, walking can be traced from dadaist excursions to 'places that have no reason to exist' in Paris in 1921 [25] to 1960's land art such as Richard Long's *A Line Made by Walking* from 1967 [26] and more recent work like Petra Lilja's *Mineral Walks* in 2020 [27] to name a few examples. Dadaists came from the field of literature to anti-walk or visit in urban places. Long was interested in landscape and how the walking alters the landscape as a canvas and is a performative act. Lilja's work could be called walkshop with minerals and placed in the contemporary posthuman feminist and new materialist discourses where the more-than-human is to walk and think with. Notably, the aspect of more-than-human relations is pivotal and can be considered a development in walking as aesthetic practices in the past years.

Scholars Stephanie Springgay and Sarah Truman broaden the discussion to involve the environment or cosmos in depth. They consider more-than-human walking methodologies to include – in addition or side by side to place (being in place), sensory inquiry (tuning into sensory experiences), embodiment (what it means to move in particular place) and rhythm (pace and tempo of walking) – the concepts of land, affect, transmateriality and movement [2]. While studying the permafrost condition and encountering the time-travelling beings of it, the actual environment of the melt becomes important. It is not just a place but land that reaches out from spatiality with diverse subjectivities and agencies. Even though the melted waters and greenhouse gases will travel from the site of the permafrost, there is the geos where the microbes of it had stayed frozen since the pre-historical times. Time-travelling microbes share this land with a flow of affect and can be encountered through transmateriality: queering the coherent self. Movement in walking can be translated as direction but more- than-human walking proposes to understand it as "inherent in all matter, endlessly differentiating" [ibid: 6] and resisting capture. This materiality and vibrancy of movement is abundant when looking at the microbes through the microscope. How to walk with it and intimately entangle with it? Encountering with microbial communities of permafrost can be experimented through more-than-human walking methodologies combined with intuitive interspecies communication as a form of meditation.

3. Walking Barefoot with Permafrost Time-travelling Microbes

In this case, the land of permafrost is situated in Abisko, North Sápmi, Sweden where I work mainly on the same sites with the natural scientists who collect their data and experiment

with permafrost. Abisko is located next to a large lake called Torneträsk which is also a starting point for Torne River, drainage basin that flows all the way to the Baltic Sea. Assumably, this could be a water-bodily way for the time-travelling microbes to their new habitats elsewhere. I chose to walk barefoot on this land to allow exposure through the soles of the feet, without isolation or insulation of shoes. As a species standing on two feet, the naked soles are the direct, sensory and permeable contact to land. This practice required walking to the edge of the physical limits of cold. I approached the permafrost condition and the time-travelling microbes through the active layer which is the part of soil or peat on permafrost that seasonally freezes. Active layer can be directly sensed with barefoot when the actual permafrost layer is oftentimes deeper in the ground. On the first walks, I had to concentrate a lot of energy on being able to walk on snow, ice and cold water [Figure 3.].

This was mainly painful, though one can gain resilience for it and thus, it can be transcendental. I was able to collect small samples of peat from existing boreholes and water from the pond where the scientists mentioned the permafrost is actively thawing.

Generally, the melted permafrost water can be everywhere on this site.



Figure 3: Walking barefoot on permafrost. 2022. Photo by Yongmei Gong.

I took samples of peat and water to observe them with a microscope. I reserved a lot of time to do this on several occasions and filmed the movements of the microbial life. I did not attempt to identify them as species but looked at them and silenced my every day, busy mind-traffic to observe and sense their movement with my whole body, as IIC suggests. It seemed possible to live through the manifestation of the cyborg [28]: with the permafrost microbial, with microscope, with microbes in my body and so forth - tackling the different materialities present. Empathising and therefore relating to the time-traveling microbes is not easy. As bodily beings, we do not have much resemblance and I would not see them without the help of the microscope. However, the view through the microscope is an initiation point from which one can emerge into the microbial movements and memorise them as corporeal rhythms. It becomes a combination of meditation that moves in cyborgisation and empathy.

I returned the samples of peat back to the site where I had collected them and started barefoot walking on the mire again. In a similar manner as I was viewing the microbes through the microscope and filming them, I placed a drone to film my own movements from above. Then, I started to repeat the microbial patterns and rhythms, navigating the forms, textures, wetnesses and scent-capes through the proposal of these patterns. Namely, I tried to be empty and to listen. I was affected by the sounds of

wind, cars on the nearby road and the rumbling of the trains transporting iron ore from the mine not so far away. A moose witnessed my doings. I kept returning to the site and walking in different seasons that varied from freezing cold winter to the warmth of summer. The seasons offered different kinds of encounters such as imagining how the microbes move if they would eat cloudberry or how they would shiver while freezing or warming up. Transcorporeality or -materiality was lived through the extremes of the bodily limits in cold but also in pleasures and care the more offered.

While walking with permafrost microbial communities, the water became an essential medium. Notably, the human body does not have receptors for perceiving wetness [29] even though the body is primarily water. Water was around me and in me as sweat, while peeing in bushes or putting my hands in the pond, rain, and mist - the experience of perception consisted of sensory register combinations and exchanges. I was focused on sensing it through the soles of my feet and further: its' forms from ice to snow to liquid and dampness in the moss. If water is a carrier of memory as Astrida Neimanis suggests [30], it carries the memory of the permafrost time-traveling microbes through the porous skin which would mean - simply - that they are in me. Informed by the latest discoveries in physics, these watery memories make the form, too. The theory is called hydration solids, and it proposes that water in its' fluidity defines solid state characteristics of the biological matter and gives structural rigidity through hydration force [1]. This changes the former understanding that it is the bonds in between atoms and molecules defining the properties of solid materials. I argue that hydration solids theory adds to the Neimanis' hydrobodily - thinking and can expand the understanding of transcorporeality or -materiality, in this case; how we become to the hydrobody form with time-traveling microbes.

The process of walking with microbes was manifested in a video artwork called *Walking with Permafrost More-than-Human* (upcoming 2024). The video is linked to the sense of sight, as it was the initial point of seeing the microbes through the microscope, but it is also an invitation to explore the patterns with bodily movement outside the mire. Simultaneously as I was developing the video, I worked on a participatory performance that could facilitate the experiences on the mire outside of it.

3.1. Walking with Permafrost Participatory Performance

Walking with Permafrost (2022 - 2023) participatory performance facilitates an encounter with time-traveling microbes and human participants in a collaborative manner [31]. The performance happens in winter or possibly in cold conditions to create a contrast and to experiment with bodily limits. Human participants are given information about permafrost at first, comparable to what I have written in the introduction of this paper: to introduce the context of what has happened and what might happen. The introduction is followed by watching the video clips of the microbes I had filmed through the microscope to meditate and embody their movements in the mire. Then, the participants are taken outdoors to walk barefoot and explore the movements themselves.

Some of the participants described a change in their perception while walking; they focused on different observations in the environment than before. This was because they were not used to walking barefoot in the cold and it happened in relation to the microbial movement [32]. This was similar to my experience in the mire.

After the barefoot walk, a foot bath is offered for the freezing feet. It plays with the notion of transcendental contrast from cold to warm, possibly something that the microbes melting from the permafrost might be exposed to - but is also an act of care. The human participants have an option to infuse their footbath with a small amount of water from the melted permafrost that had been collected from the pond in the mire. This positions the negotiation of danger and resilience as a tangible, collective act. It becomes possible to imagine a choice to encounter the time-traveling microbes, whereas in reality, this choice does not exist for either humans or the microbes. The participants think of their immunity or ponder if the microbes could hurt them. For instance, a participant told of having the "feeling of trust in the skin as a healthy and permeable layer of me in the world" and acknowledging there were no wounds in the feet that could be infected [33]. The skin of the feet is not seen as a shield but as a point of entry, a gateway to the hydrobody being. The same participant also noted that "I have agency and I will use it as best as I can, but with thawing permafrost I'm up against something that is beyond my own individual choice" [34], summarising both the inevitable thaw of permafrost and the inevitable encounter of what melts from it.

The participants are guided to IIC meditation during the foot bath. The meditation suggests imagining a relation with the microbes to explore what could be sensed or learned with them. The meditation ends with drying all participants' feet one by one.

Being informed by the microbial movements and emerging with the permafrost waters can open ways to tie together personal experiences with the melting worlds. A participant said that he shrank and traveled as a microbe deeply into the ground, through soil levels and minerals during the footbath IIC meditation:

"My thoughts started going a million miles an hour and I felt like I was plunged into water being pushed through the water at a high speed. Hitting the bottom, it was as if I transcended I to ice or some strange material void, surrounded by biological history and ancient microscopic organisms. I was at their mercy and on their scale."

J, written feedback, November 2023

The transcendence that he describes as uneasy and peaceful, was followed by meeting with a human ancestor; his mother who had unexpectedly passed away some years back. He felt her existence together with his shrunken microbe body and this brought him comfort and safety [35]. Thus, this imaginative meeting did not only invite to encounter the permafrost microbial lives but brought up deep ancestral relations that extend beyond the biological kinship to include land in this relation.

4. Conclusions

Different ways of relating with microbial life can expand the understanding of the changing world and the leaking messiness of the permafrost cryosphere. This relation can be a tangible, cognitive and corporeal experience. Artistic practices informed by more- than-human walking methodology and sensory experience of IIC meditation emphasises encounters with time-traveling microbes and add to the discourse of how humans and more-than-humans exist in the transcorporeal mires. Permafrost is not in a faraway place, rather it is in the waters everywhere on

the planet. Thus, walking with microbes of the permafrost is an attempt to transfer the sensory experience to a variety of environments. Concurrently, this can shift the sensory experience of the place in question.

Even the participants of *Walking with Permafrost* were not worried about the possible danger of the time-traveling microbes, it is worth taking into consideration that when these entities encounter human hydrobodies, they can possibly have a harmful effect. This is an opening from the subjective affect to communal. Thus, the suggestion is to explore the spectrum of danger and resilience found within barefoot walking encounters and moving with more-than-human together. Furthermore, it is a proposal to investigate and disrupt the immunity-community binary within the resilience spectrum. Here, it can be noted that individual choice can be melting towards the communal being and to a suggestion that the microbe in the permafrost mire or under the microscope could be an entanglement: arrangement of you, me and all.

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This research happens in an indigenous land in North Sápmi where Sámi people have lived since time immemorial. I pay respect to the knowledge and care of traditional custodians of land, water and to the custodians' manifold spiritual principles. I pay respect to the land, water, and air that sustain humans and all their relations. This research was made possible through a research grant from Kone Foundation (no. 202007067) and Access Abisko programme by Swedish Polar Secretariat. I thank my supervisor, professor Laura Beloff and my research team colleagues in Abisko for support. I thank all of those who kindly walked with me.

Ethical statement

The human informants who took part in this research and who were interviewed on audio, were explained openly what purpose the data was collected and what is the nature of this artistic research. Those whose interviews were recorded on audio, signed a consent form explaining the storage, management, privacy and use of data they provided. With those who shared their experience via email exchange, these matters were discussed in the emails. There were no minors involved in the research. All the materials are in the possession of the author. The guidelines of the Finnish National Board on Research Integrity were consulted, and the research plan did not require an ethical review statement according to these principles.

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Hacking the dominant narratives of technology:

The case of Akwasi Bediako, Dj Boboss and François Knoetze's situated practices of e-waste reappropriation and remix

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Abstract

This contribution argues for the role of arts and design practices in order to critically address and debunk these narratives. More specifically, it proposes to explore the potential of arts and design as powerful vehicles that question in a situated, playful and open-ended way these harmful dominant narratives. The contribution starts from one set of objects: electronic-waste processing-sites of countries our western and euro-centric discourses frame as the global South. Bridging here arts and design practices with these normative sociotechnical discourses around waste, it moreover shifts our focus to the way electronic-waste is recycled, repaired, transformed and reappropriated by arts and design actors in three African countries: Ghana, Kenya and South Africa. The first section of the article unpacks for the reader the plurality of practices emerging from African processing-sites. Informed by a fieldwork in Agbogbloshie, framed by western dominant media such as the Guardian as “the world's largest e-waste dump” [3], the section contextualizes the vibrant network of actors gravitating around the site. In opposition to this storyline, it sheds light on the vibrant community of actors - recyclers, dismantlers, scrap-dealers, burners - extracting gain and profit from the materials we refer as waste. The second section of the article introduces the work of Akwasi Bediako Afrane, a Ghanaian sculptor interested in building what he frames as “amputees”: repurposing discarded digitals outside to critique and speculate on the planetary electronic-waste issue. By doing so, we explore how his practice re-appropriated these “rejects” [4], giving them a second-life outside of our consuming culture they are initially bound to. Third, the contribution distangle the practice of Dj Boboss: a Kenyan music producer building Dj racks out of scraps - transistors, capacitors, trashed computer components - found in the nearby landfills. Exploring his practice of remix, detour and subversion, we contextualize how his work is, first and foremost, political: infiltrating with his analog and material assemblages the ideological circuit of digital music and its seamless aesthetics. Our fourth and final section zooms-in at the level of François Knoetze's CAPE MONGO (2013 – 2016) [5]. Intertwining here mythology o with e-waste objects and material histories, we situate the importance of his work in order to, inside our western cultures and gaze, collective reframe our dominant internet discourses and reinforce the “zombie-media” (Hertz and Parikka, 2012) characteristics of our computational culture.

Keywords

Harmful narratives, Agbogbloshie, situated practices of e-waste, arts and design

Introduction: harmful western and euro-centric narratives of electronic-waste

Digital growth and progress is often depicted by the general media as disconnected from its environmental “site of execution”: from undersea cables to antennas, modems, routers, and, at the level of the physical layer that constitutes it, the metals that are used to produce our sociotechnical objects. From gold, tantalum, aluminum and copper to produce our computer's chips to cobalt and lithium required to produce our “greener” technologies, these are hidden from our western and euro-centric tropes and dominant storylines focusing on the digital. Behind the seamless and playful infrastructures that pervade our platform and algorithmic cultures sits, moreover, the “invisible bodies” [1] of technology. From assembling line workers soldering small Integrated-circuits (ICs) to our motherboards to platform's gig workers hired to manually label our datasets, these workers are obfuscated behind tropes of digital progress and connectivity emerging from Silicon Valley and its ideology. They are hidden behind words and metaphors we use to frame the ubiquitous technologies that shape us on a daily basis. Two of these words are here the starting point of this article: the internet cloud and the electronic waste. At the level of both concepts, a power dynamic takes place and performs a division impacting and fragmenting sociotechnical discourses and imaginaries. These words assert, in other words, a specific vision and practice of technology; that connects to a broader political and economic agenda. Both at the level of the cloud or the electronic waste, this underlying agenda is the one of planned-obsolescence: as the key-logic structuring our interactions with technology. Reinforced by these metaphors, technology appears here as exterior to use: as an object we simply use, consume and trash [2].

This contribution argues for the role and importance of arts and design practices in order to critically address and debunk these narratives. More specifically, it proposes to explore the potential of arts and design as powerful vehicles that question in a situated, playful and open-ended way these harmful dominant narratives. The contribution starts from one set of objects: electronic-waste processing-sites of countries our western and euro-centric discourses frame as the global South. Bridging here arts and design practices with these normative sociotechnical discourses around waste, it moreover shifts our focus to the way electronic-waste is recycled, repaired,

transformed and reappropriated by arts and design actors in three African countries: Ghana, Kenya and South Africa. The first section of the article unpacks for the reader the plurality of practices emerging from African processing-sites. Informed by a fieldwork in Agbogbloshie, framed by western dominant media such as the Guardian as “the world’s largest e-waste dump” [3], the section contextualizes the vibrant network of actors gravitating around the site. In opposition to this storyline, it sheds light on the vibrant community of actors - recyclers, dismantlers, scrap-dealers, burners - extracting gain and profit from the materials we refer as waste. The second section of the article introduces the work of Akwasi Bediako Afrane, a Ghanaian sculptor interested in building what he frames as “amputees”: repurposing discarded digitals outside to critique and speculate on the planetary electronic-waste issue. By doing so, we explore how his practice re-appropriated these “rejects” [4], giving them a second-life outside of our consuming culture they are initially bound to. Third, the contribution distangle the practice of Dj Boboss: a Kenyan music producer building Dj racks out of scraps - transistors, capacitors, trashed computer components - found in the nearby landfills. Exploring his practice of remix, detour and subversion, we contextualize how his work is, first and foremost, political: infiltrating with his analog and material assemblages the ideological circuit of digital music and its seamless aesthetics. Our fourth and final section zooms-in at the level of François Knoetze’s CAPE MONGO (2013 – 2016) [5]. Intertwining here mythology o with e-waste objects and material histories, we situate the importance of his work in order to, inside our western cultures and gaze, collective reframe our dominant internet discourses and shed light on the “zombie-media” (Hertz and Parikka, 2012) characteristics of our computational culture.

Unblackboxing e-waste dumping sites: the case of Agbogbloshie and its communities of computer recyclers

Driven by grounded-theory and evidence-based data, this section therefore explores the lifecycle of our computational objects once they arrive on-site. Drawing here from the work of Lepawsky [6], it is crucial to first debunk the global North to South narrative that structures our mainstream views around the topic. Following the discard studies geographer, e-waste is therefore not simply ‘dumped’ from the North to the South: but follows more nuanced international, transnational and local trajectories. While Agbogbloshie is framed as a major location where our computers go to die, the reality is in fact substantially different: with an average of 50 to 85% of this waste located on-site “domestically generated out of the consumption of new or used EEE [electrical and electronic equipment] [7]. In order to debunk the underlying narratives of e-waste through the Agbogbloshie’s “blackbox” [8], one might also need to engage with Ghanaian urban studies scholars researching on the multifaceted nature of the site. Amongst them, it is crucial to cite Grace Abena Akese, Richard Grant, Martin Otteng-Abagio, DK Ossero-Asare and Yasmine Abbas. These take the counterpoint of our western imaginaries around Agbogbloshie and recontextualising the site as a urban-mine [9], a cluster that sustains local livelihoods [10] and an innovation hub [11]. This section is also inspired by the work of Jenna Burrell, retracing the lives of discarded computers from their bulk-shipping and arrival to the port of Tema to their reuse in the capital’s

plethora of internet cafes [12]. From there, the section maps the lifecycle process of discarded computers at the level of five groups of computer recycling workers gravitating around the site. When the use of harmful words and narratives [13] ranging from the graveyard to the dump depicts the site as disconnected from economic circuits, shedding light on these clusters of workers aims to disentangle the rich network of communities extracting profits out of waste. The first group of workers are the ones of vendors. Located around the neighboring districts of Agbogbloshie - from La Paz to Circle -, they sell to the public and corporate actors second-hand computers imported by Ghanaian “burgers” on the local market. These computers are either imported in working conditions or untested and shipped with missing or damaged parts to replace: from harddrives to motherboards and memory-sticks. When incomplete, vendors work with their networks of repairers: gravitating between Agbogbloshie, La Paz and Circle depending on the nature and location of their contracts. Repairers are either affiliated to a shop or working as independent workers: fixing computers’ faults so that vendors can sell them and make profits. In order to work on these machines, repairers store in warehouses or workshops computer parts they need. A common part they collect is the motherboard: with integrated-circuits (ICs) they can re-use and swipe between the different machines. When too much from these parts are faults, however, they sell them to dismantlers: collecting condemned across the city. Dismantlers’ work consists in dismantling trashed computers in order to extract and sell valuable metallic parts. From the aluminum of computer cases and to copper located from the the Printed-Circuit-Board (PCB) to the Graphical Processing Unit (GPU) heatsink, they use screwdrivers, hammers, chisels dismantler and strip computer parts apart and sell them by the pound on the Agbogbloshie’s market. Between yam and onion vendors, schools and mosques where the community of Agbogbloshie gathers and lives also lays a network of scrap-dealers: buying e-waste scraps from dismantlers and other recyclers. Using scales and building from a body of tacit techniques they developed through the years in order to assess the quality of metals, they acquire aluminum, copper, steel or brass. In addition to local scrap-dealers, another network of waste transformation also unfolds with gold, located in the integrated-circuits (ICs) of PCBs. In this context, scrap-dealers are Nigerian workers: collecting the chips and circuits on-site and selling these to Chinese. For less scarce metals, scrap-dealers sell their findings to smelting factories: receive trucks non-only coming from Ghana but also from its neighboring countries; Benin, Togo, Burkina-Faso, Nigeria, Malo. Owned by Indian workers, these factories, each specializing on a specific metal they process, transform scraps into mass-produced objects such as iron rods they then ship through Tema on the global market.



Figure 1: Dismantlers of Agbogbloshie. Credit: Cyrus Khalatbari.

Akwasi Bediako Afrane: From our trashed technological gadgets to the making of his “TRONS” (2022-)

Afrane’s installations and sculptures take the form of an assemblage of various of knobs, wires, transistors, light-emitting diodes (LEDs), servo-motors, or printed-circuit boards (PCBs) entangled together and connected to outdated screens and interfaces of our sociotechnical cultures: cathode-ray tube (CRT) televisions, old computers monitors, game-arcades. In Afrane’s projects, the material and physical components that power and constitute our technological devices are exposed and made visible to the audience: showing both the digital outputs these installations generate and the material and hardware conditions that make these outputs possible. In addition to engaging with second-hand electronic computer parts assembled in ways that hijack their initial market-driven uses, the artist also works with 3D-generating systems and virtual-reality (VR): placed side-by-side with the trashed electronics inside his installations and sculptures. This is the case of one of his TRONS, where an old CRT television and its interior is unblackboxed and shown next to a VR headset users can wear and interact with. In the project, the headset is used to visualize digital and 3D-objects the artist produced and designed. These are 3D-translated forms freely-inspired by his “non-utilitarian” gadgets: expanding at the level of these digital objects the physical and material implications of new-media. In opposition with the Californian Silicon Valley’s ideology [14] depicting the sociotechnical devices we use on a daily basis as trashable and driven by their structuring logic of planned-obsolescence, Afrane takes through his projects the counterpoint of technology as a ‘cloud’ that we simply observe and interact with. While the metaphor depicts moreover our usual technologies as seamless, disconnected from the earth and its eco-material implications, the author refurbishes and re-appropriates our discarded computers. This allows him to shed light on the planetary e-waste “wicked” [15] issue we are inherently tied to as computer users. In this context, the author’s TRONS serves as a catalyst to reveal what sits behind our electronic rubishes: the transformation of these objects into inter-manipulated assemblages [11] that are then inquired by the recyclers, dismantlers, scrap-dealers, burners. Behind, therefore, the action of trashing our old TVs or computers, Afrane exposes the network of material implications and components digital growth and progress depends on. Ranging from cables, knobs, LEDs, transistors, circuit-boards and other hardware components, the artist makes tangible what opaquely sits inside the cloud. At the level of his installations, he recontextualizes our sociotechnical black-boxes - computers,

screens, gadgets - inside the broader infrastructural network they are part of. This debunking of our western dominant tropes and storylines [16] is explicit when zooming-in at the level of his TRONS iterations where, as introduced earlier, old media apparatuses [17] are in dialogue with VR headsets and 3D-environments. In opposition to digital-growth and progress depicting the internet as “bits replacing atoms” [18] in our culturally-situated paradigm of new media, Afrane exposes here two historical regimes of technology. These two regimes are, on one side, what we consider as new - in this case, the VR headset displaying cutting-edge graphics -, and on the other, an old discarded media: the CRT television. Borrowing here from Hertz and Parikka, what is at stake and revealed here is then the condition that new media always become old [19]: and that the illusion of newness is crafted by the sociotechnical paradigm of planned-obsolescence that operates and dictates our computational culture. With his zombie-media [19] installations resurrecting old devices into new uses and nuancing our glossy, high-tech and shiny understanding of technology, Afrane’s TRONS reframe the from a non-linear perspective our perceptions regarding the history of computing. In echo with Starosiesly or Hu’s works revealing how crucial aspects of our digital and computational processes such as undersea cables [20] or server farms [21] are built on top of old infrastructures ranging from the telegram to the cold war’s bunkers, Afrane exposes here the material genealogy of technologies we consider as new. In other words, he shows how media is always intertwined at the level of its softwares and hardwares in different historical regimes that nuance and contradict the crafted discourse of new media that structure our sociotechnical views on technology.



Figure 2: Akwasi Bediako Afrane’ iteration on TRONS. Credit: Akwasi Bediako Afrane. Source: <https://www.gameoftrons.com/selected-work-1?pgid=ljmwfl07-841b4af4-f6c1-4561-b475-ab302f244d61>

DJ Boboss: Intertwining analog signals with digital inputs inside his self-made drum machine and turntable (2021-)

Paul Mwangi, who goes by the stage name DJ Boboss, is a Kenyan artist and music producer that developed his notoriety and a large fanbase of one hundred fourteen thousand followers on the Instagram social media. Dj Boboss is a self-trained musician and hardware hobbyist: that learned outside of institutional circuits how to build his electronic circuits out of second-hand computers and electronic components found in recycling sites. From his turntable’s red, blue and yellow painted case to the interface’s assemblage of audio jacks, knobs, buttons, switches as well as the device’s PCB composed of

modulators, oscillators and transistors, Dj Boboss built his instrument from scratch. By doing so, he used and combined together various parts of what our western and euro-centric societies consider as waste: opening and dismantling old computers and radios in order to find and re-use parts required to produce his machine. The artist's turntable is both digital, analog and material. More specifically, when the Dj plugs his cellphone in order to input MP3 files to his device, the audio signals are distorted by his oscillators, electronic circuits and knobs before they are outputted by the in-built speakers, recorded by the microphone and processed again. The device interface even contains a spoon that the artist uses in order to, through a custom-made electrical system, alternate between different sounds. This chain of low fidelity (or low-fi) effects is at the core of Dj Boboss' artistic signature. Tweaking in his scrap-made instrument the different knobs, buttons and then using the spoon to alter the signal, his live performances and representations are inviting and intriguing; both to his online community and in the streets of Nairobi where he performs. In echo with Akwasi Bediako Afrane's TRONS, the case-study of DJ Boboss nuances our illusions and beliefs gravitating around new media. Zooming-in at the level of his instrument the artist entirely designed and produced out of electronic scraps make moreover the layered temporalities and material characteristics that co-exist inside our digital processes. Where the cloud is depicted by dominant sociotechnical discourses as seamless, Dj Boboss intentionally engages with the seamfulness of these processes: playing with the various physical, analog and digital seams [22] of his machine in order to produce his music. With the combination of his circuit's spoon, knobs, amplifiers and switches altering the sound, Dj Boboss exposes in other words the material condition of our computational processes. Altering the inputted MP3 files with analog components found on second-hand condemned computers and electronic devices, his work is foundational in helping us to nuance the underlying logic of new media at play behind planned-obsolescence. The narrative is also, here, debunked by another core aspect of his turntable: the role of the spoon. Likewise, the silicon transistors of our computer chips and GPUs unlocking the required computing power needed to operate our internet platform objects [23], the artist brings the infrastructure of our audio processes to its "geological characteristics" [24]. In actively embedding and engaging with the metal of the spoon as an agent in the creation of his music, the artist enables us to re-embody, in other words, our digital processes within their "earth layer" [25]. In analogy with our computational processes and in opposition with the disembodied cloud metaphor, Dj Boboss' practice acts here as a catalyst helping us to situate the role of our earth's metals: serving as the foundational site of execution [26] from where our signals originate. Finally, the artist informs us on another myth emerging from our western and euro-centric socio-technical cultures: the e-waste dumping sites. Circling back, here to Agboglobloshie and its harmful narratives, studying the Kenyan artist's practice makes tangible the need to reconceptualise waste as inter-manipulated assemblages [11] with components displaced from their previous usages and used in new and alternative contexts. In connection with the Agboglobloshie's community of workers and Akwasi Bediako Afrane's TRONS, this is here materialized in the artist's process occurring in the extraction of old radio's components for the making of his turntable. Such as iron rods

made out of scraps or non-utilitarian sculptures re-build with condemned, this example takes, again, the counterpoint of our dominant views around e-waste dumps; disconnected from economic, social and creative practices of reappropriation.



Figure 3: Dj Boboss' turntable. Credit: Paul Mwangi/Dj Boboss. Source: <https://youtu.be/3-bMtRMcjuM?si=YwGsB6185gVii9C4>

François Knoetze's CAPE MONGO (2013 – 2016): mapping the culturally-situated practices and imaginaries of e-waste

The third and final case-study of the contribution is François Knoetze's CAPE MONGO (2013 – 2016) [27]. Through his wearable sculptures that he then wears during street performances across various cities, the South-African artist engages with different materials that our consumer cultures trash. In this project, the artist moreover engages with six materials shaping our capitalistic societies. These correspond to six categories of rubbish: VHS, Glass, Metal, Plastic, Paper, Cell. Exhibited as wearable costumes in the streets of Cape-Town, these sculptures take the form of mythical creatures entirely made out of scraps and disposable items. With the plastic iteration of Knoetze's project for example, the sculpture visually represents a gigantic bird: where colorful bottle caps are mixed with all sorts of plastic bags discards. The VHS is composed of tapes that are intertwined together and floating when the artist walks across the city. Last but not least, the Cell sculpture is a dense gathering of trashed phones and telephone wires found across the city's e-waste sites: glued together and serving as a base to compose the imposing silhouette with which the artist performs. Drawing from the artist, these mythical figures of our rubbish and planned-obsolescence cultures are then used for the creation of short films; where these walks across the city are placed in dialogue with references emerging from our history of capitalistic growth, planned-obsolescence and racial injustice. Inside Knoetze's project, it is explicit that the network of media devices that surround us embody various layers that are "not only human memory, but also the memory of things, of objects, of chemicals and of circuits" [19:425]. In the context of the artist's work, this co-existence of various temporal agencies is tangible by the dialogue between the two characters emerging from the VHS, on one side, and the trashed mobile phones on the other. By placing, in other words, these two socio-technical devices that both correspond to different cultures of computing and data transmission processes embedded in various material characteristics, Knoetze nuances, at first, our views on new-media. Building from the previous two projects of Afrane and Dj Boboss, technology is here

depicted as both old and new: with technologies embodying various technological histories and contexts entangled inside our computing “hyperobject” [28]. In analogy with our internet cloud and the body of second-hand computer recycling practices gravitating around African landfills, the artist reveals here how the unfoldment of computing through time does not occur in a linear way: with computer devices simply disappearing when we put them to the trash. Such as Hu’s analysis on data-centers built on top of cold-war bunkers or Starosielski’s undersea-cables deeply connected to colonial histories gravitating around the telegram, our devices are not only technical. They are historical, social and political [29]: as expanded on now. By creating these wearable sculptures that are then activated in a speculative [30] and mythical context, the artist sheds light on these socially and culturally-situated characteristics of waste (and e-waste). By bringing moreover these objects to performativity and life, the author posits that trash is inherent to the way we shape the world as well as our “sociotechnical imaginaries” [31]. In dialogue with Agboghloshie, its harmful discourses and its vivid community of recyclers, they enact a variety of tropes, beliefs and new “techniques of the body” [32] from which waste is recycled, transformed and displaced. Finally, Knoetze’s project makes tangible the political, normative and colonial entanglement of waste and e-waste. This is done at the level of his videos and storytelling approach: where recordings of his mythical ‘trash creatures’ [27] walks across the city of Cape Town are placed in dialogue with references coming from the history of toxicity, computing, racial-segregation and consuming culture emerging from our western countries. Unblackboxing in his visual and storytelling language the harmful and disconnected narrative of the cloud, the artist recontextualizes here the role and responsibility of our Global North countries inside the broader planetary flow of e-waste.

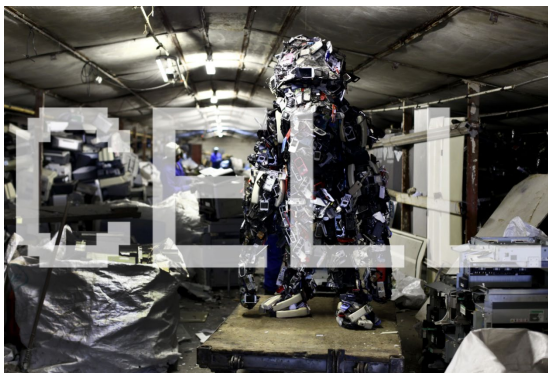


Figure 4: François Knoetze’s CAPE MONGO. Cell variation. Credit: François Knoetze. Source: <https://francoisknoetze.com/mongo/>

Conclusion: African arts and design practices to nuance the dominant narratives of technology

In opposition with the western and euro-centric narratives and metaphors of the cloud and the e-waste dumping site, we argue in this contribution for the importance of studying African arts and design practices engaging in a critical and speculative way with e-waste. To debunk, nuance and critique these harmful narratives, we posit moreover that it is foundational to map the lifecycle of objects at the level of African e-waste landfills. Here, we zoom-in at the level of Agboghloshie: infamous in our dominant media discourses for being the “world’s largest e-waste dump” [33]. Arguing that

these narratives are harmful as they obfuscate the complex and multi-faceted reality of second-hand computer recycling, we unpack the trajectory of these e-waste objects. We follow moreover, inside the contribution, their arrival from the port of Tema to their repairing, dismantling, scrap-dealing and burning: transformed into iron rods before they are shipped globally. In opposition with the harmful dominant tropes gravitating around the cloud and the dumping sites, we contextualize and situate the rich body of e-waste cultures and practices emerging from various countries of Africa. We moreover unpack these practices at the level of three artists: both reappropriating and subverting in their own ways and medium the production of e-waste. The first one is Akwasi Bediako Afrane, a Ghanaian artist based in Kumasi. Creating in his TRONS non-utilitarian assemblages and installations made out of discarded computers and electronics, Afrane activates the materiality of our computing culture in a way that nuances new media. Taking here the counterpoint of our planned-obsolescence logic, he builds circuits that are both physical, analogue, digital: intertwining inside his installations sociotechnical objects of various temporalities. The contribution investigates then the work of Dj Boboss: operating from Nairobi, Kenya. With the creation of his custom-made turntable running with trashed components he found in the nearby landfills, we reinforce how the artist engages with the material site of technology as affordances and restrictions for the creation of his low-fi electronic music. Third and finally, the contribution sheds light on the work of François Knoetze: based in Cape-Town, South-Africa. Exploring the creation of wearable sculptures made out of trash and e-waste he then uses for the basis of his performances, we bring forward the cultural, social and political entanglements that are inherent to this rubbish. In opposition to the cloud and e-waste dump metaphors, the contribution situates the work of these artists in order to argue for three key teachings and characteristics inherent to our sociocultural cultures. The first point critically nuances the logic of planned-obsolescence and new media. Whether at the level of Afrane’s TRONS, Dj Boboss or Knoetze’s CAPE MONGO, our technological infrastructure encapsulates both old and new media: embodying different human, social and material memories [19]. Outside of the dominant understanding of the cloud as cutting-edge and seamless object, these three practices inform us on the non-linear nature of our computational culture: where digital and “weightless” objects and platforms coexist and are intertwined with wires, networks, routers, undersea-cables, second-hand computers, etc. Second, we assert that studying these three artists actively reappropriating and subverting e-waste also enables us to reframe our western and euro-centric perspectives around African (and Global-South) “dumping” sites. In echo with the Agboghloshie’s community of repairers, dismantlers, scrap-dealers and burners, Afrane, Dj Boboss and Knoetze helps us to further situate and contextualize Waste Electrical and Electronic Equipment (WEEE or e-waste) as Electrical and Electronic Equipment (EEE or 3E): not as waste, but as inter-manipulable assemblages of 3E-materials” [11:41] serving both economic and artistic practices. In contradiction with the e-waste dump - or, as depicted by the British Daily Mail, the graveyard where our computers go to die [34] - studying these three artists enables us to shed light on the hidden life cycle and stages of transformation these objects embody. Third and finally, with a focus on Knoetze’s CAPE MONGO, we state

that studying these practices is also foundational in order to connect us with a discourse that is hidden and obfuscated by our western and euro-centric computing narratives: the connection between these discarded and colonialism. Critically reframing again, here, the harmful narrative of the dumping site and cloud culture depicting our sociotechnical processes as weightless and disconnected from their toxic and poisoning materialities, we analyse how these works serve as a catalyst exposing the political and ecological consequences of our digital culture.

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(De)composing Media Art through Practices with Nonhuman Agencies

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Abstract

The history of modern media has been one of resisting nature's decomposing forces. Durable materials have been chosen to permanently "embalm" sounds and images while pursuing the constant innovation of new media. Such contradictory attempts have led to a sharp increase in non-degradable and harmful waste.

This paper argues that re-evaluating the decomposition for media art is crucial in the age of crisis. What then does "decomposition" mean for media art? How can it address the problem of resources and circulation on a planetary scale? How can artwork incorporate and digest these issues, rather than simply presenting a glorification of nature or a critique of technology?

We will undertake a critical examination and devise strategies to surmount such predicaments through three media artworks: *A record without prior acoustic information*, *Chromatophony*, and *Making Soil*. These works respectively seek to decompose the infrastructure of the recording industry, the regime of digital media through biological tissues, and the ideal model of circulation between the natural and the artificial.

This paper elucidates how these works induce the action of decomposition on a conceptual and material level and make us experience or embody its dynamic process through sensibility. We conclude that the possibilities of media art specific to the post-anthropocentric era are actualized through the entanglement between human and nonhuman.

Keywords

Waste, Materiality, Bio Art, Compost, Entanglements

1. Introduction: Decomposition in Media and Art

In the age of ecological crisis, media artists must be cautious about creating something new. While the cycle of production and consumption accelerates in the global economy, anthropogenic materials that take a long time to decompose overflow from landfills and form a new stratum on the planetary surface. Parikka (2015) asks the following questions that might be considered in recent conditions: "[w]hat is the temporality of dust—and then more significantly, what are the specific temporalities that media technology produces on the level of materials and toxins? This is one specific attempt to tackle the issue of speed, and instead of increasing speed, we might examine the slowness of material decomposition" (p.14). Artists today need to examine not only what to create or compose, but also what to decompose to raise issues about the media. But what is decomposition in media art?

The history of modern media has been one of resisting nature's decomposing forces. In the 1960s, French film theorist André Bazin found the "mummy complex" in the history of plastic art, a result of which is photography that "embalms time, rescuing it simply from its proper corruption" (Bazin, 2004, p.15). Jonathan Sterne (2003) claims that the same desire also navigated the development of sound technology. Phonograph and gramophone, developed contemporaneously with the art of chemical embalming, were expected to "'protect' future audience" from the fear of death and decay "by transforming a substance in the present in participation of future" (p.294). In keeping with the desire for preservation, durable materials have been chosen and developed for sound-recording media from shellacs to hard drives via vinyl.

On the other hand, modern media industries have also pursued "novelty" in the mass-produced commodity. In the 1930s, Walter Benjamin noted that "the novelty of products—as a stimulus to demand—is accorded an unprecedented importance. At the same time, the 'eternal return of the same' is manifest in mass

production” (Benjamin, 1999, p.331). To compensate for the loss of originality in an economy of mass reproducibility, the slightest difference from older products became a criterion of value. This capitalist valuation has increasingly promoted disposability in the global economy. Today, “[t]he ‘newness’ of new media is sustained by people continually disposing of the equipment they have in anticipation of something better” (Sterne, 2007, p.22). In short, the modern media industry has contradicted itself by pursuing both durability and disposability of its products, depositing materials that cannot be decomposed.

All of this has had disastrous consequences in the form of a rapid increase in waste. The most problematic of these is waste from digital devices. As Gabrys (2011) argues, “[w]hat appear to be dematerialized and harmless devices, digital media technologies instead are material and toxic entities that generate waste across their lifespan. At the same time, pollution from electronics remakes ecologies, organisms, bodies” (p.107). One solution to such a problematic economy is a new development model that actively seeks to salvage and reuse waste as a valuable resource. However, this ideal has its limits, because “[w]aste always returns. Even with extensive attempts to salvage, recuperate, and recycle waste, remainders surface and resurface, thereby challenging sustainable development models that hold out for the flawless reintegration of wasted materials for renewed production” (Gabrys, 2011, p.132).

Nor does a return to the analog era solve this problem. Devine (2019) traces the history of the music industry from shellac to data, noting that it has damaged both society and the ecosystem in terms of political ecology: “people suffer, communities scatter, oils spill, environments suffocate, wars storm, empires soar. These are the conditions that define the production of petroleum, and they spiral into existence every time a needle glides through a groove” (p.7). In other words, it is the anthropocentric effort to rescue humanity from the modern fear of decomposition that has caused the crisis for humans and nonhumans¹.

Although media are defined as “extensions of man” in classical media theory (McLuhan, 1994), such definitions are now at a crossroads. Therefore, we have chosen decomposition as a keyword to replace the romantic notions of authorship such as creation and composition. However, the effect is not limited to the conceptual level; it also operates at the material level where a variety of animate and inanimate agencies reassembles the human scale. To demonstrate these processes, the following examples will focus on the practice of media art entangled with nonhuman agencies.



Figure 1: Kazuhiro Jo, A record without prior acoustic information (from left top to right bottom, wood, metal, paper, and porcelain)

2. Wood, Paper, Metal, and Porcelain: Kazuhiro Jo's *A Record Without Prior Acoustic Information*

First, we would like to investigate decomposition with the practice of “Wood, Paper, Metal, and Porcelain - A record without prior acoustic information” by Kazuhiro Jo, which he exhibited on February 14–26, 2023. [Figure 1]

I have suggested to change the gramophone from a reproductive instrument to a productive one, so that on a record without prior acoustic information, the acoustic information, the acoustic phenomenon itself originates by engraving the necessary *Ritchriftreihen* (etched grooves).” (Moholy-Nagy, 1923)

Bauhaus master, László Moholy-Nagy, made the above proposal to produce a record without inputting acoustic information. With advancements in analog vinyl technology and the availability of personal fabrication tools, this provocative idea has been realized (Jo, 2014) using a range of materials including wood, paper, metal, and porcelain.

Artworks in the exhibition are a progression of this practice. Each work features a motif from the French folk song *Au Clair de la Lune*, recorded by French inventor Leon Scott in 1860, which is believed to be the earliest recording of a human voice at this time (Feaster, 2012). The frequencies from the scores were calculated, and the corresponding waveforms were carved as horizontal grooves on the surface of the chosen material. To carve out the grooves, different techniques were employed, such as using a laser cutter for wood and a cutting plotter for paper.

Regarding metal, to perform *Au Clair de la Lune* on a gramophone, an apparatus that was contemporaneous with Moholy-Nagy's provocative idea, materials that could withstand the high needle pressure of the gramophone were examined.

Ultimately, an anodized aluminum plate coated with lacquer, which closely resembles the material used for master recordings of traditional vinyl records, was selected. Porcelain, in collaboration with a potter, was chosen as the material for this work to realize a description of sound, which history has assured

¹ We partially agree with Bruno Latour's (2010) assessment that the modern bifurcation of nature and culture, science and politics has never been realized, and his distrust of ideas such as “progress” and “nature” and the linear, homogeneous time

they presuppose. However, the following discussion nevertheless attempts to encourage debate in a different way, recognizing that “critical” possibilities are still inherent in works of art.

us can be preserved for thousands of years. These grooves produce vibrations that are based on the same digital data (i.e., an Adobe Illustrator file), but their actual sounds are different.

If we consider the difference in terms of the classical information model, such as the general communication system (Shannon, 1949), either the material or data must be considered as a noise source. Thus, dualism fails to capture the distinctive sounds of wood, paper, metal, and porcelain. Instead, as Cox (2018) noted, noises such as hum, hiss, and crackle from different apparatus (i.e., radio, tape, and record) can be seen as contributing to the aesthetic value of the sound. In this light, we might need to view these uniquenesses as the “voices” of the materials. Those “voices” do not express the modern subjectivities but expose unintentionally the nonhuman agencies or “vital materialities” in the complex assemblages of matters and forces that are “not governed by any central head” (Bennett, 2010, p. 24).

In addition, when we contrast the distinct sounds of wood, paper, metal, and porcelain with the familiar resonance of a standard vinyl record, it becomes apparent that these works exhibit a delicate material nature because of their susceptibility to burning, cutting, shaving, and breaking, in contrast to the tough character of vinyl (Devine, 2019) both materially (strong but supple, bending but rarely breaking, and potentially emitting toxic smoke) and socially (LPs circulating almost endlessly in second-hand economies). From this perspective, Jo’s works stand in contrast to the social demands of the mass-production market for vinyl records, owing to their inherent limitations in terms of scalability in creation. These works also suggest the possibility of escaping the characteristics associated with vinyl records, such as audiophilic and nostalgic attachment, as well as the dependence on oil in their format.



Figure 2: Kazuhiro Jo, *Fragmented Music* (2014)

Before summarizing this section, we introduce the Jo’s another work, *Fragmented Music* (2014), which was influenced by both Milan Knizak’s broken music and Pierre Schaeffer’s use of a locked groove. [Figure 2] This piece splits a groove into a

collection of arcs and reconfigures the sequence to produce a myriad of beats.

In summary, these works decompose conventional vinyl records based on three points. First, mechanically, they produce sound without relying on prior acoustic information to decompose the mass reproducibility of vinyl in a capitalist market. Second, materially, it makes records of wood, paper, metal, and porcelain without vinyl to criticize the dependence on the oil economy.

Finally, mainly with the last work, we also propose a musical approach to (de)compose a sequence of music by treating the record player as an instrument capable of playing the fragmented sound pieces.

3. Decomposing Visual Medium: Juppo Yokokawa’s *Chromatophony*

While the works examined in the previous section bring the effects of decomposition to the material and institutional levels, this term may also evoke many organic nuances. Therefore, we discuss *Chromatophony* (2019) by Juppo Yokokawa as a work that deals with biological decomposition. [Figure 3]

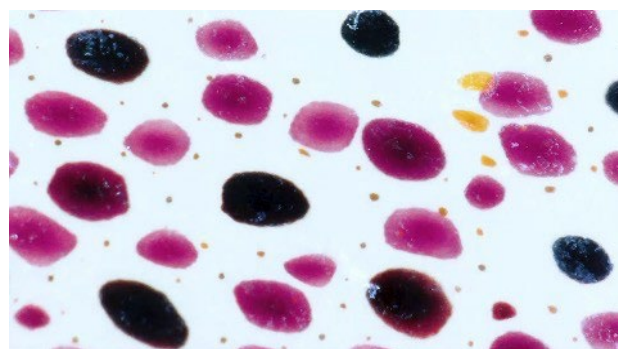


Figure 3: Juppo Yokokawa, *Chromatophony* (2019, Screen capture)

This work records the surface of a squid body using a digital microscope, projecting the pulsating cells of the squid that move in harmony with sound². To fully appreciate this artwork, it is essential to understand the underlying biological properties of squids. Cephalopods such as squids and octopuses are known for their dynamic skin color changes. These shifts in hue and pattern serve various purposes, including camouflage and communication. This phenomenon is caused by chromatophores, which are pigment-filled cells enveloped by muscles that can expand and contract swiftly. Although the color variety depends on the growth stage and species, three types of pigments can be observed and mingled in *Chromatophony*: brown, purple, and yellow.

This work was inspired by an experiment conducted by Backyard Brains, a company that sells educational neuroscience

² Juppo Yokokawa, *Chromatophony* (2020, May 30). <https://youtu.be/oeu3CWkiGvQ?si=G4dV8dAC9MsztEk>

laboratory kits³. They previously used music as an electrical stimulus to manipulate squid chromatophores. Their experiment involved stimulating chromatophores with an iPod connected to a euthanized longfin squid, producing a mesmerizing visual response to the song “Insane in the Brain” by Cypress Hill. If you look at their experiment carefully, you can note a similar pattern; chromatophores were notably responsive to lower frequencies, such as bass or kick drums, but seemed indifferent to higher tones, such as hi-hats or guitar sounds. Inspired by the fact that chromatophores react to certain sounds, Yokokawa designed audio signals to optimally activate cellular tissues, identifying the most effective frequency of approximately 90 Hz and the waveforms suitable for this work (Yokokawa, et al., 2022). Thus, this work achieved perfect synchronization of the sounds produced by the speakers and the images depicted by the living tissues.

Considering this practice in terms of decomposition, we discern two layers as follows:

1. Decomposition of visual media: The vibrant elements generated by chromatophores challenge the technological conditions of visual media in this digital era, which is often supported by a pixelated image on a flat screen.
2. Decomposition of biological entities: The materials of this work segmented from the squid inevitably degrade over time, changing their color and movement.

While with the aid of nonhuman agencies we can decompose the technological aspects of contemporary visual media and explore their alternative possibilities, it must be noted that decomposition in this case is engaged with certain ethical issues. However, instead of taking a macroscopic view of species, this work leads us to contemplate the life and death of cellular structures and their chemical reactions. In other words, the decomposition presented by *Chromatophony* is an intensive process of energy exchange across artificial hierarchies such as species, individuals and tissues. Consequently, in contrast to the positive aspects generally implied by notions such as the life cycle and ecosystem, this work also reveals the inherent brutal, bare, even disgusting aspects of decomposition (Douglas, 1966).

4. Entanglements between the Natural and the Artificial: Soichiro Mihara’s *Making Soil*

The Great East Japan Earthquake in 2011 brought about the issue of decomposition as a major contradiction: planetary forces caused both natural and artificial entities to decompose, while simultaneously confronting society with the impossibility of decomposing radioactive substances leaking from nuclear power plants. Prompted by their impacts, Soichiro Mihara began exploring soil, resulting in *Making Soil* (2021), which was created as a 24-hour webcast of a real-time video⁴.

In this work, Mihara employs a mechanical process involving a slowly rotating motor to mix soil within a transparent bucket-like container. In addition, he “trashes” organic residues from his daily meals into this soil. In contemporary society marked by relentless cycles of production and consumption, a multitude of objects circulate continuously. Many of these objects are either mechanically processed as waste or left unprocessed. However, this work presents a challenge to the linear trajectory from production to consumption and questions the label of “garbage” for objects that have diverged from this trajectory.

“Garbage” such as the tails of fried fish, gradually loses its original shape and color when introduced into the soil. In this context, the tails cease to be categorized as waste and assimilate into the soil, becoming an integral part of it. This work presents neither production nor consumption, but rather the transformation or decomposition of matter in the soil.

As observed recently, soil serves as a medium in which a multitude of microscopic living and non-living forms coexist and are intricately entangled with each other (Montgomery and Biklé, 2015). Microorganisms engage with organic substances, initiating chemical changes and decomposing them to differing degrees.

This process renders matter as a recurrent source in metastable states. Just as the tail of fried fish is decomposed by microorganisms, eventually serving as a nutrient for sunflowers, the decomposed material, in turn, becomes sustenance for other life forms. At that moment, different things that have never met before are assembled. The soil with microorganisms as agents facilitates new encounters between various beings, exchanging life and death, destroying and equalizing their socially and politically defined positions, and developing a recycling process of decomposition: composting (Haraway, 2015). Consequently, in *Making Soil*, we witness essentially the composting process, which is primarily centered on microbial decomposition.

However, this is a slow transition process with no dramatic changes rendered visible by the slowly rotating container and browser for broadcasting. This rotational motion imparts movement to the soil within the container, leading to rotational shifts in the soil as avalanches. This scene is taken with a DSLR from the perspective of the open mouth of the container for webcasting 24/7 on its original website. Drawing on these technological elements, we add another aspect to this work: the temporality of the uninterrupted flow realized by them.

The rotating movement of the soil, which promotes a sense of immersion, evokes a cycle of matter which becomes a milieu of entanglements and encounters. Such gradual rotation of the container also facilitates air circulation, thereby supplying oxygen to the microorganisms present in the soil and ultimately expediting the decomposition process. However, this transformation of the milieu becomes intense and harmful agitations for certain forms of life, including anaerobic microorganisms. In the sense that it is a favorable process for aerobic micro-organisms, this displacement allows for an exclusive and antagonistic form of decomposition.

³ Backyard Brains, *Insane in the chromatophores* (2012, August 23). <https://blog.backyardbrains.com/2012/08/insane-in-the-chromatophores/>

⁴ Soichiro Mihara, *Making Soil* (n.d.). <http://compost.mhrs.jp/>

This continuum of entanglements and encounters does not extend outward but remains confined within a transparent bucket. In this way, *Making Soil* makes material circulation suspended. However, the idea of a circulation is never an absolute and natural order of ecology but is artificial and includes a perspective that puts human concerns first (Chakrabarty, 2021; Ward, 2018) on the basis of various technological and industrial practices, such as knowledge of chemistry, agriculture, and economics. *Making Soil* does not seek to provide enlightenment but rather a critical reflection on circular models that are often idealized in the face of pressing environmental issues.

5. Discussion: Decomposition as intrinsic to the Media Art

Based on the instances examined thus far, we would like to consider again the following issues: what does “decomposition” mean in the practice of media art? How can it respond to the problem of electronic waste disposal, which continues to increase on our blind side, or to the supply of electricity that we take for granted, causing resource extractivism behind the scenes? Beyond simply presenting relevant themes, how can artwork incorporate and digest these issues of energy?

As mentioned in the introduction, cultural traditions, particularly in Western societies that have held human acts of composition and creation in high regard, have frequently portrayed them as a means to resist death and decay. However, even if this understanding is true to some extent, it does not escape criticism for the “anthropocentrism” that has been frequently pointed out in recent years, especially in the field of anthropology (Kohn, 2013; Ingold, 2006). Furthermore, although the term “Anthropocene” may be an opportunity to think about this topic, the name itself seems to be a residue of modern anthropocentrism, as it endeavors to perpetuate the prefix “anthro-” on a planetary scale transcending the human domain.

The sources of such criticism are not irrelevant to the current situation, in which diverse technologies permeate all aspects of art scenes and daily life, accelerating economic and political disparities. Consequently, the predicament of Occidentalism, which has pushed for technological innovation, has led to a growing argument dedicated to nonhuman beings that are positioned as equivalent to humans. To this tendency, we may add the claims of some scholars in the fields of art history and visual studies (Belting, 2011; Mitchel, 2005) who argue that the image itself has a certain agency that has historically controlled human beings (not vice versa). In sum, these critics of anthropocentrism call for a reassessment of the human position within a dynamic meshwork (Ingold, 2011) that encompasses nonhuman entities such as technology, animals, plants, inorganic objects, and living images.

From this perspective, it is possible to remember historical examples of (media) art that appear to have incorporated decomposition. For example, there is a famous episode in which, when *Bride, Even if Naked by a Bachelor* (1915–1923, also known simply as *Large Glass*) was broken during transport, the author,

Marcel Duchamp, was happy to leave accidental fractures during repair. Alternatively, Kurt Schwitters' *Merzbau* reconstructed abandoned trash or dumps to create avant-garde plastic work.

More recently, Christian Marclay's *Record Without a Cover* (1985) incorporated the scratches left on the surface of a record during transport into the work itself.

Whether accidental or intentional, these examples certainly use decomposition as part of themselves. However, we chose the term “decompose” because, unlike the mere destruction or decay of works, we believe it sheds light on the aspect that could not be grasped by the simple dichotomies of creation and reception, or production and consumption. In other words, by showing decomposition as something intrinsic to artworks, we can detract the humanistic subject from its exclusive position and transform it into something equivalent to nonhuman agencies, which leads to the actualization of post-anthropocentric art.

6. Conclusions: Post-anthropocentric Media Art

To conclude this paper, we would like to refer to a book entitled *Philosophy of Decomposition* written by Japanese historian Tatsushi Fujihara (2019). This ingenious work actually uses “decomposition” as a keyword to develop theoretical reflections that, for example, reconsider Negri and Hart's famous concept of *Empire* or Agamben's philosophical arguments, or critically examine the historical establishment of ecology as a scientific discipline.

In relation to the last point, Fujihara does not hesitate to express his sheer criticism of using environment and ecology frequently as rhetorical clichés to conclude recent arguments. This is because the term “ecology” often leads to the innocent and naive notion of “nature,” but also preserves the human-centric belief in its ability to control them uniformly. In contrast, decomposition is a crude and brutal process that sometimes swallows everything without regard to the distinction between humans and nonhumans, as we observed above. According to Fujihara (2019), the phenomenon called circulation or sustainability is indeed “a rough, grafted, flayed, content-popping, harsh, bustling, odor-filled phenomenon” (p. 24, translated by authors), which is an ongoing reality within ecology similar to intestinal activities in our body. He argues that grasping and describing such processes has particular significance in our time, when the balance between production and consumption, or the economy and environment, has become unstable on an unprecedented scale.

Our attempt is to connect his argument to the context of media art and develop it in our own way. In the first example, *A record without prior acoustic information* by Jo excavates the dimensions of materials, such as wood, paper, metal, and porcelain. This leads to decompose not only the notion of composition on which conventional music is predicated, but also the technical or mechanical foundations that make it possible. As a result, what is heard from his works may be the texture of sounds or even something like “noise,” but foregrounding such “a rough, grafted” features induced by material agencies allows for the

decomposition of the communication model supporting the established music.

The second case, *Chromatophony* by Yokokawa, was an audiovisual work using a chromatophore, the biological tissue of a squid, which is literally a nonhuman being. It is important to confirm that this work does not intend to communicate with an individual squid. Rather, the vivid colors and pulsating rhythms provide a critical perspective that decomposes digital technology into an alternative to the pixels that we normally see in our daily lives. In addition, they remind us that decomposition is always a brutal and “harsh” process and should not be enclosed within an anthropocentric framework, but rather situated within and open to nonhuman agencies.

Unlike these two works, which extend decomposition from the material or vital to the conceptual level, *Making Soil* by Mihara presents its organic and material processes. In this work, we can see soil as matter entangled with microorganism life and media technologies, and their “odor-filled phenomenon” could become sensible as a miniature of planetary circulation. The vastly different time scales intrinsic to decomposition become apparent here and generate a dynamic assemblage in which the binary oppositions of the organic and inorganic, or life and death, are swallowed.

Ultimately, the dynamic process of decomposition beyond the human scale is a critical feature common to all these works. They allow us to experience or embody this process through the visual, auditory (and sometimes tactile and olfactory) senses. Thus, decomposing media art cannot be a nostalgic return to innocent nature or a mere critique of the technology that attempts to control matter and life, but rather shows the possibility of moving beyond both paths. In other words, it is crucial to locate the process of decomposition as immanent to the material and organic agencies, which can reveal the critical potential of media art in times of planetary crisis. When the dynamic process of decomposition proceeding inside the “ecology” can be transformed into something sensible and tangible even to humans, a post-anthropocentric form of media art would emerge as a genuine resource for our future.

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Dreaming The Cities: Shifting Cultural Stereotypes through Collaborative Media Art

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Abstract

In 2021, Dreaming the Cities was produced after receiving a grant from the British Council Dice Fund, which promoted the development of inclusive and creative industries. The experimental international project paired diverse artists from São Paulo, Brazil and Lahore, Pakistan, to develop collaborative and socially relevant artistic works. Comprising a monumental effort in logistics across language, culture and time zone barriers, the “event-experiment” is hereby examined as a case study of how media arts, when mediated through the Internet, can provide a strong basis for addressing urgent social topics and furthering a deep connection beyond cultural stereotypes. This paper describes the project with a particular focus on one artwork that arose from it, a video projection of feminist icons from both countries presented in a large-scale format in São Paulo. We examine how, in the exchange dynamics between artists, initial stereotypes and confusions grew into a deep artistic connection and how the process of collaboration through media led not only to a greater understanding within the partnerships but also on a broader scale. We share how the project led to initiating dialogues around minority rights and led to respectful, productive conversations through these collaborative artworks. Finally, we speculate on how the format of Dreaming the Cities can be expanded and matured to become a powerful tool to address damaging cultural stereotypes and urgent social topics such as minority rights and climate change. We offer some learnings from the project that can become a model for other artists and institutions through media art.

Keywords

Digital curation, collaborative art, online collaboration, media art, physical/digital

1. Introduction

In 2021, the first edition of the project Dreaming the Cities (DTC) São Paulo x Lahore was produced with funding from the British Council Dice Fund, which aimed at “Developing Inclusive and Cultural Economies.” The project, created and produced by the authors in conjunction with Lahore Digital Arts Festival (LDF) founders (Pakistan-based) and Linha3 (L3) (Brazilian production company), envisioned bringing together artists across the vast cultural and geographic divide that separates the countries on the project. The concept of DTC was intended to use the internet as a medium, and to understand whether the digital experience could create a space where artists from such distinct backgrounds could learn about each other’s creative process, outputs, and potentials, reach creative agreements, and collaborate in meaningful ways that might shift social and cultural stereotypes.

While the internet has often and increasingly been used as a medium for professional collaboration, it is generally supported by previous physical interactions or connections, such as remote work environments. It has also the potential to be an excellent facility for artists who already know each other or share communities, languages, or cultures. On the other hand, the internet does favor social media interactions with strangers, and scientific, creative and commercial large-scale projects where anyone can submit contributions.[4] The potential for collaborative spaces on the internet can be seen through a variety of tools that facilitate collective drawing or ideation processes, such as Hello Paint or Miro.[14],[15] However, besides the awareness of its mediatic potentialities and influence, and despite its ubiquity in “every sphere of activity in developed societies, its magnitude is still being processed by artists and curators,” the question remains on the social impact the internet can have.[7]

In the examined case, there was strong interest in hosting a collaboration between artists who would otherwise have remote chances to interact or discover each other, and to curate a space in which they could transcend language or barriers common to unprivileged realities. In the case of Brazil, English speakers are usually in the upper-middle classes, and thus communication needed to be facilitated independently of social status. In Pakistan’s case, a country with a “weak passport,” artists have restricted

ability to travel, limiting or eliminating the possibility of in-person international collaborations.[16] As a curated artistic endeavor, DTC also aimed to facilitate an environment where the artists' cultural outlooks on the other would evolve from biased and superficial ideas towards interesting and exhibition-worthy artworks. In short, the driving question was:

Can the internet be a medium where artists from vastly different backgrounds and countries collaborate in a way that shifts social and cultural stereotypes?

Departing from a curatorial theme as illustrated by the title of the event, the cities served as the connecting link between the three pairs of artists with the idea that grounding of the discussion in urban living as a common point would allow the artists to contextualize and compare the information they were receiving from the other. They presented their cities from their perspective and asked each other about their lives, compared routines, beliefs, fears and hopes of new possibilities.

In order to create this intentional collaborative space, we developed a structure that included many actors capable of moderating and guiding the process, preserving the creative agency of artists. The whole project comprised twenty individuals in total, and took place over forty-five days, with four live sessions and independent development time. Over this period, we witnessed the transformation of the artist pairs and overall group from strangers to friendly creative partners. Each pair conceptualized and enacted a collaborative piece, all of which coincidentally focused on social issues, particularly around women and minority rights. Interestingly, two of them explored the physical/digital liminal space, thus enacting a kind of phygital¹ space that added depth to their work.[17]

The feedback from the participants following the project showed that the aim of improving cultural understanding was successful, and significant shifts had taken place. In the "Learnings" section, we will more closely analyze the structures and curatorial decisions that led to this result, and compare it with a second edition of DTC that LDF enacted which further articulated the necessary elements for creating successful internet-based collaborations. Finally, we will theorize a methodology based on the project that can serve as inspiration for other initiatives.

2. A Collaborative but Curated Learning Environment

Considering the nature of the project and this paper's focus on the process, structure, and learnings of DTC, rather than presenting an in-depth literary review we instead explore some theories and methodologies that influence and connect to the project. We first investigate collaborative art as a source of social change and challenges to the view of the internet as equalizer, and then

establish DTC in the Online Collaborative Learning model. Finally, we explore ideas of digital curation.

Beyond the well-researched potential of the arts in creating social impact, collaborative art, particularly when conducted with local communities, has its own transformative power.[8] The coming together of many hands for various reasons - to create, heal, and ideate - often inspires innovative and powerful outcomes. Even large-scale community projects without direct social impact goals can have interesting and poignant meanings.[11] Thus, while it does represent an impersonal medium where often collaborators never meet each other, the internet provides a wide-open space for potential collaborations, which likewise may have social issues at their heart.[9]

Despite this wide-open nature, it is not necessarily so that the internet is an ideal platform for the kind of collaboration that places all participants on an equal level. Scholars have discussed the potential biases and complications in understanding the internet as a pure democratized space, and technological tools as extensions of biased human systems.[2] In an internet-based collaborative setting other frameworks must be recruited, such as the Actor-Network Theory in which all actors in a network, including the non-humans ones, perform important roles.[3],[18] Further, Hall's theory of Encoding/Decoding particularly around media and marketing can be relevant here as well, as each collaborator must embark on their own process of translation.[5]

Network theories and collaboration come together in interesting ways, particularly in learning environments.[1] Here we can look to Online Collaborative Learning theory (OCL), in which the teacher or facilitator plays an integral role in guiding the process.[6] In particular, we note "the three elements involved in the effectiveness of Online Collaborative Learning Environments: Learning Environment, Learning Task, and Learning Interaction." [10] While DTC was not a traditional learning environment, nonetheless the learning involved in shifting cultural stereotypes was a central goal.

In order to truly establish DTC as a learning environment in which these shifts could take place, as creators we worked extensively on the curatorial process from the beginning. Here we look to Lowry's text "Curating with the Internet," where he writes, "Today, new curatorial approaches are emerging in tandem with digitally activated modes of presentation and dissemination distinguished by perpetual reproducibility, multiple intersecting temporalities and materializations, and the subsidence of physical space." [7] In the text, the author discusses cases of internet-based art and social media art, and notes how

many of these approaches are no longer necessarily connected to singular events or spaces and are perhaps better understood as omnidirectional movements

¹ The term, appropriated from marketing lingo, adds physical to digital in a hybrid space or cross-influenced experience. The term is used in this article to illustrate the intention of seamlessness and blurred lines

between modes of conception, production and dissemination connected through the screen as a communal space. This communal space might offer either access to new works, illuminate the existence of works understood to be elsewhere in time and space, or offer multiple or alternative materializations, versions, attributions, interpretations and representations of existing works.[7]

In DTC, however, the project paradoxically allowed both creative exchange for the artists without physical contact, and was able to transgress the virtuality or the “screen as (only) communal space.” Many pieces were bound to or transgressed the screen barrier, where music, dance, and projection joined ‘purely’ digital projects, thus furthering the discussion and exploration of the phigital space as it brings new horizons and value to digital works.[19]

In consideration of all these concepts, the creators of DTC felt it was imperative to develop a curated structure that would facilitate not only collaboration, but a learning journey on each other’s cultures. The structure is detailed in the next section.

3. *Dreaming the Cities: Structuring and Bridging a Remote Collaboration*

Dreaming the Cities was initially conceptualized in the fall of 2020 as a digital curation experimental project. It was enacted throughout the spring of 2021. The planning process took two months and then 45 days during the project execution. In total, 20 individuals were involved: 5 curators and producers of which 3 were from Pakistan and 2 from Brazil²; 7 artists, 4 from Brazil (two of which formed a duo), and 3 from Pakistan; 5 cultural producers and experts as mentors, 3 from Pakistan and 2 from Brazil; and 3 language mediators bridging the gap between Brazilian Portuguese and English. The program comprised of three videocall sessions³ for exchange and mediated discussions, a final live presentation on YouTube, and an evaluation process.[12]

The artists were chosen by the curators from their own country. They were required to be based in Lahore or São Paulo, and were selected for their diversity and artistic talent. The curators then paired the artists after studying their works, themes, ideas, and mediums of expression. The mentors for each country were likewise identified by the respective team members. They were present in one of the three Zoom sessions and asked to present about their work and help guide discussions. In the Brazilian case, two mentors attended more sessions.

Because the selected artists from São Paulo were not fluent in English, the use of language mediators was necessary. These were not professional translators but people interested in the arts and fluent in both languages. They were present in all the Zoom sessions and served to translate what was being spoken into the other language by writing in the Zoom chat during the main sessions, and translating verbally during the artist’s discussion in

the breakout sessions. Each mediator was additionally assigned to a pair of artists and was included in a chat group to facilitate communication outside of the sessions. In Pakistan, spoken languages include both Urdu and English, and the artists were able to communicate in English. All the participants, including team members, artists, mentors, and language mediators, received a stipend. The team provided guides in advance of the project for artists, mentors, and language mediators to prepare and establish expectations.

The four working sessions were organized by curated themes, steps planned to build connection between the artists: “Presenting the Cities,” “Describing the Cities: Local Cultural Scene,” and “Co- Creation - Imagining Urban Futures.” The concept of centring the discussions around the cities was chosen to provide a physical grounding, a common point of reference, especially for artists who had little to no understanding of life in the other’s country. The sessions were structured, starting with initial introductions, mentors’ presentations, and breakout sessions in which each pair joined a room with one team member from each country, one mentor, and one language mediator. The team members were mostly silent observers, and the mentor was present to provide guidance when necessary. The below figure shows the conceptual framework of the project

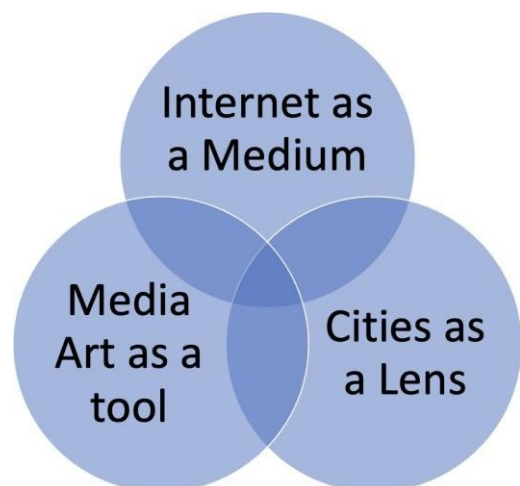


Figure 1. The Conceptual framework of DTC.

In the first session, artists were prompted to share their physical experiences of living in the city, such as sounds, food, and sights. In the second session, artists shared an artwork that exemplified their practice and were tasked to find two relevant points in common between their cities, according to their interests. They were then asked to decide on a single issue of cultural sustainability that their collaborative work would focus on. By the third session,

³ Video conferences were hosted at the application Zoom, referred to as “Zoom sessions”.

² The main team was formed by the curators Amanda Parra, Azeem Hamid, Julieta Regazzoni, Najam Ul Assar and production management by Gillian Rhodes.

pairs defined the format and topic for their work and shared a pitch of their ideas. They were encouraged to think about possible futures for urban environments and local economy, including questions about potential creative tools that could build futures for their contexts and what would make the cities more supportive to a sustainable artistic environment. In the final session, which was broadcast live, each pair was invited to talk about their artwork, which was then screened and commented on. This session was also attended by some of the mentors.

Following the project, all participants were invited to complete a survey to share feedback and discuss how their understanding of the other's country and culture had evolved throughout the project.

4. Discussion

The main question that the project was attempting to address was if the internet could be used as a medium where artists from vastly different backgrounds and countries could collaborate in a way that shifted social and cultural stereotypes. In this section, we share positive results and impact, and use one of the artist projects as an example. In the next section, we go deeper into the learnings and extract a unique Dreaming the Cities methodology that others can use to facilitate meaningful connections across international and cultural borders.

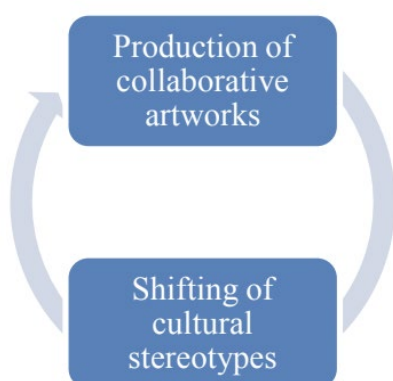


Figure 2. The two objectives of DTC, which rely on and complement each other.

The objectives of the project were twofold and complementary (Figure 2): the production of collaborative artworks, and a deeper shared understanding of each other's culture. Both were met satisfactorily. For the former, each pair produced a completed and meaningful artwork that showcased their medium of preference. Here we provide as an example the artwork created by the Brazilian collective Coletivo Coletores and Pakistani artist Romaisa Fawad. The artwork was entitled "Cidades/Sonhos" Territórios de Resistência - "Cities/Dreams" Resistance Territories.[13] The group described it as:

The result of a joint research between two different realities and at the same time consonant in the challenges for the construction of "Cities / Dreams", based on stories that are built over many years of struggle and resistance...

...This proposal highlights the territories from their fighters, daily warriors, in the relentless battle for dignity, education, representation and human rights that make their realities effective. The territories of struggle are territories of resistance, of new subjectivities, of the creation of universal symbols that can be read in addition to languages, the signs of less imperative and more welcoming and inclusive cities. For such a challenge, the objective is to occupy the city of São Paulo with images of eight references in the construction of more inclusive futures, either through intellectual production, or through tireless struggle in extremely unequal spaces.

The pair enacted their project as an installation which projected a video of "the faces of prominent Afro-Brazilian feminists who dedicated their lives to the fight for the rights of black women, through their voices and diverse activities" combined with Pakistan's most prominent feminist faces, "who have defied and resisted violence against women, children and religious minorities, fighting fearlessly for their freedom" on the face of a building. The action took place in Cidade Tiradentes neighbourhood in São Paulo, one of the most populous outskirts of the city. The artists also relied on the "visuality built in Lahore, composing a scene between cities based on the visuals." The centring of female and feminist voices as an 'intrusion' on public space recalls the continuous struggle of prominent feminist figures to find their place in the city. The concept, images, and edit were co-created by the artists. This pair was not the only one to focus on social issues: all three artworks took as subject minorities and their place in the city.

For the second objective, we measured success primarily from the feedback forms completed after the project. Many of the participants shared that their understanding had grown and they had a newfound appreciation and awareness for the other culture. Interestingly, feedback showed that it was not just the collaborating artists who were affected by the process: both language mediators and mentors also reported gratitude and interest in being part of the project. Many of the participants reported that they were particularly interested in the opportunity to make international connections, and that the extreme cultural diversity and differences was an incentive to join the project at the outset.

It is important to note that, while not directly part of planning, the overall atmosphere developed throughout the process was surprising, particularly the way that the group as a whole came together, even despite the language barrier. By the last session, they shared a sense of community and familiarity.

5. Learnings

While the project was ultimately successful, there were many learnings along the way, as the team was continuously discussing and adjusting throughout. Here we present the main learnings that we felt most significantly impacted the outcome of the project.

6. Language Mediators are important

Perhaps the most important contributions to the project came from an unexpected source, those who were initially seen as a practical solution: the language mediators. As noted, these were not professional translators. Due to their personal excitement around the project, they took their roles with commitment and seriousness, and performed a mediation that went beyond pure translation. This allowed the project to reach diverse artists, which was an important aspect for the project's central interest of connection and learning. This also transcended the enforcement of English as the language of communication, as is often the case with international connections.

Initially, the team discussed numerous options for language facilitation, including closed-captioning, speech-to-text apps, Zoom tools, and more, but opted for an apparently simple solution. The curators wanted to create an atmosphere that would allow the artists agency and freedom to the highest extent possible in very structured virtual sessions, as well as allow them to spend the most time possible in the breakout rooms with their pair. As such, the team decided not to use spoken translations for the opening remarks and mentor presentations, as this can double the time spent. Instead, we opted to have the language mediators write the translated text into the chat function in Zoom as the presentation continued. While this did reduce the details communicated, it allowed the mentors to remain in their flow.

Each language mediator was assigned to a pair of artists, and worked with them in every session and in the separate chat groups. This was important as we saw communication improve along the project as each pair and their mediator gradually learned each other's pacing and rhythm of speech.

The importance of engaged language mediators cannot be overstated, as they were present and willing to work through all stumbles. This made the project more inclusive and stimulated the artists to understand each other, to communicate clearly and carefully, knowing as they did that their words had to be translated. The pairs also found other ways of sharing information directly, such as sending recorded sounds of the city or swapping music. Interestingly, the language mediators provided the most positive feedback at the close of the project.

7. Structures, Roles, and Deadlines

Although the internet as a medium of collaboration is often more casual or open-ended (as in open contribution projects where more than a million artists share works), DTC was successful due to the clear structures, roles, and deadlines that it created.

Between the team's supervision and the mentors' guidance, there was a strong support system for the artists as they navigated the challenges of production and understanding (Figure 3).

Feedback showed that artists were grateful for the mentors' presence, which provided inspiration through their presentations and served as guiding voices in the breakout sessions, suggesting points or asking pertinent questions that spurred their discussions forwards. Additionally, deadlines and expectations for all roles were outlined from the beginning, which provided an overarching structure. The importance of these larger structures came specially to light a year later, when LDF conducted a second edition of DTC with two artists each from France and Pakistan.⁴

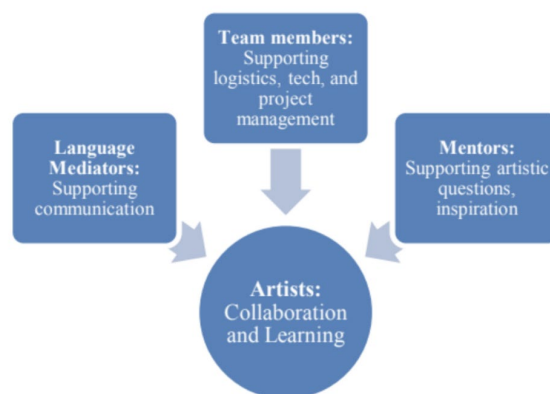


Figure 3. The curatorial support structure of DTC Lahore x São Paulo.

Here, while the conceptual framework was the same (Figure 1) and comprised of three sessions focusing on connections of the cities, the larger structures were missing. Rather than multiple team members, there was one team member from Pakistan who contacted and paired the artists from France and Pakistan. There were no mentors, and all artists spoke English well enough to communicate.

Because the overarching structure was not present from this edition, the responsibility of the collaboration fell solely on the shoulders of the artists (Figure 4). As such, one pair flourished and established an excellent working relationship that required little intervention. The other, however, struggled to establish a deeper connection. While both pairs did produce a collaborative artwork, the shifting of cultural understanding was less prominent.

This is a critical lesson and one that is necessary to consider for future projects. The twofold objectives of DTC relied on each other, as the collaboration was a tool for the exploration of other cultures and the expansion of understanding. In providing support to the artists, this first edition allowed the curatorial responsibility of the collaborative space to fall on the shoulders of the team, rather than the artists. In the second edition, the artists themselves were asked to develop this curated space, and where this was less successful, there were no larger support systems to rely on.

⁴ Upon the close of the initial DTC edition, producers of LDF and L3 verbally agreed that each could reproduce the DTC format in their own organization, with the idea that over time the network of DTC would expand to include more and more organizations

across the world. The project's replicable methodology and intellectual property belongs to the all curators who co-created it.

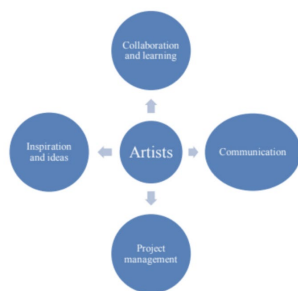


Figure 4. A chart showing how the artists took on more responsibility in DTC Lahore x Paris.

8. Physical grounding of digital interactions

The choice of centring the project around the cities was done so in order to provide a physical grounding to an interaction which was otherwise purely digital. The artists involved had never met each other nor travelled to each other's cities, and may never do so. As such, it was important to create a sense of shared lived experience that would provide both a starting point for connection and a physicality to the discussions.

A surprising aspect of this physical grounding was that it seemed to automatically turn the discussions to questions of minorities, belonging, and inclusion. While the team did encourage artists to focus on issues of cultural sustainability, their work mostly focused on social issues, such as gender and minority rights. Indeed, in focusing on what the cities were, the artists were somehow drawn to exploring what the cities *could be*, and in describing what spaces were present, they also looked to the spaces that were missing.

One unexpected result of this physical grounding was how it engendered the development of a kind of *phygital* space between the physical and the digital. Like the *Cities/Dreams* example presented above, the artworks created were a complex interaction between these realms. Those that dived deeper into this exploration were perhaps more impactful, and could be a space to explore deeper in the future.

9. Dreaming the Cities Methodology: Curated Spaces

DTC created an online environment in which artists were invited to interact with a completely alien culture through the process of creating a collaborative media artwork. It did so by creating a curated space supported by team members, mentors, and language mediators that encouraged listening, understanding, and co-creation. Here, we speculate on the methodology that made this a successful project.

1. **Structure and expectations:** Creating a structure in which the artists were solely responsible for listening and connecting with each other enabled an environment that was comfortable

and supported. Stipends for all allowed every participant to commit to the project seriously. Expectations were established beforehand.

2. **Guidance and supervision:** Having team members from both countries as well as mentors distributed the responsibility of holding this curated space, and ensured that the artists stayed focused and on track. The mentors provided valuable inspiration, and played key roles in the breakout sessions in prompting exchange.
3. **Physical grounding of the cities:** Digital interactions need physical grounding in order to centre the exchanges on lived experiences. Cities represent the meeting point of cultures and groups, and as such immediately offered a pathway to shared experiences and a predisposition to exploring issues of sustainability and diversity.
4. **Listening and patience:** One of the most important aspects was that all participants, from team members to artists, came into the project with the expressed interest of learning about another culture, even despite existing stereotypes they may have held. As such, throughout the various stumbles and misunderstandings, there was a mutual attempt to try and understand.

10. Conclusion

Dreaming the Cities represents an effort to leverage the accessibility of the internet and global commutability of technological tools in the creation of digital art to bridge the chasms of culture and geography. This paper has detailed how the project was enacted and the theoretical underpinnings in its inception. It has shared the impact and lessons learned, and theorized a methodology that other organizations can be inspired by to engender meaningful collaborations.

Moving forward, there is much more to be explored in the format. The extension to the *phygital* space could provide an exciting dimension, as it would be interesting to go deeper into this exploration, perhaps as an expectation for the artists to envision how their work could become an intervention within the city itself.

Finally, while the project did connect artists across vast cultural, linguistic, and geographic divides, the framework of the project automatically attracted people who were open to the idea of learning more about the world. As such, one could speculate that the effectiveness in shifting cultural stereotypes was in part or in full due to the fact that everyone was open to having their perspectives shifted in the first place. It would be necessary to conduct multiple projects with many more cities and artists represented to more thoroughly understand the impact and efficiency of the proposed methodology. At the very least, however, it can provide a clear foundation for internet-based, media art-driven collaborations that seek to address social issues and deepen cultural understanding.

Acknowledgements

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Investigative Arts as Grassroots Empowerment to Environmental Research:

Taming the Forest and xMobil

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Abstract

Through a gradual consolidation of networks and platforms across realms of education, economy, and both NGO as well as public cultural institutions, it is especially the media-artistic practice of the investigative kind that trailblazes possible itineraries and develops (speculative) toolbelts for venturing into any kind of liveable future, possibly such that might surpass the aporia of the Anthropocene. Upon an analysis of four award-winning artworks at the Arts Electronica Festival 2023, the selected two project cases depict possible strategic approaches lending well to grassroots initiatives, even if both are embedded within either wide-ranging multi-million supported (structural) platform endeavours or trans-national programs such as the European Capital of Culture. An ongoing collaborative process between art and science, Taming the Forest is being implemented by a group of students, artists and researchers charting an interdisciplinary cross-field among bioeconomy, cultural history, policy, and art(ivism). The project-as-process shows how different blends of methodologies in artistic-cum-scientific research can become truly relevant for both of their respective realms, opening new creative pathways and pedagogical registers, while repeatedly returning to the local (forest). Taming the Forest manifests the need for a new sensibility and complex knowledge, moving beyond the objective study and becoming attentive to different dimensions of research and its outputs that emerge through the introduction of Art Thinking that becomes crucial in order to tackle the manifold big-scale problems such as climate and biodiversity crises. xMobil (2021-) is a multi-stakeholder prototype development process of a mobile laboratory in a solar-powered car trailer, assembled mostly of salvaged technology parts and reused materials, geared for investigative-art and DIY/DIWO-workshop applications. Empowering creativity and innovation in off-grid public and remote locations, and promoting autonomous art-science practices as well as creative-community projects, particularly in the realm of environmentalism, it combines the work of artists, designers, architects, researchers and engineers who act as mentors to both students, and non-formal learners coming from diverse educational programs, both formal and non-formal. The contribution raises the issue of visibility, sustainability and preservation of such transitory projects or platforms, where artistic(-cum-scientific) works are based on grassroots research and experimentation, examining their methodological approach as well as their topic-setting as regards the limits of growth, and not least discussing their costs to social and natural ecosystems, increasingly permeated by technology.

Keywords

Art thinking, ecocriticism, ecology, bioeconomy, DIY, autonomy, art and science.

1. Introduction

In the current state of multiple and repeating planetary-scale crises, ranging from climate disasters to resource mismanagement, the complexity of problems often takes humanity into exploring unknown unknowns. Through a gradual consolidation of networks and platforms across realms of education, economy and both NGO as well as public cultural institutions, it is especially the media-artistic practice of the investigative kind that trailblazes possible itineraries and develops (at least speculative) toolbelts for venturing into any kind of liveable future, possibly such that might surpass the aporia of the Anthropocene and find a new way of making (up to) kin, to paraphrase one of the main conceptual novums in Donna J. Haraway's "Staying with the Trouble: Making Kin in the Chthulucene," (2016).

By briefly analysing four current (globally awarded) examples, and going just slightly deeper into two cases (where the below signed article author is involved as co-author, mentor, and researcher), this contribution will raise the issue of visibility, sustainability and preservation of such transitory projects or platforms, where artistic(-cum-scientific) works are based on grassroots research and experimentation, examining their methodological approach as well as their topic-setting as regards the limits of growth, and not least discussing their costs to social and natural ecosystems, increasingly permeated by technology.

2. Analysis of selected cases awarded at Ars Electronica 2023

First, let us briefly look at four examples among some of the currently premiered, awarded artworks at "global scale", the Ars Electronica Prize winners of 2023. The festival motto-question was: WHO OWNS THE TRUTH?

2.1. A Tale of Two Seeds

The Golden Nica-winning artwork in the category of Digital Musics & Sound Art, titled "A Tale of Two Seeds: Sound and Silence in Latin America's Andean Plains," presented by Atractor Estudio and Semantica Productions, epitomizes the paradigm of Investigative Arts, intertwining with the principles of Eco-criticism that can be considered an important theoretical cross-cutting priority of the latest contemporary art discourse. This pioneering piece, accessible via the link provided [<https://calls.ars.electronica.art/2023/prix/winners/9666/>], transcends traditional boundaries to encapsulate a profound narrative, engendering grassroots empowerment within the realm of environmental research. In terms of ecocriticism that

according to Gerrard (2023) explores the ways in which we imagine and portray the relationship between humans and the environment across many areas of cultural production, this artwork delves into the profound alterations triggered by the ongoing agro-industrial colonization in Latin America, particularly focusing on Colombia. Comprising three distinct components, "A Tale of Two Seeds: Sound and Silence in Latin America's Andean Plains" utilizes multifaceted scientific methods to illuminate the transformative sonic landscape of the Andean region in the wake of the pervasive monoculture soy expansion, which is in the artwork opposed by amaranth as a plant that in its many features presents a kind of critical opponent to the soy.

The first component delves into the subterranean and surface soundscapes, harnessing advanced recording techniques to capture the auditory essence of the Andean soil. These recordings are paired with precise measurements of electrical conductivity within the soy and amaranth plants, offering an auditory testimony to the ecological shifts brought forth by the proliferation of genetically modified (GM) soy cultivation over the past decade. In so doing, the artwork not only echoes the activist potential and the critical edge of Investigative Arts approach but also unveils the subtle intricacies of environmental change in Latin America, exhibiting a deep-rooted commitment to the principles of ecological research, here paired with the artistic approach. Augmenting this immersive soundscape, the installation is complemented by two thought-provoking video works. The first, "On Vegetal Politics," dissects themes of food sovereignty, deforestation, and the preservation of biodiversity, seamlessly entwining the story of soy monoculture and its expansion within South American territories. It introduces an algorithm that is commonly employed in the agribusiness sector to model the growth of transgenic crops on various soil types, thus opening the door to a profound exploration of agricultural practices and their environmental impact. This segment of the artwork exemplifies the Investigative Arts' potential to unveiling (sometimes intentionally) hidden ecological relationships and resonates with the transformative power of grassroots empowerment within environmental research.

In a confluence of artistic expression and technological exactness, the second video work, "Botánica Transgénica," transcends traditional boundaries by manifesting as a web 3.0-related and blockchain-critical art piece. Employing cutting-edge search algorithms and web scraping techniques, it endeavours to register as Colombian intellectual property the codes patented by foreign agro-industrial conglomerates on native, indigenous living organisms. This bold act underscores the artwork's commitment to interrogating the ethical and legal dimensions of environmental research and aligns with the ideals of Eco-criticism. In summary, "A Tale of Two Seeds: Sound and Silence in Latin America's Andean Plains" masterfully combines elements of the Investigative Arts, grassroots empowerment, and environmental research, presenting a compelling narrative of ecological change in the face of agro-industrial expansion. By drawing from the ideas of Eco-criticism, this manifold and complex artwork embodies the evolving discourse on environmental transformation and intellectual property. The innovative and ground-breaking nature of this piece resonates with the ethos of eco-critique in art and science, making it an essential contribution to the contemporary discourse on ecological research.

2.2. Sunlight, Soil & Shit (De)Cycle

The "Artificial Intelligence & Life Art AWARD OF DISTINCTION" of the Ars Electronica festival was in 2023 presented to the 3SDC project, "Sunlight, Soil & Shit (De)Cycle" by Oron Catts, Ionat Zurr, and Steve Berrick. It exemplifies another sci-art coalition that, by implementing the artistic (thinking) approach, brings about grassroots empowerment within the realm of environmental Research. The project, accessible via the following link [<https://calls.ars.electronica.art/2023/prix/winners/8743/>], unfolds as a durational performative experiment, orchestrating a profound narrative that challenges contemporary food system futures, rooted in the tenets of eco-criticism and contemporary criticism of artificial intelligence systems and concepts.

The 3SDC project delves into the intricate interplay of biological food production systems with the ever-advancing landscape of artificial intelligence. This open (input-dependent) circular system deliberately refrains from food as its primary output, channelling its creative energy towards the generation of vast amounts of mostly useless data. The project's structure mirrors contemporary narratives surrounding sustainability, wherein new food production and agricultural initiatives, including cellular agriculture, aspire to eliminate natural elements from the production process. In this quest to automate and control food production, traditional and non-standardized factors such as sunlight, soil, and waste are supplanted by artificial light, substrates, and fertilizers. Assumingly, this mechanistic approach to food production is driven by the notion that it has a minimal or no impact on the environment, much like the tech industry's promotion of the metaverse as a nature-free habitat. However, beneath this veneer of environmental friendliness lies an intricate web of concealed ecological, physiological, and psychological consequences.

Interpreted in the context of eco-criticism, the 3SDC project embarks on a profound exploration of some crucial environmentally transformative paradigms. It reveals the multifaceted implications of substituting natural elements with artificial counterparts in food production, showing how the Investigative Arts approach may explicate the hidden layers of ecological narrative. In doing so, it embraces the essence of grassroots-level empowerment by questioning the consequences of tech-centric food production and its impact on the environment. The project's critical stance aligns with contemporary eco-critique, challenging the prevailing narrative that a separation from nature, as manifest in tech food systems, carries minimal ecological repercussions. This endeavour exemplifies the interconnectedness of ecological research, Investigative Arts, and environmental activism. Drawing inspiration from Naomi Klein's "This Changes Everything: Capitalism vs. the Climate" this artwork may be claimed to embody the assumption that ecological status quo cannot persist in the face of our contemporary consumerist culture. It signifies a shift, a challenge to the prevailing materialistic paradigm, and a demand for grassroots empowerment.

2.3. Gan Eden

The recipient of the "U 19 / Young Professionals Award of Distinction," the artwork "Gan Eden," conceived by Anatol Grandits and Tomas Perkovic, may be described as a theoretical and artistic fusion of eco-criticism and contemporary art, within its increasing tendency to critical utopian narratives. Accessible through the following link

[<https://calls.ars.electronica.art/2023/prix/winners/8121/>] this audio-visual piece ushers us into a world where humanity has not merely detached itself from the natural world but has, in an act of ecological erasure, extinguished all forms of life. The title, laden with symbolism, pays homage to the paradisiacal realm we have forsaken in our relentless pursuit of mass consumerism and materialism. The artwork beckons viewers into an interactive experience that transcends aesthetics, encapsulating an unspoken, simmering anger. This emotional undercurrent is, in fact, a reflection of our collective resignation in the face of the mounting climate catastrophe.

In line with Timothy Morton's "Dark Ecology," "Gan Eden" serves as a gateway to a logic of future coexistence. It immerses its audience in a world characterized by a void created by the actions and ideologies that have estranged humanity from its ecological roots. This allegorical landscape unveils the layers of the environmental crisis that simmers beneath the surface of our materialistic existence. Considering a plethora of existing practice cases as well as different epistemologies to the topic as presented in Heather Davis's "Art in the Anthropocene" (2015) we might claim that "Gan Eden" is not merely an artistic creation; it serves as a vessel for encounters among aesthetics, politics, environments, and epistemologies. Through its unspoken narrative, it forges an encounter between viewers and the harsh realities of a world (soon to be) devoid of life, an encounter that invites introspection and challenges the apathy that has often characterized our collective response to the climate crisis. "Gan Eden" is more than an artwork; it's a catalyst for dialogue, a mirror held up to society's passive acceptance of environmental degradation.

2.4. Klimaton ARCTIC≈2020

The artistic endeavour "klimaton ARCTIC≈2020," a recipient of the Honorary Mention in the category of Digital Musics & Sound Art, may be said to represent the fusion of eco-criticism, and an implicit criticism of the scientific approach in contemporary arts. Crafted by Adnan Softić and Nina Softić, featuring contributions from Thies Myther and the MOSAiC Expedition Team, this installation work, accessible through the provided link [<https://calls.ars.electronica.art/2023/prix/winners/8121/>], assumes the form of a generative sound object that addresses the intricacies of scientific fact communication in the climate change context. Situated at the crossroads of science communication, eco-politics, technology production, and artistic DIY practices, "klimaton ARCTIC≈2020" acts in response to a seminal event in scientific research. In late 2020, the MOSAiC research expedition culminated, after more than a year of extensive data collection employing a kilometre-long network of measuring stations. This monumental expedition engendered the most extensive scientific data repository from the Arctic region to date, potentially marking one of the final large-scale recordings of a vanishing landscape considered by scientists as the "key witness of climate change."

Drawing upon the ideas in Timothy Morton's key work "Dark Ecology," the artwork may be said to engage with the imperative for a logic of future coexistence: it forms a bridge between scientific data and the realm of Investigative Arts, critically caching a range of (often unaddressed) complexities inherent in scientific fact dissemination within the context of climate change. The artists (as well as the users of the object may) "play with" the enormous scientific data archives, challenging the

notion of traditional science communication by transforming this data into an evocative generative sound object, echoing the investigative principles of eco-criticism. Moreover, in alignment with Naomi Klein's "This Changes Everything: Capitalism vs. the Climate," the work "klimaton ARCTIC≈2020" underscores the urgency of the climate crisis and the necessity for transformative action, however at an intimate level. It reframes the monumental scientific data collection as an opportunity for individual reflexive empowerment and eco-critical, somewhat imaginary participation in environmental research. The imperative is no longer just to archive data but to actively engage with it, fostering a heightened ecological consciousness and an open dialogue on the consequences of climate change.

3. Two primary case studies

The selected two project cases for this presentation, that I am going to talk about in the following, depict two possible strategic approaches lending well to grassroots initiatives, even if both are embedded within either wide-ranging multi-million supported (structural) platforms, or trans-national programs such as the European Capital of Culture.

3.1. Taming the Forest, a manifold art+sci process

An experimental process between art and science in a pedagogical, yet also real-life professional setting, "Taming the Forest" was implemented LAST YEAR (2022) by a group of students, artists and researchers charting an interdisciplinary cross-field among bioeconomics, cultural history, policy, and art(ivism). The project joined students, artists and researchers of the School of Humanities and the School of Arts of the University of Nova Gorica including external collaborators in some of its episodes. The art-science research group consisted of students from BA, MA and PhD programmes, ranging from artistic practice to humanities as well as researchers in those fields, including a high-profile JRC-based researcher of bioeconomics, specialized on European forest management. Importantly, in the development of the video interim product, an artificial-intelligence based con-creative entity (Dall-E 2, by Open, then in beta use) was included into the process: prompts of key phrases from the research process were used to generate further pictorial material for the emerging video, now available through the provided link [<https://vimeo.com/725233829>].

Researching the conflicting narratives of history and economy about biodiversity in general, and specifically on forests, the project brought about several public formats such as lectures, video installations and eventually an AV performance, as well as a scientific article to be published soon in a high-quality scientific journal. The project-as-process shows how different blends of methodologies in artistic-cum-scientific research can become truly relevant for both of their respective realms, opening new creative pathways and pedagogical registers, while repeatedly returning to the local (forest).

The 4-month initial research stage brought about a video that was presented at the Resonances IV SciArt summer school organized in June 2022 (in Ispra, Italy) by the Joint Research Center (JRC) of the European Commission, in response to the theme NaturArchy: Towards a Natural Contract. The video provides an interpretation of archival sources about forest management in the Karst (a plateau in South-Western Slovenia, partly stretching into Italy) at the turn of the 19th and 20th centuries. At the same time, it also brings new findings about

forest management during the afforestation of the Karst, and timely reflections on human-nature relationship. The complexity of experiencing the forest is mediated both through maps and photographs as well as in original illustrations of local birds and recordings of their singing, complemented by images created with artificial intelligence. They are connected into a whole by a sound composition that intertwines with spoken theory on complex system. Along the inspiring argumentation of “How Forests Think - Toward an Anthropology Beyond the Human” by Eduardo Kohn from 2013, it may be claimed that

‘(...) if “we” are to survive the Anthropocene—this indeterminate epoch of ours in which the world beyond the human is being increasingly made over by the all-too-human—we will have to actively cultivate these ways of thinking with and like forests.’ (Kohn 2013: 227)

The further and currently last stage of the artistic investigation within the TTT process resulted in a biosonification performance-process “Symphotree”, presented in September 2022 at the international festival of new media culture Speculum Artium (Trbovlje, Slovenia). The project thus premiered its performative phase that involved signal inputs by dripping water and a living plant (as con-creative) entity, co-steering the audio-visual output, both factual (coded, verbalized) and emotional (midi-interfaced, based on modular-audio).

A particular challenge in this project was to test the art-sci collaboration in the higher education context where it is common to speak and write about interdisciplinarity in theory, however it is rarely encountered in practice among students, researchers and professors. The aim of the TTT project was to give attention to real differences of thinking and approach in art (new media, animation, music) and science (history and ecology, critical theory, philosophy), and eventually manifest this in (collectively) experienced physical situations, as well as speculative artwork, and not least scientific outputs. Finally, the project also brought about meaningful transformations in top-level scientific thinking, such as the one conducted at the Joint Research Center of the European Commission.

3.2. xMobil, a vehicle for eco-critical activism

“xMobil” (2021-) is a multi-stakeholder prototype development process of a mobile laboratory in a solar-powered car trailer, assembled mostly of salvaged technology parts and reused materials, geared for investigative-art and DIY/DIWO-workshop applications. Empowering creativity and innovation in off-grid public and remote locations, and promoting autonomous art-science practices as well as creative-community projects, particularly in the realm of environmentalism, it combines the work of artists, designers, architects, researchers, and engineers who act as mentors to both students and non-formal learners coming from diverse educational programs, both formal and non-formal. In this context, the work resonates with the principles articulated in Heather Davis's “Art in the Anthropocene: Encounters Among Aesthetics, Politics, Environments, and Epistemologies,” in such a plural way, fostering a fusion of artistic and scientific inquiry within the ecological sphere.

“xMobil” was conceived by a community of developers and future users representing highly diverse sectors, from industry, independent arts production, natural sciences and education

(teachers and students), to activism, and even local governance or cultural policy. The recent status of the project is to be taken from its Instagram profile at the provided link [<https://www.instagram.com/xmobil25/>]. After the premises were soft-squatted as the main venue of an international contemporary art festival, “xCenter” was established in 2020 jointly by NGOs, the municipality, and a local university, greatly supported by tech companies from the region of Nova Gorica (Slovenia), a peripheral brain-drained yet smart-city ambioned town, struggling with diverse structural inequalities – however with the title of European Capital of Culture 2025, of which the solar-powered mobile art-science lab and a DIY-workshop platform “xMobil” is a vital part of.

The project – or rather the trailer-lab as such – may serve as an example on how to synergize the colliding forces behind such “cross-over innovation,” while tirelessly addressing burning issues of geographical, social and spatial peripheries, aesthetical and cultural minorities, as well as ideas and practices of ecocriticism that according to Gerard (2023) engages with the natural environment to investigate climate change, environmental justice, sustainability, the nature of humanity with the technological sphere etc. – while keeping up a diverse range of artistic (research) practices.

After its gradual build-up and pilot usages in 2022 and 2023, “xMobil” will now lend itself through an open call for investigative artistic projects. Besides its solar-only electricity provision, this year an on-board low-cost water-filtering system will be devised by Miha Godec, a School of Arts UNG student (soon alumnus) who exhibited his topical artistic-research piece “Fluvial Dialects” on the same 2023 Ars Electronica Festival – now to be made compact, mobile, real-life relevant, and not least environmentally friendly. This work is accessible through the provided link [<https://ars.electronica.art/who-owns-the-truth/en/fluvial-dialects/>].

4. Conclusion

Considering the visibility, sustainability and the preservation of such artistic-cum-scientific pieces – or rather processes – one might conclude that the methodological approaches of these projects are at least as important and as relevant (to both their actors and their audiences) as their products are, be it scientific findings or artistic performances, articles or videos. This is why it is key to not only understand but also openly negotiate the blends of artistic and scientific approaches, the combinations of tools (and thinking styles) applied, and played out both against as well as (in tune) with each other.

No matter how transitory these projects or platforms may (not) be – where artistic(-cum-scientific) works are based on grassroots research and experimentation – the topics that these works engage with and the burning environmental, climate-related questions they raise, show how immense and manifold the relevance of these practices is. In particular they show, how these kind of kinships-as-processes matter socially, and how earnestly they should be analysed, promoted and, not least, preserved – even if they might not always sing the emperor's song, but rather argue against the grain, proposing not only “soft” agendas such as radical empathy or playful DIY, but also sombre considerations such as the one of degrowth that cuts deeply into our standards of every-day (Global North) Western life comfort, and calls for an immediate stopping of the business-as-usual.

This perspective aligns with the ethos of Donna J. Haraway's "Staying with the Trouble: Making Kin in the Chthulucene," (2016) emphasizing the critical need to acknowledge, nurture, and protect these art-science collaborations that challenge conventional narratives and confront pressing environmental and societal concerns.

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Telematic re:sources to counter the climate emergency: coombe hill or high water!

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Abstract

This paper discusses the conceptual and practical implications of my telematic art practice in relation to our global climate crisis, by reflecting on the history and development of my work from gallery installation to Internet performance during the COVID-19 pandemic and the environmental applications it now signals. Since the early 1990s, I have taken a phenomenological approach to combine and relocate distant participants in various familiar settings, in social and fictional contexts, from life-size projections on shared beds and sitting together on the same green-screen sofa, to virtual peace negotiation tables and sharing the same telepresent stage.

Since the outbreak of COVID-19 at the start of 2020 my telematic installations have migrated online. The pandemic highlighted the necessity for more meaningful telepresent encounters as galleries and theatres closed, whilst wildlife meanwhile encroached on our cities and vapour trails disappeared from the sky. The first such attempt occurred in May 2020 with *Pandemic Encounters* in collaboration with the Third Space Network. This was followed by *Telematic Quarantine* for the International Limestone Coast Video Art Festival: Video Art during and after the pandemic in November 2020. These performance works led to my recently completed the UK Arts and Humanities Research Council (AHRC) COVID-Response project *Collaborative Solutions for the Performing Arts: A Telepresence Stage* (December 2020 to May 2022), directly supporting the UK performing arts sector with resources and solutions to overcome the closure of theatre venues.

Following the outcomes of the *Telepresence Stage* project I developed *Coombe Hill or High Water*, an online tragicomedy encounter for two telepresent participants. The work is both an interactive telematic artwork and an online video meeting space, or story-room. A dark absurd satire on ecological ignorance told through a symbiosis of storytelling and telepresence using telematic technologies and human agency to counter it directly.

Keywords:

Telematic; Telepresence; Phenomenology; Performance; Environment; Climate; Pandemic; Interaction; Networked; Intimacy; Touch

Reframing face-to-face coexistence

From the start of 2020, we were told to stay home, stay safe and save lives. But while the humans were locked away in their homes it wasn't all bad. In their absence, goats were coming down from the mountains to reclaim the streets of Llandudno in Wales, wild boars were roaming the streets of Haifa in Israel, and herds of deer were grazing on suburban greens in East London. And there wasn't a vapour trail in sight! By May 2020 air pollution had already reduced by over 50% across the world as a result of COVID-19 lockdowns (Bakola, Carballo et al. 2022). But back in our homes, whilst resorting to baking

sourdough bread and cutting our own hair, we were desperately trying to Zoom our way out of isolation. The video chat platform Zoom soon became the staple means of all our social interactions, from work meetings and school classes to family gatherings, birthday parties and even dinner dates. But whilst its share price was quadrupling, Zoom fatigue was already starting to show and cameras were slowly being switched off. Consequently, creative attempts were being made to deconstruct the Zoom grid of head-and-shoulder newsreader boxes. From individual ballet performances in kitchens to collective acts and improvised encounters, participants were meeting to perform and escape the entrapment of Zoom. Such as Internet performance artist Annie Abrahams' group workshop *Angry Women* (2021) featuring 14 women expressing anger, irritation, and silence in Zoom box unison, and London-based performing arts company Improbable with *Outside the Frame* (2021), exploring time zones and discursive storytelling with a Zoom ensemble of women and non-binary performers.

On the 21st of March 2020, I put out a direct call on my Facebook profile in response to the already increasing use of online video communications due to the imminent COVID-19 lockdown, *be creative with your videoconferencing, make it memorable, it makes a difference*. Having spent over thirty years working with telematics, videoconferencing, and coexistent telepresence, I was often contacted for advice and comments on how to approach our new COVID-found video existence. So, I felt compelled to respond to the current situation with some words of creative encouragement through a blog post on the 21st of April 2020.

Whilst we have been quick to creatively experiment our way out of isolation, there are I believe further considerations and approaches to our new networked coexistence we can take. From my own experience of producing many telepresent video installations, I have learnt alternative methods and simple techniques to increase our sense of coexistence in these videoconference encounters. (xxxxxxxxxx 2020a)

Although videoconferencing has become commonplace in business, education and domestic contexts through video chat applications, peer-to-peer videoconferencing finds it hard to replace a look them in the eye handshake or a reassuring hug on the sofa with a close relative. However, when in your Teams or Zoom meetings I am sure you will have found yourself occasionally glancing at your own image in the smaller picture-in-picture window as well as looking at the person you are meeting – and they will be doing the same. In effect, this is a means of relayed eye-to-eye contact. Switching between the views of 'me looking at you' and 'you looking at me' for each participant is another way of converging these remote spaces. This is the first step towards creating a third-space that my telematic art installations exploit by combining these views

within the same specular image in mirrored installation settings, allowing the self and the other simultaneous reflection. The proprioceptive choreography of body movements, facial expressions and hand gestures are key components to any conversation, often used unconsciously, but by simply combing these views within the same image we become kinaesthetically conscious and in control of our combined coexistence, escaping our individual isolation. Reflecting on the environmental positives of the COVID-19 lockdown the blog post concluded.

Whilst we look forward to the day that we can read articles such as this one as old news and return to our physical engagements and social interactions as we once knew them, we might want to consider one optimistic outcome from it all ... its unprecedented positive effect on our environment. As pollution levels drastically drop in cities across the world and our carbon footprints have been significantly reduced this will be an opportunity to learn from our COVID-19 videoconference encounters and ask ourselves if we really do need to jump on the next long-haul flight for the sake of a handshake or a memorandum signing. So much more can be achieved and saved by reframing our approach to face-to-face coexistence through being creative with our videoconferencing. Making it memorable now could make a difference in the future. (xxxxxxxxxx 2020a)

Telematic portals to telepresence

My telematic art installations, including *Telematic Dreaming* (1992) and *Telematic Vision* (1993) have continually presented a phenomenological encounter with the self as other, but the *tele* (the distant or far-away) aspects of my artworks have, from a practical perspective, always addressed the climate emergency. Since the early 1990s these telepresence encounters between remote gallery locations, across cities, countries and continents, have brought distant audience participants together in a third-space of mutual coexistence. They have assimilated an unrivalled sense of intimacy and closeness through telepresent affection, touch and empathy, played out in social, political, and domestic contexts, accessed via sofas, tables and bed installation interfaces. This phenomenological encounter has always been at the core of my work, but the practical fact that the participants are physically located many miles apart has become increasingly important as a potential solution to reduce our need to travel and our carbon footprint as a consequence.

Although my practice often centres on *Telematic Dreaming* as a prime example of third space telepresence, by interacting on a projected bed surface, the most effective sense of telepresence actually occurs through the screens that surround each of the beds (see figure 1), showing the live video feed of the projected body and the gallery visitor superimposed together. The participants preferred to rely on the two screens on either side of the bed to navigate and control their interactions, but more importantly, they preferred to shift their experience into the reflected third space. The screen wasn't watched, it was entered like a portal to a coexistent space, and in doing so they could leave their physical vulnerabilities behind, along with self-conscious inhibitions to engage in the specular image through the observation of the self as other.



Figure 1. Projection on bed and monitoring screen in *Telematic Dreaming* exhibited at Fabrica Gallery in Brighton, UK, 1999.

Telematic Vision, therefore relied purely on video screens, removing the superimposed video projection technique from the installation by replacing it with a system of live 'chroma-keying' between video screens in two remote locations. The screens on each side of the sofas significantly enhanced the spatial sense of presence, providing a means of both observation and displacement of the self (see figure 2). In my installations the participants not only share the reflection of the self, but also the gaze upon the other from the same remote camera location. They are effectively sharing the same 'eyes' – the same point of view, where one's gaze on the other and view of the self are conflated. The objectification of the gaze is confronted on equal empathetic terms through this process of sharing our presence in a third-space environment from a single viewpoint. Literally, seeing something from someone else's point of view.

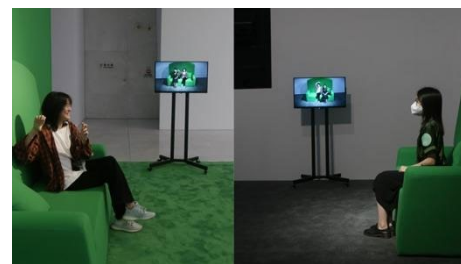


Figure 2. Screens on each side of the sofa in *Telematic Vision* exhibited in *Topologies of the Real* at Shenzhen Museum of Contemporary Art and Urban Planning, China, 2023.

Heidegger's Television

As the participants began to discover this telematic third space and their new immersive coexistence, the telematic technology and geographical distances involved were of the least concern and essentially disappeared. In the same way, this reflects the ontological claim that Martin Heidegger makes with the example of the 'hammer' in 'Being and Time' (2001 [1953]) as a tool having two states. An innate object when not in use, that Heidegger refers to as being 'present-at-hand' (Heidegger 2001 [1953], 200), or as a tool in use, performing a task which is the primary focus of our attention, whereby the object itself disappears, in a state that is 'ready-to-hand' (Ibid). We can similarly use the television as an example of Heidegger's hammer (see figure 3). In its off mode, it is clearly a static object occupying space on the table in front of us. But when switched on and through the different degrees of media we engage with and become progressively more immersed in, the television consequently disappears. Our suspension of disbelief and

embodiment in the third-person content gradually supersedes the tool we are using to view it.



Figure 3. Heidegger's Television: The disappearance of the television through the degrees of media we engage with and gradually become more immersed in, xxxxxxxxxx 2023.

But *Telematic Vision* takes us a step further. The actions of the embodied character on-screen correspond to our own movements through prosthetic agency, reflecting the self in a third space existence, or as Jacques Lacan would have it, a bodily wholeness constructed as if on stage in front of us (Lacan 2003 [1966], 1-8). The final episode in Heidegger's Television situates the embodied self-image with another participant, with whom we are now sitting and can interact, perform, and play. The focus of our attention is now solely on an empathetic encounter between the self as reflected 'other' with the 'other' participant, together on the same sofa. At this point, the television itself has completely disappeared, replaced by what is now a portal to a third-space coexistence.

The problem of Zoom

So, let us return to the problem of Zoom, what initially promised to keep families, friends and employees connected during lockdown, started to tire as Zoom fatigue set in.

The frustration of occupying a box on a screen with a head and shoulders webcam image left many people simply wanting more 'bodily wholeness' (Lacan 2003 [1966], 1-8) from these encounters.

The flat image of our head and shoulders was as representative of the 'self' as a passport photograph, an innate 'present-at-hand' (Heidegger 2001 [1953], 200) subject as object, not in use. But what if that subject were a full body figure and experienced a proprioceptive sense of self and other, a body in 'ready-to-hand' (Ibid) use through coexistent interaction, where the self-conscious-image is no longer our concern? What if we could stand up and step back from the keyboard and coexist in a third space that maps our physical surroundings? A space where our movement and tactile experience of surfaces and objects corresponded to those reflected on screen, being able to walk around each other, dance together, and hold each other, where empathy for the other prevails and switching off the

camera would be equally detrimental to that coexistent telepresence encounter and experience.

Experiments in lockdown

My initial lockdown experiments took place in May 2020 with *Pandemic Encounters*, a collaboration with Randall Packer, Gregory Kuhn and the Third Space Network, hosted and presented as a Global LASER (Leonardo Art Science Evening Rendezvous), where I performed as a live chroma-key figure from a green-screen installation in my own home (see figure 4), interacting with participating artists from around the world. *Pandemic Encounters* reflected a collective global response to a pandemic that turned our reality and social behaviour on its head, where we retreated to the isolated confines of our homes to communicate via video-chat. The performance provided a radical alternative to the online video-chat phenomenon, one where we were free to coexist and experience a new sense of togetherness. Interacting with invited artists, musicians, dancers, media practitioners, and scientists from around the world, including Annie Abrahams (France), Clarissa Ribeiro (Brazil), Roberta Buiani (Canada), Andrew Denton (New Zealand), Bhavani Esapathi (UK), Tania Fraga (Brazil), Satinder Gill (US), Birgitta Hosea (UK), Charles Lane (US), Ng Wen Lei (Singapore), Marilene Oliver (Canada), Serena Pang (Singapore), Daniel Pinheiro (Portugal), Olga Remneva (Russia), Toni Sant (UK), Rejane Spitz (Brazil), and Atau Tanaka (UK). *Pandemic Encounters* was a collective response to a global pandemic that triggered an unfolding metamorphosis of the human condition, which Randall Packer described as 'the deep third space and the realm of telematic togetherness, navigating the precarious landscape of network connections, latencies, errors, malfunctions and glitches, while along the way discovering a few magical moments' (Packer 2020)



Figure 4. xxxxxxxxxx performing from his home green-screen in *Pandemic Encounters*, 2020.

In *Telematic Quarantine – Telepresent stories of self [isolation]* (2020), a live telematic video performance for the International Limestone Coast Video Art Festival 'Video Art during and after the pandemic' in Mount Gambier, South Australia, I connected with both artists participating in the festival and remote performers from around the world, including Cynthia Schwertsik (Australia), Steve Dixon and Felipe Cervera (Singapore), David Blaiklock, Dan McLean and Mostyn Jacob (Australia), Indumathi Tamilselvan, Nurulhuda Hassan and Alex Kong (Singapore), Kristina Pulejkova (UK), Birgitta Hosea (UK), and Tania Fraga (Brazil). A customised videoconference connection brought them into my home in an uncanny telepresent encounter. Together we shared a third-space to perform, play and improvise, telling our stories of self-isolation in a new found telematic intimacy that broke free from the constraints of video chat windows. *Telematic Quarantine*

was a layered video environment and experience of domesticity, fantasy and dream in COVID-19 times. Streamed on YouTube Live, on Saturday 7th November 2020, 7.30am to 10.00am in the UK / 6.00pm to 8.30pm in Australia.

I facilitated the performance installation from my home in Brighton UK. Over the course of the 2.5 hour performance, individual participants were scheduled to call me, each lasting 10 to 20 minutes. The performers taking part were provided with technical instructions in advance, to either set up a green-screen backdrop or use a virtual green-screen background, to allow the compositing (chroma-keying) of their incoming image with that of my own video image. They were provided with no further instruction, other than a time to call and an invitation to visit me at my home in quarantine:

All you really need to do is turn up at my front door ... I will most likely be in my dressing gown still (it will be early for me) but I would like to show you around my house. I haven't had visitors in a long while so it will test our mental health, we might need to help each other, we might need a lie-down, the neighbours are driving me crazy, complaining and partying outside, and the constant sound of ambulances driving by and BBC News updates are giving me an intense headache. So, I really could do with a visit. You are very welcome to dress for the occasion and bring a 'gift' if you wish. (xxxxxxxxxx 2020b)

The encounters that followed were entirely improvised. Using a combination of software, the live incoming video call was composited together with my own image, also standing against a green-screen backdrop in my living room. Using a live video mixing software platform, background scenes and foreground objects were incorporated into the final composited output; layering the remote performer and myself on background scenes, upon which foreground props and clips were placed. Each background scene was drawn directly from video recordings from around my home, akin to an estate agent's brochure. However, the painterly video filters used in their production, offset the photographic realist narrative and allowed for more playful agency, particularly with the foreground props and overlays, whilst still retaining the sombre undertones of COVID-19, such as delivering a Downing Street briefing in the bathroom at the fruit machine-lectern (see figure 5), or a discussion with lab technicians in the garden on how to flatten the curve and putting visitors in the living room on the spot to answer BBC News Coronavirus questions. I controlled each episode around the house using an iPad, providing full control over the scenes (rooms) and a range of foreground layers.



Figure 5. From left to right, xxxxxxxx, Felipe Cervera, and Steve Dixon deliver a Downing Street briefing in the bathroom at a fruit machine-lectern in *Telematic Quarantine*, 2020.

Although unrehearsed, I was in control of these scenography elements. Not only was I clearly familiar with my own home, but the telepresence tour of it became increasingly more fused with my physical experience of walking from room to room, the architecture of my home was the storyboard and in combination with the foreground props a telematic script could be conceived of. Moreover, I provided myself with prompts, questions and actions, written on large post-it notes in front of me covering my living room wall, off camera, allowing myself the opportunity to glance at a specified room prompt when required, as an 'agency provider'. The deconstructed constituent parts of *Telematic Quarantine*, from layered background scenes, host performer and visiting performers to foreground layers, props and agency-providing prompts, present what could best describe a telematic play or script. Contributing in part to a telepresence language built on dramaturgy telematics and scenography.

A telepresence third-space concept

The telepresence compositing concept employed in these experiments is shown in figure 6, in contrast to the Zoom grid on the left, the remote telepresence performers on the right were overlaid and composited within digital theatre sets where their full-body images could move in between each other and the digital scenography, providing a sense of scale, depth and three-dimensional reality. The video chroma-keying was performed using a live video production and streaming platform, incorporating Web Real-Time Communications (WebRTC), an open-source protocol for high-quality, low latency peer-to-peer video communication over the web. This compositing concept worked in a similar way to the 19th-century Paper Theatre, when thinking about video as a 2D layer to create backdrops, wings, foreground objects, props and performers, cut-out from their green-screen backgrounds using chroma-keying techniques, scaled and placed upstage and downstage in a telepresence equivalent of the Paper Theatre.

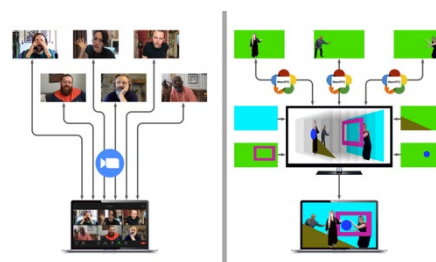


Figure 6. Communications flow-diagram comparison between Zoom (left) and telepresence third-space concept (right), xxxxxxxx 2023.

Telepresence Stage

The outcomes of these experiments led to the research project, *Collaborative Solutions for the Performing Arts: A Telepresence Stage*, providing a fit-for-purpose online theatre platform for the UK performing arts sector, enabling actors, dancers and other performing arts professionals to rehearse and interact together in shared online spaces and to produce collaborative live performances from their separate homes and studios. Led by myself as Principal Investigator, in collaboration with Co-Investigator Steve Dixon from LASALLE College of the Arts Singapore and research consultants Sita Popat Taylor, Satinder Gill and Randall Packer. The research team worked with ten distinctive performing arts companies between November 2020 and May 2022. Each company undertook a three-month online residency, culminating in a unique

telepresence performance, involving up to four company members, performing together from their separate homes and studios. The companies and their performance outcomes Included; Phoenix Dance Theatre from Leeds, with *Experiments in Wonderland* (April 2021); Creation Theatre from Oxford, with their rendition of *The Card Players* (June 2021); The female duo, Pigeon Theatre from Manchester with their performance of *Where are the Children* (July 2021); Ririe-Woodbury Dance Company, the only non-UK company from Salt Lake City with their performance *Black|White* (July 2021); Cabaret performers Guttersnipe Theatre from London with *SHUGA FLXX vs The Illuminati* (September 2021); Red Ladder Theatre Company from Leeds with *TAXI* (January 2022); DAP-Lab, Directed by Johannes Birringer from Brunel University London with the performance of *The River of no one* (March 2022); Sharp Teeth Theatre from Bristol with their online murder mystery *Sherlock in Homes* (April 2022); and experimental performance company Improbable (see figure 7) with the second telepresence version of *Outside the Frame* (May 2022). Each individual performer was supplied with a large green-screen backdrop, LED video lights, a webcam, and two video monitors, positioned on either side of their green-screen. In a similar method and setup to my earlier installation *Telematic Vision* (1993). This provided them with the ability to monitor the performance on both sides of the green-screen, as well as straight ahead using their computer screen, giving them complete observation and control of their telepresence performance from all three available angles.



Figure 7. Remote performers from Improbable warm their hands around a campfire together in *Outside the Frame* for Telepresence Stage, 2022.

Creation Theatre concentrated on one single scene, drawn from Paul Cézanne's 1895 painting *The Card Players*, with two performers interacting across a small square table. Whilst they appeared to be sitting at the same table, they were in fact miles apart sitting at separate green tables, against green-screen backdrops. Using Cézanne's painting *The Card Players* as a virtual set required subtle visual adaptations to the original painting, changing the angle and size of the table and removing its original two card players, to create the empty scene. Their green tables were exactly lined up with those in the painting, allowing the two actors to inhabit and explore Cézanne's card players scene, just as if they shared the same physical table. The ability to touch and feel the surface of the tabletop, albeit painted green, whilst observing their self-image, touching the painterly impressionistic surface of Cézanne's card table enabled the actors to further embody their telepresent 'other' through an extended sense of touch. Or as Maurice Merleau-Ponty would have it, an extension of bodily synthesis (Merleau-Ponty 2012 [1945], 154). The actors particularly relished the opportunity to actually lean on the virtual table (see figure 8), something they had not explored before, and even sit on the table which one actor did in a display of defiance of formality. Playing with the

form and using the surface of the table became a central vehicle in their devising process and in the development of the storyboard and performance. The relationship between the characters changed, and moments of conflict and confrontation arose in relation to it, for example with one actor casually putting his feet up on the table and the other indignantly wiping down the table top in response.



Figure 8. Creation Theatre actors composited together at a virtual table in *The Card Players* for Telepresence Stage, 2021.

The virtual set consisted of several layers; walls, chairs, a table and a bottle of wine. Invisible cross-fades between these different layers allowed the actors to be positioned in different perspective configurations and to walk around virtual props, for example, placing one actor behind and the other in front of the bottle of wine on the table. Switching between foreground and background sequences provided the actors with a greater sense of depth within the scene, also allowing them to stand behind or in front of the virtual chairs and each other. The occasional appearance of one of Cézanne's original card players suddenly brought three characters around the table, as did the surprise arrival of an audience participant, using an additional layer, who was brought in during the performance. Creation Theatre used the opportunity of their Telepresence Stage residency to experiment with the paradoxes and potentials of how the physical can interact with the virtual in third-space telematic theatre. They reported it as eye-opening – feeling like they were discovering an entirely new medium, and experimenting with it exuberantly to discover its 'magical' possibilities in much the same way that Georges Méliès and the early cinema pioneers did over a century ago.

Coombe Hill or High Water

Following the completion of the *Telepresence Stage* project in May 2022 I used the project outcomes, resources, and techniques to produce the online telepresent encounter *Coombe Hill or High Water*, between October 2022 and March 2023. Whilst the *Telepresence Stage* project was specifically targeted at performing arts companies and essentially how they can reach audiences online during lockdown, my own artistic interest was in their unique experience of telepresence and the effects it had on them as interacting participants. Although they were perhaps more adept with performing in public to audiences, *Coombe Hill or High Water* was developed purely for an online public audience to participate in, giving them the unique experience that the actors had. The new work builds on online telepresence techniques such as green-screen compositing, networked video production and virtual set design to provide coexistent telepresent interactions between remote performers. However, I could not assume or rely on an online public audience having the time, resources, and experience to set up green screens, cameras, preview monitors and lights. Therefore, I introduced background segmentation techniques instead of green-screen

technology to create a networked telepresence artwork for online public participation, requiring only a computer, webcam, Internet connection, and web browser to participate.

Coombe Hill or High Water is simultaneously a story, game, drama, and meeting, perhaps best described as an interactive improvised tragicomedy for two online participants, presented in a dystopian post-Brexit, 'end of days' narrative. The work consists of twelve interconnected scenes or environment settings, placing the participants' overlapping webcam images within scenography backgrounds and foreground overlays, inspired by images from my past – growing up on a road named Coombe Hill. The participants appear in a range of precarious, intimate, and awkward situations, waking up in bed together to discover the room is in flood water and washed-up detritus. The scene transitions and they find themselves outside in the flood, swimming in raw sewage and taking refuge in a floating wheelie-bin (see figure 9). Meanwhile, Jeff Bazos makes his escape in Blue Origin, launching in the distance as the scene zooms out and appears as a breaking news story on a makeshift TV news channel, hosted by the two participants.



Figure 9. Online participants swimming and floating in a wheelie-bin, in a breaking news story of floods, raw sewage, and rocket launches in *Coombe Hill or High Water*, 2023.

Each scene lasts for approximately 4 minutes and the only people who appear are the participating protagonists, who can make whatever they want of it. The open narrative moves to other scenes, reminiscent of my earlier telematic works, appearing on a sofa (as well as in bed together), complete with augmented legs, sitting at a table in a dilapidated kitchen attempting to distil their own fuel. They take to the road behind the wheel of a clapped-out car, driving into the hills to escape the flood water. The car eventually breaks down and they are forced to camp out overnight, appearing as shadows in a tent infested by flies and midges. Just as things couldn't get worse, fire breaks out on the high moorland and they have no option but to return home by foot, to find themselves back where they started, in bed amongst the floodwater debris. Before the scene transitions back to the flood, they appear immersed in holes in an ambiguous dream-like hallucination (see figure 10), perhaps resulting from something they might have ingested from the floodwater or something picked up on the hills, but this is for them to decide.



Figure 10. The online performing participants find themselves immersed in holes in an ambiguous dream scene in *Coombe Hill or High Water*, 2023.

Unlike my earlier telematic gallery-based installations, *Coombe Hill or High Water* is accessed and experienced completely online, and in this respect, the work shares similarities with earlier 'net.art' projects from the 1990s. But chiefly, the work is a deliberate move away from the gallery space installation, and the carbon footprint its logistics demand, including travel, venue, installation, and the carbon footfall of the visiting public – although notwithstanding its network requirements on the earth's resources to function. But moreover, it reflects a post-internet art context, the work is not clicked, hyperlinked and scrolled through. *Coombe Hill or High Water* is entered via a web browser but is physically acted on, a do-it-yourself installation that implies and proposes a proprioceptive engagement by moving away from the keyboard and using the body and physical space to perform, play, and embody the 'self' as 'other' in an online coexistent experience. In this phenomenological respect, the underlying intent of the work is the rejection of the 'self' – as the self-centred, selfish, capitalist-driven individualism at the route of our climate catastrophe.

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Art humanities to promote Climate adaptation for coastal populations: Old tools for new Tradition

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Abstract

The third chapter of the IPCC report (2022) lists many ecosystem aspects that climate change affects and compromises. The impacts that coastal populations suffer are therefore direct, in terms of sea level rise, flooding, heat waves, extreme events but also indirect in terms of jeopardizing of economic activities because of loss of biodiversity and risks for several sectors, including the ones contemplating recreational activities.

When one thinks of climate change one of the first images that crosses the mind of any world citizen is a photograph of flooded Venice. It is not graphs, diagrams, or complex technicalities, but it is a photograph. Arts (including, of course, photography) play a crucial role in raising awareness and promoting action to mitigate and adapt to climate change.

As indicated by the IOC State of the Ocean Report (2022) accurate forecasting and early warning system mitigates impact due to coastal hazards but public awareness and preparedness play an equally important role.

There is, therefore, an urgent need to build resilience of coastal communities via cultural approaches that complement existing engineered and nature-based solutions. And this in terms of knowing how to deal with extreme events, but also in developing long-term solutions. The sense of belonging to a community is the driver for resilience and since culture structures the identity of a society, the efforts and solutions for adaptation are to be found primarily in it.

But how can past rituals and artistic practices help/teach to improve resilience today and adapt to changing climate conditions?

The objective of the document is to explore if social practices¹ used to reinforce the sense of community could be re-interpreted and applied by communication and/or public art, especially installation, exhibitions and performance to promote education and resilience. Using the above-mentioned elements as methods to investigate and topics that are shaping the world today: climate crisis, social and environmental justice, spatial equity through various media.

Building on a set of studies dealing with art and communication in climate change, and role of collective rituals in building community cohesion (Benz, J. (2020), Gorsegrner, A. (2016), (Watson-Jones, R.E., Legare, C. H.), considerations are made to be linked to art experiences and the ongoing EU efforts in building a carbon neutral Union, by means of the European Green Deal, and gaps in terms of cultural approach to achieve these ambitious goals.

Keywords

Ocean Literacy, Ocean Citizenship, Climate Adaptation, Cultural Adaptation, Climate Change

1. Introduction

The issues related to climate change (IPCC, 2023) have generated a context of increasing need to rethink social and behavioural models. With the knowledge of human impacts on the natural environment came also a novel issue of eco-anxiety (Bourban, 2023) that is, to this day, not answered by theoretical framework enabling citizens to solve the contradictions of post-capitalist societies (Beattie et Al., 2016). The ecological transition is being driven in the EU by a set of policies that fall under the umbrella of the European Green Deal. They face some of the issues linked to consumption, raising the issues of Greenwashing and the need for reliable labelling (European Union 2019, 2022). The EU citizen is, therefore, assimilated to a consumer, and it could hardly be otherwise considering that the EU originated from a common market (as highlighted by some of the research carried out in the MSP-GREEN project). However, the EU countries are united also in reason of shared history and culture and with the aim of promoting cooperation between neighbouring populations, especially in shared sea basins.

Moreover, a general concern for environmental issues is expanding the concept of ecological citizenships. A concept that needs to be fully studied and promoted in the European Green Deal context.

There is therefore room for exploring the social role of culture and art in supporting the adaptation to climate change, the shifting in behaviours towards sustainability (Soini and Dessein, 2016) and the endorsement of ecological citizenship. This paper wishes to argue that resilience and adaptivity in coastal contexts facing climate change threats can be reinforced by social design in the form of art and cultural support.

The current paper is focused on coastal populations, as being at the forefront of climate change (sea level rise, ocean acidification, etc.). and being at the same time object of dedicated outreach, in the form of Ocean Literacy (UNESCO, 2018) and studies dedicated to marine citizenship (Buchan et Al. 2023). The paper is developed combining results and ongoing research from the EU projects MSP-GREEN² (Communication and culture towards sustainability of maritime sectors in the framework of Maritime Spatial Planning), REGINA-MSP³ (Ocean Literacy for Maritime Spatial Planning at regional level)

¹ "Social practices, rituals and festive events" are cited in the UNESCO's 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. Their role is expanded in the UNESCO's dedicated webpage.

² European Maritime and Fisheries and Aquaculture Fund

³ Ibid.

and POSEIDONE⁴ (Perception of local population for marine protection and marine citizenship).

1.1. Need For Social Experimentation

Starting from the assumption that we live in times of high technological development. The threats we face, as major as they are, can then be compared to the challenges our ancestors had to tackle with sensible less aid. It can be argued, therefore, that their occupation of less-than-optimal areas, in terms of climate and resources, has been determined by several factors that counter the recurrent choice of migration.

Among those factors the attachment to personal roots and comfort in being inserted in one's original culture has to be taken into consideration.

This paper wishes therefore to suggest that community cohesion and community resilience in the face of changement can be supported by art and culture, just as cultural production in the past has made easier, if not possible, overcome difficult issues; for instance, hymns have contributed to the building of nations by inspiring patriotism, music participates in generating identity, and propaganda posters have fuelled industrial and war efforts in the past century.

In particular media art and cultural production (imagery, songs, poetry, literature, theatre production, etc.) may reinforce marine-ecological citizenship, proposing positive behavioural models.

Media art will be especially relevant because of its relatively easier dissemination through mobile dispositives. It may be a contemporary alternative (for instance in Tik Tok videos and alike) to what songs and poems have been in the past of our civilization.

Likewise positive models can play a role in reinforcing knowledge and its means of dissemination, in this case Ocean Literacy, proposing attractive formats.

It is only reasonable to expect that said community cohesion can also work in informing bottom-up and endorsing management frameworks for the optimization of resources and ecological transition of activities, such as Maritime Spatial Planning.

The opportunity for experimentation would be, therefore, offered by two coastal populations, similar in numbers, history, resources and geographical position.

The research to be designed would need to respect ethical standards and consider the following steps:

- Identify the two communities.
- Provide a preliminary study highlighting similarities and differences.
- Assess perception on marine and climate issues and citizenship, including marine protection, as per practice developed by the POSEIDONE project
- Provide one of the two with strong ecological storytelling, reinforcing the sense of community. belonging with dedicated media art and cultural production (better if co-created with local artists).
- Submit the two communities (samples) with a survey proposing different behavioural answers in the case of worst climate scenarios.
- Evaluate discrepancies between the two experimental groups.

Endnotes

This paper, by considering available literature and highlighting connections between ecological policies, social design, ecological citizenship and art production proposes a set of steps to consider the effects of cultures in allowing communities to be climate change responsive. Positive outcomes of a line of research may be the basis for new sustainable traditions able to transfer into populations' cultures virtuous behaviours.

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The *Ice-Time* Project

Tessering the Space-Time of Climate Change

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Abstract

The geological provides a glimpse of time as a supra-dimensional force, a four-dimensional perspective that subsumes both past and future and whose deep time view far exceeds human perception. Visible evidence of this space-time polytope is our perception of changing matter over time: rusting metals, geological strata, coral reefs, and melting ice caps.

Fathoming global warming-induced climate change involves vast systems and timeframes that are disconcerting for the mind to assimilate. Can we comprehend data representing planetary scales of matter and timeframes that progress over generations, far beyond empirical experience and the limits of our physical perception?

Ancient glacial ice provides an 800,000-year timeline, a fourth dimension, into Earth's climatological past and the future uncertain outcomes of rising temperatures. The *Ice-Time* project is a series of immersive media artworks created in response to the precarious state of Earth's ecosystem, engaging interdisciplinary science-art research methodologies, including heuristic experience with polar ice in Greenland and collaborations with scientific experts. The project explores momentous environmental challenges – challenges framed by the concept of the Anthropocene, the idea that humanity should now be considered a geological and terrestrial force.

The artworks presented here use the notion of the cinematic tesseract, a four-dimensional container of space and time, to formally explore immersive cinema in and as hyperspace. The series of cinema-installations enact the accelerating space-time of glacial ice caused by global warming. The *Ice-Time* project is realized in diverse, immersive moving image forms that include a multi-channel video installation with spatial sound, 360°-cinema, ultra-high-resolution hypercinema formats, and virtual reality to create embodied experiences of the changing timeframes of polar ice. This essay will focus on two works from the series, the immersive video installation *Ice-Time* and the virtual reality environment *TesserIce*.

The six-channel video / spatial audio installation *Ice-Time* is an immersive cinema mediascape. In the installation, the beholder experiences the time frame of a different form of matter as a proprioceptive, somatic experience. *Ice-Time* conveys realistic views of ice taken at all scales of space, from the microscopic to the planetary, combined within a three-dimensional space of original sound recordings of ice. *TesserIce* composes a true four-dimensional mediascape in virtual reality that allows participants to propel themselves through the hyperspace dimensions of Earth's polar ice. The experience of higher-dimensional landscapes and acoustic cinematic environments uniquely places participants within a four-dimensional architecture. Placing the spectator's body in a conflation of real with virtual space fosters a radical solicitude between the space-time of the human and the geological. In each

of these works, the stark imagery of ice serves as a distinct access point into the overwhelming complexity of global warming and its ramifications, creating an embodied, participatory, and poetic experience of climate change's time, scale, causes, and effects that imbues the spectator with a deep awareness of the environment and the cultural implications of ice.

Keywords

Anthropocene, polar ice, immersive cinema, supra-dimensional cinema, embodied perception, hyperspace, tesseract, Greenland, climate change, global warming

THE *ICE-TIME* PROJECT

The *Ice-Time* project is a series of media artworks combining science, technology, and art created in response to the precarious state of Earth's ecosystem. The project realizes hyper-dimensional, cinematic spaces that transform the audience's subjective perception of time by transposing non-human scales of time to the human and back to grasp the temporal reality of climate change, particularly the time scales of glacial ice. These works enact the current accelerating changes in the space-time of glacial ice.

The project engages interdisciplinary science-art research methodologies, including a polar expedition to Western Greenland and collaborations with scientific experts. The *Ice-Time* project uses immersive moving image forms that include a multi-channel video installation with spatial sound, 360°-cinema, ultra-high-resolution hyper-cinema formats, and virtual reality to create embodied, proprioceptive, poetic experiences of the changing timeframes of ice. The images in the *Ice-Time* series present hyper-realistic, magnified views of ice taken at all scales, from the microscopic to the planetary. We achieved exceptionally detailed images of ice cores, crystals, glaciers, and other natural ice formations using ultra-high-definition time-lapse photography and micro-photography in the field and in collaboration with polar scientists. The artworks explore momentous environmental challenges – challenges framed by the concept of the Anthropocene, the idea that humanity should now be considered a geological and terrestrial force.

The resulting cinema-installations aim to convey the quiddity of ice and its ramifications as embodied, deeply aesthetic experiences. They create the opportunity for the participants to internalize knowledge of the cryosphere as few people in the populated and more temperate parts of the Earth have the chance to do, imbuing participants with an implicit awareness of polar ice's environmental and cultural implications.

This essay focuses on two works from the series, *Ice-Time* and *TesserIce*.

FATHOMING

Each individual life plays a small role in the state of the world, like the role of a single snowflake in creating a flowing glacier. Our collective imperative is to see beyond our immediate surroundings, envisage our effects on distant parts of the world, and grasp the scale of our collective impact.

Climate change is the defining issue of our time. Philosopher Bruno Latour compared the interdependencies of our planet's atmospheric processes and our inextricable reliance on them to the life-support technology of a space station that is breaking down. Using philosopher Peter Sloterdijk's designation for unambiguity, he wrote,

Our current condition nearly relies on a more explicit understanding that this tentative technological system, this 'life-support,' entails the whole planet – even its atmosphere [...] we are finally out of this strange idea of a nature that could remain infinitely distant from the fragile life-support system that we are slowly making explicit. (Latour, 2006:106-107)

As we are all now aware, global warming is precipitating unprecedented weather events, oil disputes, water wars, and refugee migrations while rising oceans and raging fires begin to redraw the global map of habitable spaces. Latour summarized this situation: '[...] everyone now knows that the climate question is at the heart of all geopolitical issues and that it is directly tied to questions of injustice and inequality.' (Latour, 2018:187). Psychically remote, we obliviously engender harm.

The Antarctic Ice Sheet, Earth's largest ice mass, holds 90% of the planet's fresh water. Antarctica's ice currently remains relatively stable, but, for example, Thwaite's Glacier, which drains an immense expanse of West Antarctica's ice sheet, is expected to contribute several inches of sea level rise by the end of this century at its current rate of retreat. Should global warming remain unchecked, unleashing a sudden glacial retreat, Thwaite's Glacier alone could release enough ice to raise sea level by ten feet over the next few centuries (Michon Scott, 2023), creating unfathomable alteration to Earth's current land masses.¹

Greenland's Ice Sheet is the second-largest ice mass on the planet. Because of its location, it is both more accessible for study and melting at a significantly faster rate than Antarctica. A joint study by NASA and ESA showed that Greenland lost 3.8 trillion tons of ice between 1992 and 2018, contributing 11 millimetres to rising sea levels. The melt rate of Greenland's ice accelerated sevenfold between 1992 and 2018. The study's findings forecast 70 to 130 millimetres of global sea level rise due to Greenland ice by 2100 (Michon Scott, 2023). But millimetres of sea-level rise and trillion tons of ice over a quarter century are cryptic numbers, abstractions that lack an emotional ingress. Can a work of art serve as a means to comprehend the unfathomable by providing an emotional connection to its subject? Can it provide, to quote poet Percy Shelley, '...the creative faculty to imagine that which we know ...to act that which we imagine?'. (Shelley, 1917) For the *Ice-Time* project artworks – to know – we headed to Ilulissat in Western

Greenland, the location of Jakobshavn Isbrae, the largest outlet glacier in Wester Greenland and the fastest-moving glacier on Earth [Fig. 1].

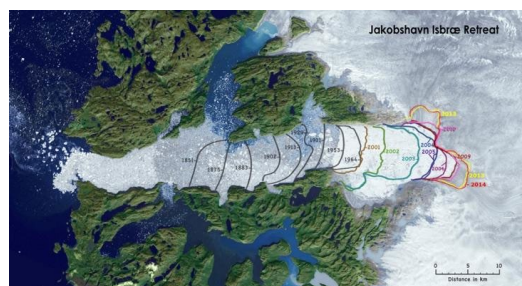


Fig. 1: Jakobshavn Isbrae, Western Greenland, glacial retreat from 1851-2014. Original data NASA. Since the onset of the Anthropocene, Jakobshavn retreats, deflates, and withdraws its terminus. (Andersen *et al.*, 2019)

In this essay and these artworks, it is geology that is made explicit. Like Latour's atmosphere, geology has been reconfigured, and with it, the significance of polar ice. We've realized that ice is an essential ecological system, a terrestrial life-support that makes our life possible. Ice in the cryosphere is also the most visible indicator of the short-term effects of climate change. Greenland's ice is a prelude, a supra-dimensional window into an unfathomable space and time.

MATERIAL TIME

The geological provides a glimpse of time as a supra-dimensional force, a four-dimensional perspective that subsumes both past and future and whose deep time view far exceeds human perception. Visible evidence of this space-time polytope is our perception of changing matter over time: rusting metals, geological strata, coral reefs, and melting ice caps.



Fig. 2: *Ice-Time*: GISP 2D 1841 ice core section from the Greenland Ice Sheet. Depth: 1840 to 1841 meters. Age circa 16000 years B.P. Image provided by the National Ice Core Facility, National Science Foundation. © Clea T. Waite, 2017

The Earth's cryosphere contains deep time. Imagine time as a material axis, a spatial lens outside our three dimensions that makes subtle changes to Earth's atmosphere visible. The frozen poles are containers of Earth's climatological timeline, a four-dimensional archive of atmospheric history. Ice cores drilled from ancient glaciers in Antarctica and the Greenland Ice Sheet, the planet's deepest ice deposits, form this material lens [Fig. 2]. They provide a physical timeline 800,000 years back into the chronicle of Earth's climate and the future uncertain outcomes of rising temperatures. The poles are what philosopher Timothy Morton calls hyperobjects, a metaphor for forces and scales of space and time beyond human comprehension that '...involve profoundly different temporalities than the human-scale ones we are used to.' (Morton, 2013: 114) Glaciers are crystal tesseracts.

¹ In 2019, the Intergovernmental Panel on Climate Change estimated that 680 million people living in low-lying coastal zones

would be adversely affected by sea-level rise due to ice mass melt. That number could exceed 1 billion by 2050 (Michon Scott, 2023).

Comprehending global warming-induced climate change involves systems and timeframes so vast they are disconcerting for the mind to assimilate. Can we comprehend data representing planetary scales of matter and timeframes that progress over generations, far beyond empirical experience and the limits of our physical perception? The tesseract, a four-dimensional hyper-container of space and time, plays a fundamental role in the metaphors and structures that make the *Ice-Time* project.

GROUNDWORK

Heuristic immersion in the realm of ice, the first-hand experience of the cryosphere, was essential to *Ice-Time* (Waite, 2017) from its first inception [Fig. 3]. The research process for creating this project included the empirical methodology of the naturalist in the field, collaboration with scientific experts, and artistic praxis. Our intention was to venture beyond romantic notions of the sublime frozen North to work directly with polar scientists on the ice and in the laboratory.

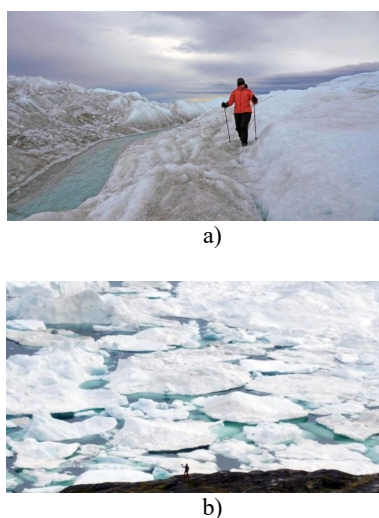


Fig. 3: Heuristic immersion in the realm of ice. a) The author on the Greenland Ice Sheet above Kangerlussuaq. Photo: A. von Chamier, ©2016. b) Angelika von Chamier recording sound at the Icefjord, Illulissat. Photo: C.T. Waite, ©2016.

Production for the *Ice-Time* project centred on a two-woman expedition to Western Greenland in 2016. We spent three weeks immersed in the ice landscape, filming and recording sounds in the 24-hour daylight at the Icefjord in Illulissat, The Eqi Glacier, camping at Point 660 Camp on the GIS above Kangerlussuaq [Fig. 4], and the Greenland Ice Sheet above Eqi near ETH/CU Camp, GIS [Fig. 5]. Throughout our trip, enthusiastic guides, mostly Danish graduate students in geology and biology, assisted us, and they repeatedly made our quest for specific ice forms possible.

Collaborations

The integrated practice of art and science embodies a fundamental notion of interdisciplinary proficiency. We approached the creation of *Ice-Time* by applying the methodologies of both artists and scientists. This practice entails a direct engagement with materials and methods, combined with a commitment to deep research and seeking out the poetic artifacts that emerge from our scientific collaborations. Engaging with polar scientists deeply informed the artwork, providing insight into the interpretation and ramifications of

current research data and the cryosphere's role in understanding the greater picture of climate change.

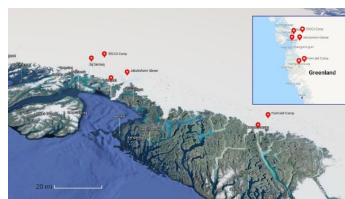


Fig. 4: *Ice-Time* locations in Greenland: Kangerlussuaq and Point 660 Camp, GIS, Ilulissat and Jakobshavn Glacier, Eqi Glacier and ETH/CU Camp, GIS. Image: C. T. Waite, 2017.

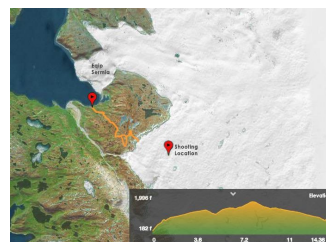


Fig. 5: *Ice-Time* location Eqi Glacier and our ascent to ETH/CU Camp and the GIS. Image: J.J. Andreassen, 2016.

A number of scientists contributed knowledge, experience, and data to the *Ice-Time* project.

Physicist Kenneth Libbrecht at CalTech was the first scientist to join the project. Libbrecht is renowned for his studies and photographs of the morphology of ice crystals. He invited me to his laboratory in Pasadena, and we created custom snowflakes with his apparatus. Data from his research appears throughout *Ice-Time*.

We began our field collaborations by consulting the ARCUS directory of Arctic Researchers and reaching out to the Polar Division of the National Science Foundation. These resources put us in touch with scientific researchers willing to collaborate. Geologist Twila Moon at the University of Bristol first suggested going to Greenland as the hotbed of current glaciological research. She and her colleagues Stephen Cornford and Michael Cooper generously taught us the fundamentals of glaciology.

We met with David and Denise Holland from New York University while in Illulissat and again in their laboratory in New York. David Holland is one of the first scientists to discover that the outlet glaciers are being melted from below by the warming seawater in addition to the warm air above. The ramifications of this discovery are now playing out on the accelerating melting of the ice shelves in Antarctica.

Henry Kaiser is one of the world's foremost under-ice divers, working for the NSF. Henry provided underwater video material from beneath the Ross Ice Shelf in Antarctica, a location beyond our reach. There are fewer under-ice divers in the world with Kaiser's skillset than astronauts.

Finally, we worked with Joan Fitzpatrick, Geoff Hargreaves, and Eric Cravens at the National Ice Laboratory in Denver, spending two days filming ice cores and thin slice samples in the freezers there [Fig. 6]. A highlight was when the NICL pulled out one of their most unique subjects for us, the ice core segment known as 'Black Beauty' [Fig. 7]. This ice core contains the thickest, most prominent volcanic ash layer found to date in any ice core sample. The ice core is from the WAIS Divide on the

West Antarctica Ice Sheet.² More recent layers of ice reveal traces of nuclear fallout and plastics.

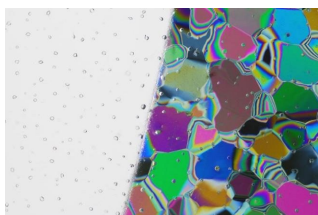


Fig. 6: Crystals and trapped air from the WAIS Divide Core WDC 06A half and half. Research: Joan Fitzpatrick. NICL/NSF. Photo: E. Cravens.

Comparing the atmospheric records revealed by ice cores from Greenland and Antarctica and other sources, including tree rings and sediment deposits, reveals global interactions of climate events. Recent studies demonstrate a north-to-south reaction direction of abrupt climate signals, such as the systemic reaction to significant volcanic events, and have revealed the dominant role of ocean circulation in the interaction between North and South previously attributed to atmospheric processes.³



Fig. 7: 'Black Beauty' ice core sample, NICL. Photo: © A. von Chamier, 2017. The NICL is part of the US Geological Survey.

SUPRA-DIMENSIONAL CINEMA

The notion of an object only perceivable in time, a higher-dimensional object containing the time dimension within its own space, makes the four-dimensional tesseract – the hypercube, so intriguing. Motion is essential for comprehending all aspects of a higher-dimensional object from a lower-dimensional space, giving the tesseract as perceived from three-space an inherently cinematic nature.

Three-dimensional film space – the two-dimensional image plane and the singular timeline dimension – is a closed system. The passage through this narrative space is passive, ocular, linear, and determinate. In contrast, four and higher-dimensional film spaces are participatory, somatic, relativistic, and non-deterministic. Within supra-dimensional film space, perspective is a function of the sentient spectator's point of view. The narrative is dependent on the movement and orientation of the participant. Linear progression is augmented by spatial simultaneity. Navigation through supra-dimensional narrative space engages multiple vectors of physical engagement and perception, occupying a liminal space between the real and the virtual.

² The entire WAIS Divide Ice core was drilled to a depth of 3,405 meters and was completed in December 2011. This cylinder of ice represents more than 68,000 years of climate history. The ash layer in the photograph has been correlated to the eruption of Kuwae in Vanuatu in the 15th Century, around 1458.

The artworks presented here use the notion of the cinematic tesseract to formally explore immersive cinema in and as hyperspace. This supra-dimensional cinema creates a spatiotemporal flow structure that expands the screen into an architectonic, immersive hyper-mediascape fostering a poly-perspectival narrative. The sentient spectator of immersive cinema navigates and deciphers different patterns of juxtapositions and associations within a four-dimensional cinematic space.

In traditional cinema, we are disembodied viewers. We lose our connection with tangible knowledge. In supra-dimensional cinema, the spectator moves freely amid a multiplex geography of audio-visual facets, building interpretations and decoding meaning using formal structure, memory, juxtaposition, and association. With our supra-dimensional cinema, we aim to create an explicit connection to a poetics of space, an enfolding of embodiment and participation within the spatiotemporal experience of the cinematic.

Our approach to visualizing and navigating a supra-dimensional, immersive cinema involves considering narrative as both time and space, faceted into simultaneous streams distributed in the cinematic architecture. The spectator is placed within the geometry of the film, creating alternative perspectives. No hierarchy, no explicit viewing direction or pathway dominates the flow. Instead, the narrative is composed as an open work, a 'work in movement' in the sense advanced by philosopher Umberto Eco. He described the open work as '[...]a "work in movement" whose movement combines with that of the viewer.' (Eco, 1989: 86) The open work is a prepared field of possibilities for the unpredictable performance of the beholder, 'a work of art stripped of necessary and foreseeable conclusions ...' (Eco, 1989: 15).

ICE-TIME

The six-channel video installation *Ice-Time* (Waite, 2017) is an immersive cinema mediascape in which the beholder experiences the time of a different form of matter as a somatosensory experience. In the *Ice-Time* installation, we intentionally ground the body of the spectator in a conflation of real with virtual space and time.

Within the cinema-installation, the diegetic scales of ice's time expand and contract. The natural movement of ice often occurs at speeds beyond human perception – until the timescale of the ice is transposed to meet the perceptual timeframe of the participant. Time then reverts in *Ice-Time*, drawing the sensate viewer back into the perceptual time of ice. The participant's body is enfolding in an alternate timeframe, collapsing its sensory distance to the ice.

The *Ice-Time* installation occupies a hexagonal architecture, echoing the structure of water crystals [Fig. 8]. Six large projections and a 9.1-channel, three-dimensional soundscape - fifteen simultaneous media streams in total - create a room-sized environment whose spatial narrative is deciphered by the movements of the beholder. The concept of embodied perception enacted by the *Ice-Time* installation considers the

³ See Sigl, M. et al. A new bipolar ice core record of volcanism from WAIS Divide and NEEM and implications for climate forcing of the last 2000 years: A 2000yr Bipolar Volcano Record – Journal of Geophysical Research: Atmospheres 00-118, 1151–1169 (2013).

entire body as a perceptual field in a poetics of space. The physical/virtual synthesized space interacts with the phenomenology of movement, enacting Eco's work in movement. Proprioceptions construct an individual narrative within the space-time continuum of the cinematic construct.

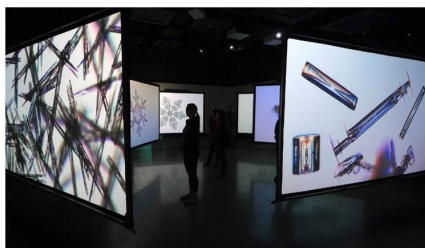


Fig. 8: *Ice-Time* occupies a navigable, hexagonal architecture, echoing the structure of water crystals. Photo: K. Baumann, 2017.

Cinema comprises both sound and image. The soundtrack of *Ice-Time* creates an acoustic volume that further shapes the perceptual space of the artwork. Our sound recordings place the audience acoustically near the ice, recorded using contact microphones and hydrophonics in direct proximity to the ice, composed into a three-dimensional soundscape.

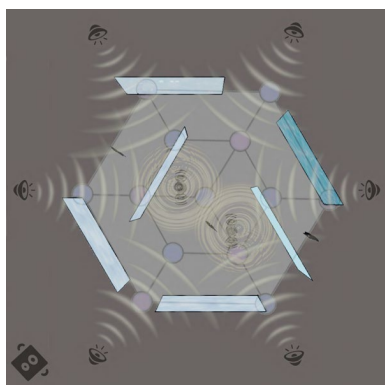


Fig. 9: Model of the *Ice-Time* installation, top view, with three-dimensional sound setup. © Clea T. Waite, 2017.

Spatial cues in the soundtrack are critical to choreographing the viewer within the installation. Shifts in the wave formations from each loudspeaker cause the acoustic interactions to vary, depending on the listener's position. These formations create a strong spatial sensation. The design of the audio environment allows accurate placement of sounds within the space, giving us control of the overall interaction of sounds with each other throughout the room [Fig. 9].

INNER AND OUTER REALITY

Four-dimensional cinema, three-space and time, fosters participation in constructing an individual narrative. It engages the sensate body and spatial memory in decoding poetic meaning. The immersive structure of the *Ice-Time* installation reinstates a distinct connection to a poetic space, an enfolding within the spatiotemporal experience of the cinematic. The beholder of immersive cinema is placed in an uncertain oscillation between inner and outer reality, virtual and real space. This supra-dimensional enfolding is rendered explicit in the five dimensions of the following work, the virtual reality project *TesserIce*.

THE FOURTH DIMENSION

Common experience has three directions: up-down, side-to-side, and forward-back. This world consists of three orthogonal dimensions laid out along the construct known as the Cartesian coordinate system (x,y,z). Visualizing four-dimensional structures from the confines of our three-dimensional space is a question that has challenged mathematicians and artists for 150 years. Most solutions necessarily view these structures in compromised form as two- or three-dimensional renderings viewed outside the polytope, looking at them rather than experiencing them from within. The results are shadows of shadows – the two-dimensional screen renderings of three-dimensional shadow projections of the four-dimensional object.

Two strands of interpreting the fourth dimension developed at its inception at the turn of the twentieth century; one defined the fourth dimension as an additional dimension of space perpendicular to our own three (x,y,z,w), unimaginable to us yet encompassing our three-dimensional scope as the cube encompasses the square. The other defined the fourth dimension as time (x,y,z,t), imagining space and time as a continuous, four-dimensional volume of past and future spread along a linear time axis, all moments existing simultaneously. In this interpretation, the present constitutes a continually shifting moment, manifested as a three-dimensional slice of this space-time polytope passing through the visible dimensions of our space.

The perception of the four-dimensional tesseract from three-space relies on motion. The use of stereoscopy and cinematic motion in a 360° viewing field uniquely positions virtual reality to visualize a four-dimensional, cinematic space (x,y,z,t). V.R. provides an opportunity to geometrically construct, animate, and navigate the fourth dimension's shifting landscape and acoustic environment.

TesserIce

Reality is a hyper-volume of past and future matter extending along the limitless axis of time into a higher dimension of space beyond our sensory perception. Humans are existentially confined to the third dimension in the physical world, never able to physically experience the space of the fourth dimension that profoundly affects us. Within the hyper-volume of reality, polar glaciers are crystal tesseracts, four-dimensional containers of Earth's environmental deep time.

Imagine entering a four-dimensional space-time lens outside our three dimensions that renders subtle changes to Earth's climate visible and visceral – a space in which time is a material axis. *TesserIce* (Waite, 2024) creates an opportunity to experience a higher-dimensional landscape as it constructs a 4D, navigable architecture in V.R. The mediascape provides a chance to enter within the higher-dimensional landscape and acoustic, cinematic environment. *TesserIce* brings human perception into the supra-dimensional space-time of glaciers, creating an immersive, embodied experience of the time, scale, causes, and effects of climate change on the ice.

In *TesserIce*, the participant enters a crystalline, four-dimensional cinema architecture. The participant is within a life-size, traversable, virtual tesseract in which space, time, and sound behave according to the unfamiliar geometry of the fourth dimension. Their movements propel them through the hyper-dimensions of this tesseract, traversing different cube rooms constructed from the images and sounds of *Ice-Time*. The space unfolds in uncharted vistas, juxtapositions, and timeframes within the space-time of Earth's polar ice [Fig. 10].

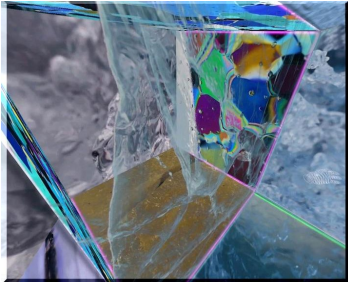


Fig. 10: A four-dimensional architectural mediascape from within. *TesseractIce* stillframe. © Clea T. Waite, 2024.

In *TesseractIce*, the participant is free to pass through walls and along floors, ceilings, and time within the four-dimensional architecture. The paths connect cubes following the true geometry of the tesseract. The navigation is inspired by novelist Robert A. Heinlein's short story, 'And He Built a Crooked House,' (Heinlein, 1967) describing a four-dimensional architecture that infinitely wraps back on itself. Viewing back into the third dimension from the four-space of the tesseract, an object's head and tail are coextensive. Neither inside and outside, nor top and bottom as we know them, are distinguishable. Linear perspective is fractured into crystalline, poly-perspectival facets or bent into a space of relativistic proximities.

Within cinematic hyperspace, action is as pervasive as sound. In immersive cinema, immersive sound is critical as a key sensory component in defining space. The acoustics of the *TesseractIce* mediascape, like *Ice-Time*, are essential to the sensory environment of the experience. We experimented with how an immersive soundscape 'behaves' in a four-dimensional, navigable space while adding essential spatialized information cues to the immersive experience.

TESSERING: AN EMANATION OF THE REFERENT

Philosopher Roland Barthes characterized (predigital and unadulterated) photography as an 'emanation of the referent,' a witness to authenticity, capturing reality into a spatial actuality that persists outside time.

The lens-based image presents a paradoxical oscillation in the space-time continuum between virtuality and reality. This paradox evokes a supra-dimensional state of perception in which the mind experiences past and present times and real and virtual spaces in multiple, simultaneous levels of awareness.

The photograph is literally an emanation of the referent. From a real body, which was there, proceed radiations which ultimately touch me, who am here; the duration of the transmission is insignificant; the photograph of the missing being, as Sontag says, will touch me like the delayed rays of a star. (Barthes, 1977: 44)

Placing the viewer briefly in a paradoxical state of perception where multiple times and spaces are coincident – into

a state of *tessering*⁴, collapses the logical space-time continuum between two events, namely the place and time of photographing and the place and time of viewing. This act of tessering is an enfolding, an instantaneous leap through the fabric of space-time using a shortcut through a higher dimension [Fig. 11].

For the wider public, the empirical nature of data, like photography, is inevitably experienced as virtual. Much of our current data originates without human mediation, which filmmaker Harun Farocki designated 'operational images.' (Parikka, 2023) The *Ice-Time* project, conversely, serves an experiential function as a document of our unique moment in glacial space-time. The artworks mediate the paradox of presence – a first-hand yet simultaneously remote experience of image and data. The viewer becomes connected, tessered, to the original time and space of the ice, sharing the presence of place experienced by the human cinematographer at the scene.



Fig. 11: *Tessering* into *Ice-Time*. Still frame (Icefjord Illulisat, Greenland). © Clea T. Waite, 2017.

Conclusion

Glaciers are crystal tesseracts, hyperspace containers of environmental time.

The geological provides a physical manifestation of deep time. It demonstrates the supra-dimensional force that is time, allowing us to glimpse a higher-dimensional perspective that subsumes both past and future and whose scope far exceeds human perception.

The notion of the cinematic tesseract, a higher-dimensional polytope, formally explores immersive cinema in and as hyperspace. Space-time as an enveloping domain is made explicit through this formal cinematic device. In supra-dimensional cinema, narrative space is rendered architectonic and relativistic, engaging multiple vectors of perception. Embodiment, participation, and a poetics of space emerge from this formal compositional approach to cinema, placing the participant in a liminal space bridging the real and virtual.

The *Ice-Time* series of immersive media artworks documents our unique moment in glacial space-time, using the form of supra-dimensional cinema to enfold the participant in a paradoxical oscillation with a remote and unfamiliar reality. The series of immersive films realizes diverse hyper-dimensional cinematic spaces that transform the audience's subjective perception of time while simultaneously imagining the microscopic, our own human scale, and the scale of the planetary. The works structurally transpose non-human scales of

⁴ The nomenclature 'tessering' is introduced by the author in (Chamier-Waite, 2019). 'Tessering' is originally derived from its use in the science fiction novel *A Wrinkle in Time* by Madeleine L'Engel, 1962.

time, particularly the time scales of glacial ice, to visualize the current temporal reality of climate change.

The *Ice-Time* moving image works create a supra-dimensional space of signification and navigable time, enacting the meta-dimensional data vistas of climate research as unique, deeply aesthetic experiences. The cinema-installations serve as entry points for reflecting on natural systems and processes, tessering our awareness to remote ecosystems affected by the climate crisis we have created – now affecting us at home. Placing the spectator's body in a conflation of real with virtual space fosters a radical solicitude between the space-time of the human and the geological. The embodied, participatory structure of the works enables the sentient spectator to form a deep, poetic awareness of the environment, the cultural implications of ice, and the imperative of our engagement with it.

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Manifesting the Invisible

The Poetics of Space, Time, Science, and Nature

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Abstract

A century ago, the poet Percy Bysshe Shelley defended the necessity of poetry as fundamental to comprehend the unfathomable. Despite the scientific disclosures about our earth, the scale and complexity of the climate crisis have produced broken communication lines and misaligned actions. In *Manifesting the Invisible*, three artists and designers explore the influence of scientific and socio-technological discoveries on their interdisciplinary works in which they consider scientific data and technological inventions as a vocabulary for a material language of poetics. Each manifests the invisible to question contemporary views of natural and anthropogenic environments. The presented works address artistic and design practices that explore the liminal poetics of space, time, science, and nature, engaging with data that reveals the invisible signifiers driving contemporary environmental and cultural symptoms.

Keywords

Climate change, embodiment, immersion, poetics, science-art, information visualization, perception, environmental literacy, urban environments

MATERIAL POETICS

We have given ourselves technologically enhanced vision supplemented by microscopes, telescopes, and satellites emitting radar and sonar. We have universal access to information shared over global networks. We live in the meta-dimensions of a redefined, disembodied world, full of strange data vistas surrounding us in manifold perspectives.

The artworks presented here began in the liminal space between science and art, engaging with data that reveals the signifiers driving contemporary ecological and cultural symptoms. The works focus on the moving image as a material, architectonic construct whose poetics are a spatial, embodied experience.

Through a vivid, material presence of image, sound, data, and time, Waite's expanded cinema works establish a spatialized, dynamic interaction of form and content as they elaborate the details of invisible forces and unravel the cultural implications embedded within the aesthetics of data artifacts. Combining the technological tools available to cinema and science reveals a vocabulary for a material language of poetics beyond the visible.

KIWA: CONSTRUCTED NATURE

Kiwa is a spatial edge or boundary that symbolizes an extreme moment in the metamorphosis of things. *Kiwa* evokes the threshold at the limits of the senses that summon extreme sensations when something is generated, vanishes, or changes. *KIWA Project* examines the relationships between urban images and "constructed nature" from the Japanese perspective of *Fudo*,

climate. Through the interaction of individuals from different cultural and professional backgrounds, *KIWA Project* deeply examines the "way of perceiving the world" from both art and science perspectives. It fosters a thematic understanding of "human beings as a part of an ecosystem" by developing a platform for co-creation and dialogue between diverse people, positions, and perceptions.

Via performances, exhibitions, and workshops on the edges of urban water bodies, *Kiwa* are formed through dialogues of images, sounds, texts, objects, and gestures.

EXPLORATORY URBAN ENVIRONMENTAL MEDIA

Although sensing and visualization technologies have significantly advanced, environmental data are still not widely, continuously, and cohesively accessible to the public. While standard methods are used to present the information, untrained citizens may be overwhelmed and disengaged by its complexity. The communication disconnect reduces the sensitivity and urgency and threatens the citizens' ability to participate in solution-making.

Bogosian combines evocative design with locative and immersive media to change how we perceive and construct urban environments. By highlighting a number of participatory air and water quality sensing efforts, the work examines how traditional cinematic techniques coupled with narrative construction structures and immersive information visualization techniques can create climate action.

PANELISTS

Tomoko Mukai is a creator, designer, artist, scholar, and educator engaging in cultural and spatial projection for public spaces, performances, and exhibitions. Her approach aims to evoke intuitive experiences focusing on complex relationships between information, memory, and bodily perception shared in social life.

Mukai has realized works at various sites, such as cultural and historical hubs in local communities. She also emphasizes interdisciplinary collaboration with members of different professional fields. In such collaborations, she fosters moving across platform boundaries to allow communication between different fields. Her work also explores bodily perceptions and mental states using spatial projection in collaboration with wellness

Clea T. Waite, Ph.D., is an internationally exhibited intermedia artist, scholar, engineer, and experimental filmmaker whose artworks investigate the material poetics emerging at the intersection of art, science, and technology. Her pioneering immersive, cinematic works engage embodied perception, dynamic composition, and sensual interfaces – as well as one inter-species collaboration with several hundred tropical spiders. Drawing on her multidisciplinary background, her practice is modelled on the experimental laboratory, combining research

with art-making and scientific collaborations. Project themes examine climate change and water ecology, astronomy, particle physics, feminism, and popular culture. She brings a unique blend of expertise to her projects from which cross-disciplinary synergies emerge.

Biayna Bogosian, Ph.D., is an architect and immersive media designer who works with environmental data by rethinking scientific visualization, environmental robotics, and critical making. Bogosian's interdisciplinary research has allowed her to understand innovation in design and technology within a broader environmental context and explore data-driven and citizen-centric approaches to improve the built environment. Bogosian is an Assistant Professor at Florida International University in Miami where her lab focuses on the collection and visualization of environmental data.

Mediating the More-Than-Human Self: Sissel Marie Tonn's 'Plastic Hypersea'

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Introduction

On January 1st 2019 probably due to heavy storms, around 350 containers were lost at sea from the vessel MSC ZOE just above the Dutch Wadden island of Schiermonnikoog. Some of the containers broke open, releasing millions of kilograms of plastic and possibly other toxic materials into the water, which subsequently started washing up on Dutch beaches. While the list of the containers' exact contents was never published, large amounts of pink and purple toy ponies, flatscreen televisions, and lightbulbs, among other items, littered a ten-kilometre stretch of beach on the island of Terschelling the following day, while the stormy weather drove styrofoam inland along the mainland coasts in Friesland and Groningen.¹

Departing from this event, artist Sissel Marie Tonn developed *Plastic Hypersea* (2020-1), a two-part project consisting of an online multi-channel "sci-fi documentary" in five chapters (*The Spill*), and a geolocated sound walk (*The Facility*) that can be experienced at the NDSM Wharf in Amsterdam North.² *The Spill* is a fable following a group of scientific researchers referred to as The Expanders, who experiment with finding ways to extend their 'immunological selves'. In the story, their research is based on some islander communities' (referred to in the story as the Wet Communities) accounts of how a toxic spill that took place in their vicinity started affecting their bodily functions over time.³ The narrated story comprises historical facts and imagined events, and is illustrated by found footage of the real MSC ZOE spill, as well as artist-produced footage depicting both real and fictitious events.

During the sound walk *The Facility*, the participant is involved in another speculative narrative. Throughout the progression of the walk, they listen to a number of fictitious field recordings by Polly M, set in the future in the year 2099. The narrator is an immunologist revisiting for the last time the decrepit site of what used to be the research centre of a scientific project she had been involved in years prior, before the programme was abruptly stopped. As she recounts key moments from her scientific career and the phases of a major research project she had been assigned to, the listener learns that Polly M had been involved in studying the curious physical changes induced by plastic-polluted water in a group of human test subjects.

Plastic Hypersea takes its title after the biological concept of the "Hypersea," a theory developed by palaeontologists Mark and Dianna McMenamin in their eponymously-titled book published in the mid-1990s. The Hypersea theory explains how

animal and plant life could move from water to land over 450 million years ago. According to the McMenamins the survival of land organisms depended on their co-evolution as an interconnected mass of living cells. In addition, while moving out of marine waters, land animals and plants had to find ways to "fold" the ocean back into themselves in order to be able to contain within their bodies' nutrient-filled oceanic fluids. Our blood, gastric juices, sweat, and urine, for instance, all point towards a fluid, aqueous ontology.⁴ The Hypersea thus speaks to the interdependency and interconnectedness between human and non-human bodies, going back to the shared aquatic materiality and origins of all life on Earth.

Informed by this theory, Tonn considers plastic as a modern-day material entanglement connecting all marine and land-based organisms.⁵ If micro-plastics are ubiquitously present in all of Earth's air and water systems, it makes all the sense to speak of a *plastic* hypersea as a new mode of material interconnectedness. As it circulates with the Earth's air and water currents, plastic breaks down into micro-particles and passes into food systems. It is ultimately ingested by human and animal bodies, negatively impacting their health and potentially altering their physiological functions in unforeseen ways in the long term.

The narratives in both *The Spill* and *The Facility* explore the notion of "shared contamination," or how the pervasive presence of micro-plastics in the environment is a highly (bio)political matter that can challenge our sense of embodiment and prompt us to conceive of a more expanded sense of self.⁶ In *The Spill* and to a lesser extent *The Facility*, this is done by presenting the immune system as the main mediator, or membrane, between the body and an environment ridden with potentially toxic plastics encroaching on it. Rather than framing contamination in a positive or negative sense, Tonn considers this moment of possibly dangerous encounter between the body and its wider environment, as an opportunity to think through our radical entanglement with the material world.

In this essay, I examine how in *Plastic Hypersea* the artist implicitly and explicitly engages with some critical posthumanist and relational feminist theoretical explorations into the more-than-human self, especially in the act of medial translation from theoretical perspective to sound walk, dance, and multi-channel video. I start by elaborating on human-plastic entanglements and how the infiltration of micro-plastics into the human physiological system poses an ontological question. Then, I expand on how Tonn's choice of artistic media aptly convey notions of interconnectedness and flux, rousing long-ongoing art-historical questions concerning the ontology of the art object, the viewer's relationship to it—or rather, as I will

¹ Northern Times, 2019, §2.

² Tonn, 2021, §2.

³ While the event of a toxic spill — alluding to the MSC ZOE spill — is explicitly mentioned in *The Spill*, this is not the case in *The Facility*.

⁴ Tonn, 2021, §1.

⁵ Ibid.

⁶ Tonn, 2021, §4.

argue, their place *within* it—while influencing the behaviours of other bodies involved in realising these artistic forms, including those of the human performers.

I contend that Tonn's act of artistic translation troubles the traditional subject-object relation that for centuries has characterised Western systems of knowledge production and learning about the world, including art. I will be therefore looking into how the artist employs the geolocated sound walk, multi-channel video, and dance, to translate philosophical perspectives and the multi-scalar entanglements that they describe, into an aesthetic experience perceivable at a scale that is graspable by the human sensorium. I see these mediums as markers of the recent performative and affective turns in contemporary art at large that have accompanied the ongoing critical posthumanist and new materialist turns in the humanities, in response to the insufficiency of traditional Western humanist views on the nature of humanity with regards to our relationship with the material world.

Material entanglements: a plastic ontology?

In *Plastic Hypersea*, the space of artistic intervention is the various unknown factors concerning the MSC ZOE spillage. The shipping company MSC paid €3.4 million to the Dutch state as compensation for the consequences of the spillage, to cover the costs incurred by the authorities and other organisations in cleaning up the disaster. This sum supposedly factors in any future costs that might arise from the fact that not all the containers and their contents have been recovered from the seabed.⁷ The exact contents released into the marine ecosystem were never officially publicly disclosed, while the full extent of the spill's ecological impact is yet to be fully understood, and can probably never be accurately measured (let alone translated into a monetary value). Tonn employs these unknowns to speculate on the possible future outcomes of large amounts of plastic becoming fundamentally integrated within the food web and the physiological systems of marine and land-based organisms, including human bodies.

In her artistic exploration into human-(micro-)plastic relations, the artist does not only take into account the possible effects of plastic contamination on human physiology, but also the agency of the material world in the phenomenon of shared contamination.

Plastic itself is a material with specific affordances. While human industrial and consumerist practices are responsible for producing and polluting with plastic, once released into the environment, the sea and myriad organisms 'digest' and 'compost' it until it breaks down into micro-particles that enter our bodies. In the speculative narratives that unfold in both *The Spill* and *The Facility*, non-human organisms respond and adapt to plastic's ubiquitous presence in unexpected ways. Without overlooking the danger of the presence of historically unprecedented amounts of plastic waste in the environment, the artist alludes to plasticity as both a material entanglement and ecosystems' transformative potential.

In biology, "plasticity" is a term that refers to an organism's adaptive response to changes in its environment. Plastic's

malleability, therefore, especially as it infiltrates physiologies and ecosystems, is a material affordance that provides an intriguing entry point for exploring humans' morphological potential through what I term a "plastic becoming" or a "plastic ontology." While plastic as a synthetic material was only invented in the second half of the 19th century, its origins are organic and ancient since it is often fashioned out of carbon atoms provided by fossil fuels. Therefore, the ways in which this synthetic material increasingly merges with the organic self, are fascinating to consider in relation to the natural/artificial dichotomy.

Furthermore, the widespread production and use of plastic in present-day consumerist societies is closely tied to war. The Second World War necessitated the rapid expansion of the plastics industry in the United States, as synthetic materials were needed to replace natural ones in the production of military equipment. After the end of the war, plastic quickly became the material of choice in the production of furniture, product packaging, and innumerable other items. A feminist (materialist) critique—which at times surfaces in the narrator's commentary in both *The Spill* and *The Facility*—of modern industrial and scientific practices enables us to analyse these practices as outcomes of the specific contexts that enabled them, and expose the masculine military operative logic underlying their apparatuses.

In her essay "Viscous Porosity: Witnessing Katrina," which she wrote as an affected response to the ravaging aftermath of Hurricane Katrina on the city of New Orleans, feminist philosopher Nancy Tuana argues for an "interactionist ontology" that "rematerialises the social and takes seriously the agency of the natural."⁸ As pointed out by Tuana, the hurricane compromised five superfund toxic waste sites situated in and around New Orleans after the plastics industry migrated there, exacerbating a long-standing threat for the state of Louisiana when toxic waste flooded the city. Tuana observes that, "Once the molecular interaction [between human body and toxic waste particles] occurs, there is no divide between nature/culture, natural/artificial."⁹ While the *Hypersea* theory speaks of how land-based organisms are constituted of oceanic flesh, Tuana is concerned with the moment when "plastic becomes flesh," pointing out that alongside oxygen and other essential nutrients, our porous bodies are also capable of absorbing that which could kill us.¹⁰ By focusing on micro-plastics and the immune system's workings on the cellular scale as key to an alternative understanding of the self, Tonn is also attentive to how interactions occurring at the molecular level trouble such binary divisions.

In the same essay, Tuana employs the conceptual metaphor of "viscous porosity" to think through how subjects are constituted out of relationships between biological and social phenomena—what she refers to (after Donna Haraway) as a set of "material-semiotic interactions" between social practices and natural phenomena.¹¹ Thus, the biological is always already mediated—or 'contaminated'—by the social and vice versa.¹² Tuana sees Katrina as a natural phenomenon that occurred, at least in part, due to human practices induced by dominant social beliefs and structures.¹³ In turn, the hurricane exacerbated a

⁷ NL Times, 2021, §1.

⁸ Tuana, 2010, p.188.

⁹ Ibid. p.202.

¹⁰ Ibid. p.201.

¹¹ Tuana, 2010, p.195. The term "material-semiotic interactions" was first coined by Donna Haraway in her 1988 article "Situated

Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective."

¹² Ibid. p.193.

¹³ Ibid.

long-standing threat for the state of Louisiana when stored toxic waste that had been stored in various sites in and around New Orleans, flooded the city. Considering the event of the MSC ZOE spill and both its real and speculated aftermath as a set of material-semiotic interactions, leads to an understanding of the human self as a “trans-corporeal subject,” a term coined by feminist environmental humanities scholar Stacy Alaimo to bring into sharp focus the “material interchanges between bodies and the wider environment.”¹⁴

The material-semiotic interaction occurring at the molecular level between toxic plastics and human flesh is not only a highly political and ethical one to do with industrial practices and environmental health, but an ontological one in that, as Tuana points out, once the molecular interaction occurs, the distinction between natural, cultural, and artificial is simply no longer possible.¹⁵ But how can radical philosophical ideas such as “trans-corporeality” and “viscous porosity,” describing complex and far-reaching processes, be effectively translated into an aesthetic experience that is graspable at the human scale? And how are such philosophical ideas possibly transforming contemporary art forms in the endeavour of transforming our relationship with our ecosystems?

Re-embodiment artistic forms/formations

The move away from the type of subject-object relation that has traditionally characterised the beholder’s relationship to the artwork as a viewer, is perceivable in Tonn’s artistic strategies across both components of *Plastic Hypersea. The Spill* is, admittedly, experienced predominantly visually from behind the screen, but the site-specific dance portrayed in the video effectively illustrates how embodied practice not only re-embodies the act of seeing—thus enacting what Donna Haraway in her article “Situated Knowledges” terms an “embodied vision”—but presents the body as an agentic knowledge-producing subject-in-the-world (rather than a detached, gazing subject) where ontology, epistemology, politics, and ethics, converge.¹⁶

On the other hand, *The Facility* is an immersive experience demanding more active involvement. The viewer is a participant whose physical presence is required at the designated site in Amsterdam North. The work is primarily composed of sound and is activated by its receiver’s bodily engagement. Through *Plastic Hypersea*, Tonn ultimately demonstrates how contemporary artistic practice can play an important role in shifting long-established notions of interiority and exteriority, both in the sense of what has to do with human corporeality, and in how the agency of non-humans, including animate species and the inanimate material world at large, can no longer be excluded from human political and social spheres.

Both *The Spill* and *The Facility* are set in locations that have a particular thematic, material, historical, and/or geographical connection to the MSC ZOE spill, the shipping industry, pollution, and the global supply chain that avails itself of the world’s waterways as capitalist space. *The Facility* takes place at the NDSM Wharf in Amsterdam North, the former terrain of the Nederlandse Dok en Scheepsbouw Maatschappij (Dutch Dock & Shipbuilding Company). NDSM was a ship building, machine building, and ship repair company that operated

between 1894 and 1979, and had grown into the largest European shipyard by the late 1930s.¹⁷ On the other hand, the shoreline choreography in *The Spill* was recorded on Schiermonnikoog, close to where the MSC ZOE spill took place. The choreography could have been performed on any other beach without significantly impacting the documentary’s visual and narrative outcome, nonetheless the artist invited the dancers to engage with Schiermonnikoog’s particular shoreline ecology through their embodied practice.

My main argument here is that when applied to ecological thinking, the artistic strategy of maintaining a degree of site specificity works to a limited extent towards attributing the act of seeing to specific and engaged bodies, and to a larger extent to re-situating vision to real-world bodies and contexts rather than an abstract space such as that of the white cube or the scientific laboratory. In a similar manner, the artist’s speculative narrative unfolds closer to real-life contexts in which it could possibly happen. Re-embodiment and re-locating vision is crucial to critical posthumanism’s task of building a posthumanist onto-epistemology that undoes human superiority in relation to knowing and being in the world.

Haraway critiques the way in which scientific objectivity, understood as an impartial “view from above, from nowhere,” effectively conceals the specific position of the male, white, heterosexual human—a position that installs itself as a universal voice.¹⁸ Haraway is also critical of how vision, not least scientific vision aided by the enhanced technological gaze of scientific equipment, has consolidated an unequal subject-object power relation that has traditionally dominated knowledge production. The “conquering gaze from nowhere” that sees without being seen or having to be physically implicated, perpetuates a separation of the ontological, political, and ethical planes that situated knowledges seek to reintegrate.¹⁹

In articulating the link between disembodiment, sight, and (total) objectivity that has traditionally characterised Western scientific practice, Haraway points out that “seeing everything from nowhere” is a myth.²⁰ Ways of seeing, especially those enabled by instruments of enhanced vision, are socially constructed; what the observer ultimately sees is mediated by their pre-conceived notions, personal intents, and overarching political and economic agendas and narratives. In *Plastic Hypersea*, this is best illustrated through the reference to a key moment in the history of immunology; Élie Metchnikoff’s discovery of macrophages in 1882.

The macrophage is a cell responsible for a process of immunity (phagocytosis) in which an external particle that enters the body is surrounded to gain information about its substance, and subsequently initiate an immune response (or otherwise). As the listener is told in *The Facility* and sees in *The Spill* by means of an artist-created animation, Metchnikoff penetrated star fish larva with a rose thorn and observed through a microscope the way in which the cells grouped themselves around the thorn to investigate the intrusion. Metchnikoff metaphorically described the cells’ actions as a defensive manoeuvre against a foreign invasion. As the ‘father’ of modern immunology and a recognised scientist holding the privilege to interpret ‘his’ object, Metchnikoff projected the visual language of war onto a biological occurrence. He founded the emerging

¹⁴ Alaimo, 2018, p.435.

¹⁵ Tuana, 2010, p.202.

¹⁶ Haraway, 1988, p.589.

¹⁷ Geschiedenis van Amsterdam Noord, undated.

¹⁸ Haraway, 1988, p.589.

¹⁹ Ibid. p.581.

²⁰ Ibid.

scientific practice of immunology on the vocabulary of attack and defence that persists to this day, a vocabulary heavily informed by warfare as the dominant political and social occurrence of the era.

To counter the view from nowhere, Haraway argues for “the view from a body” as a more accountable and ultimately objective means of knowledge production; situated knowledges are the “apparatus of bodily production” through which a re-approximation between knower and knowledge occurs to the point of inextricability.²¹ The radical interconnectedness between subject and object problematises the traditional subject-object relation. Knowledge production is no longer reserved to those occupying a more privileged position within epistemological hierarchies—such as Metchnikoff in his time—nor is it an exclusively human domain for that matter, if all bodies, human and non-human, are agentic objects of knowledge. This is most effectively enacted in *Plastic Hypersea* through the shoreline choreography in *The Spill*, despite the fact that the dancer’s situatedness is rather temporary and staged, mostly effective at the level of the moving image, rather than an ongoing, in-depth engagement with place.

Two performers dance at twilight with the sand, sea, and sea foam on the beach at Schiermonnikoog. They mobilise their bodies and all of their senses to come in touch with the sand, sea, and all the forces and organisms that are present but not necessarily visible in the image. They let their fingers and feet sink into the sand, and they lie in the shallow water, letting their clothes get soaked through and through and allowing their bodies to be swayed by the undulations of the tide. The camera cuts from scenic beach shots, to close-ups of the dancers’ movements and submerged shots in which control over the image is relinquished to the waves and the water’s murky materiality.

Here, site-specific dance accompanied by a somewhat tense musical score, is an embodied somatic practice where the dancers’ movements in combination with the imagery, conveys how ecologies are sensuous spaces that we can get to know through an embodied vision. The narrator skilfully employs language to illustrate how an embodied vision might also find expression through means other than the eyes, using phrases such as, “they listened with the marrow of their bones to the direction of the wind,” and, “breathing in time with the rhythm of the oysters.”²²

In *The Facility*, the creation of a designated zone across which the sound walk unfolds, subverts the traditional role of the art spectator from a detached onlooker to an actively-involved participant. The participant is required to walk to nine different sites corresponding to nine physical locations indicated on an interactive map within a sound walk app, in order to listen to the fictitious field recordings of Polly M and gradually discover new insights. Physical features from the participant’s surroundings are narrated as architectural features belonging to a dilapidated scientific facility. The facilities formerly belonging to the NDSM shipping company, and currently used for various artistic and cultural events, are re-cast as a scientific testing centre in Polly M’s narration. The choice of site complements the narrative in *The Facility* in that the listener is always situated close to the polluted waterways in and around the NDSM wharf. Polly M occasionally instructs the listener to connect with their surroundings in a specific way, such as when she invites them to

touch the water and adjust their breathing to the rhythm of the water’s ripples.²³ While this is not a new strategy in contemporary artistic practices, it is worth analysing its implications within a site-specific work of art engaging with posthumanist perspectives.

As Polly M describes the architectural features of the former testing site, for instance the concrete ramp that runs into the nearby water, the participant is invited to look more attentively, seek out specific details, and become aware of their position within their surroundings. Moreover, the work is not an object installed in space—although for a time a number of sculptural pieces were installed in the water near zone 5 (until June 10, 2021) — but an aural experience unfolding through space and time through the participant’s physical movement which is required for the narrative to develop. Thus, the pursuit of knowledge in *The Facility* is not based solely on looking for visual clues, but occurs primarily through listening, touching, and moving *through* and *within*. Spectating refers to the possibility to remain untouched or unaffected by that which is being looked at, but in this case the realisation of the artwork itself depends on an implicated body that, to an extent, comes *in contact* with its surroundings. In *The Facility*, looking provides merely an entry point into the narrative.

Visually locating something that is already there, paves the way for entering the artist-created speculative reality, yet it is sound that ultimately enables the listener to become immersed in the narrative. Like the sound through which they are mediated, the fictitious events recounted by Polly M and her future presence in the same site are intangible yet material; intangible in the sense that they have never occurred, and material in the sense that the real event of the MSC ZOE spill prompted them to be imagined, scripted, and turned into an aural work.

Moreover, the sound walk moves back and forth across a spatio-temporal scale that is much longer than the individual human’s lifetime, accounting for the entirety of expanses of space and time required for oceanic bodies to ‘digest’ plastics and ‘compost’ them into micro-plastics, and the extensive process of these finding their way into the human body. The listener in the present is asked to look at their surroundings whilst imagining that they are in the future year 2099 and everything around them is a relic of a failed project that, according to the story, took place sometime in the past, at a time which would correspond to our actual present. Arguably, however, the artist’s sound-based mediation only enables a superficial involvement of the participant with their surroundings. While Tonn consciously chose the location due to its affinity with the work’s narrative, the work does not really engage with the site’s history, but rather uses the site in service of the work.

In “Viscous Porosity,” Tuana refers to sociologist Andrew Pickering’s metaphorical notion of “dance of agency” to further emphasise the force of non-human agents in shaping our human being, also in very intimate ways. Can the dance in *The Spill* be seen as a literal dance of agency that provides a physical dimension to Pickering’s metaphor? In her thinking, Tuana purposefully opts for the expression *viscous* porosity, rather than fluid porosity because in her words, viscosity “retains an emphasis on resistance to changing form.”²⁴ In the interactionist ontology of viscous porosity, significant morphological,

²¹ Haraway, 1988, p.591.

²² The narrator in *The Spill*, chapter 3.

²³ The narrator in *The Facility*, zone 5, 3:45.

²⁴ Tuana, 2010, p.194.

political, and social changes occur as a result of frictional encounters between human and non-human agents, negotiated by membranes as thresholds at various scales.

Read through this lens, the act of *dancing with* serves as a dynamic aesthetic interpretation of material interchanges occurring between human bodies and their environment, equivalent to a trans-corporeal becoming as defined by Alaimo. The dancers use their own bodies as sensing mechanisms and measure against the vast island shoreline, with their skin as membrane mediating their encounter with the various materialities to be found here. In this scenario, the emergent aspects of dance, especially in a choreography in which touch and presence within a particular location feature prominently, emphasise processes of coming into being, including the unpredictable, potentially undesirable and troublesome outcomes that, as outlined by Tuana, do not occur without an element of friction and resistance.

Conclusion

Both *The Spill* and *The Facility* include prominent formal components consisting of human bodies intruding upon a particular space, and a narrative component in which human and non-human bodies circulate and ‘touch’ each other at various scales. On the formal level, in *The Spill* the human performers dance along with the seashore ecology on Schiermonnikoog, while in *The Facility*, the participant is directed to move towards various locations across the space of the NDSM Wharf terrain. Both instances are a matter of (human) bodies coming in touch with their surroundings. Additionally, the way in which the dancers’ performance is visually mediated, continuously alludes to the sense of touch and the notion of surface-level encounters that lead to deeper and more intimate entanglements.

In both *The Spill* and *The Facility*, the narrators refer to intrusions occurring at scales much larger and much smaller than the human sensorial scale can fathom; the event of the spill (the macro) and the process of plastics being broken down into micro-plastics and breaching bodily boundaries (micro), which I have placed my focus on in this essay. These breaches are also a matter of bodies touching each other, despite only being accessible to us through technologies of enhanced vision (microscopes and video cameras) that render them visual events prone to interpretation.

The scripted narrative continuously works towards linking these instances of touch back to our own human sense and scale of embodiment, leading to the fundamental question of, do we ultimately feel touched, or, *affected* by these events in a way that moves us to take action and enter into more ethical relations with the material world? Furthermore, how does Tonn’s focus on aural and haptic modes of encounter (the latter often mediated through the visual), and her articulation of an alternative mode of embodiment, ultimately help us relate corporeality to questions of environmental and social justice?

Plastic Hypersea advocates for a more sensually-engaged experience of our own bodies and our presence within the material world. In *The Facility*, aural immersion adds a temporal layer to the participant’s surroundings. The speculative narrative in the work temporarily transports the listener mentally to the future, pointing to how touch does not only occur through space, but also over time, oftentimes over durational periods that are difficult to fathom from an anthropocentric perspective. In turn, the imagery imbued with haptic qualities in *The Spill* emphasises the human body’s material interconnectedness with its environment.

The artist does not devalue vision as such, but rather seeks to redistribute our disproportionate reliance on seeing as a mode of delineation and knowing the world. Furthermore, following Haraway, the act of seeing is restituted to the body: it is an act embedded within a specific subjectivity and the seer’s particular worldview, rather than perpetuated by a disembodied and objective observer. Contemporary artists such as Sissel Marie Tonn are attempting to add an aesthetic dimension to new vocabularies being articulated by relational thinkers. It is worth studying the forms and formations that artistic projects aligned with a critical posthumanist way of thinking are being given, especially since the artistic domain is often the first where radical theoretical ideas can be most effectively translated and introduced to the collective imagination, before proliferating into our collective political and social spheres.

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PIONEERS

From scenography to zerography

A convers(at)ion between Franck Ancel and Federico Biggio

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Maybe you've already heard the word scenography, but I don't think you're familiar with zerography. It concerns media art and I'm going to explain the reason. The pioneer who set the stage for a connection between media art and scenography was Jacques Polieri and we are going to convert here his past theory into contemporary practice in eleven points.

It's with a young researcher, Federico Biggio, who has a Ph.D. in semiotics & media, that I organized my fourth meeting in France about "Scenography and Technology". I use to organize a new meeting each time we enter a new technological or scientific paradigm. The return of augmented reality, for instance, is an example, the COVID pandemic especially set a stage for this change. The adoption of video streaming meetings reminds us of the Jacques Polieri experiment by satellites.

This text was written in the Malipiero Palazzo where I slept during this edition of Media Art History in Venice. And from France, Federico Biggio corrected and oriented it, trying to explore something about this source. We're to return to this archive source for history like sailing on the Venice canals by boat, or to get lost in her streets as in a labyrinth. Here, we have eleven bridges to cross now.

From scenography to symbiosis

The latest edition of ISEA in Paris was about SYMBIOSIS and I organized a study session at the French national Library, in order to put forward the archives of a master of arts media, the French scenographer Jacques Polieri. Jacques Polieri was born in nineteen twenty-eight and he died in two thousand eleven. Polieri is not his real name but a pseudonym because Jacques was Jewish and he started acting after the Second World War, he chose his stage name as an actor. In nineteen forty-seven he saw Antonin Artaud's legendary conference in Paris and for half a century he produced arts always in step with technology. His last production was a cybercinema project. It is not just the question of a presentation room for a conquest of space but imagining events inside the cosmos.

From Media Art History in Banff to Venice now

The first time I met Jacques Polieri was just before the very beginning of this century, at his studio-office in Paris. We worked together for a decade and I coordinated an exhibition at the National Library of France in Paris and after in Berlin. Then I gave dozens of conferences around the world, including a presentation for the first edition of Media Art History in Banff. Here, today, I'm going to take both historical and conceptual materials to recombine them with each new presentation depending on the moment and/or the site. This is important because in Italy, during the renaissance, there was an utopian theater project which was not only a theater but a spatialization of memory. The theater of memory of Giulio Camillo could be a source to understand the research of Jacques Polieri. However, we are not going to limit ourselves to discussing the theater and its modernization. For Polieri all materials are equivalent and

can be the subject of combinatorics or even of a transformation of one action into another action. This is what he calls an act of fiction, but technology allows us today an infinite creation of data. What can we do with such references or sources both in theory and for practice outside the framework?

From Wassily Kandinsky to Jacques Polieri

The most important artist of abstraction wrote a set of text-scores with a poetic dimension for the stage. « Sonorité Jaune » is one of his text poems. Jacques Polieri, who was friends with Wassily Kandinsky's wife, was the first to create a performance of this work as a scenography.

From Frederick Kiesler to Jacques Polieri

Jacques Polieri published in nineteen sixty a book with a mathematical composition like an algorithm imagined by Frederick Kiesler to theorize modern scenography. Nowadays, with operational algorithms, how can we make a new algorithm out of them, vice versa, from practice to theory?

From the Olympic games in Munich to next Olympics in Paris

As you know, the Olympic Games will take place in Paris next year. Jacques Polieri took part in the Munich Games in nineteen seventy-two by creating a networked television capture system all around the installations. The program was both live but also broadcasted through several sites. The project of Polieri called "Electronic Paris", which did not find funding for Elektra, a major exhibition on media arts in Paris. But I want to publish during this world event a facsimile from its archives at the National Library of France.

From scenography to semiotics

Polieri wrote four fundamental books that are titled "Scenography Semiology". For him it was not only a question of being connected with the field of linguistics but of thinking about signs and not only languages but also forms that came from the historical and neo-avant-gardes from last century. In fact, that's why my title is compressed on S/Z. This is a reference to the semiologist Roland Barthes who wrote the book S/Z. This interests us as a convergence of readings and knowledge in the analysis of a work, in this case a book. For Barthes about Balzac but we could forget it and just take a cross-section of knowledge as transmedia.

From scenography to zerography

In this sense, we can look at Expanded Animation meetings. It was during the last Ars Electronica festival where the art of performance was updated. Cris Salter, who we invited to Paris during "Scenography and Symbiosis", among the other speakers, showed a YouTube channel recombining these multi-sources. And yet it is from another research based on what was not a Gesamtkunstwerk at Polieri that we could imagine an art

of memory in different spaces, both publications and projections. This is what I call zerography between theory and practice, after the past and before the future.

From real sketches to virtual reality

In the archives of Jacques Polieri at the National Library of France, we obviously find diagrams, notes or recordings but unlike the great utopia of the twentieth century like Frederick Kiesler or Walter Gropius. But Frederick Kiesler or Walter Gropius have not realized in real their utopian projects that is different for Polieri if you think about "The Theater of Total Movement" for the Universal Exhibition in Japan at Osaka.

From media archive in Paris to a book in Italian

Following the study day which took place in Paris last May as part of ISEA, I began to work with one academic who has worked at the Felice theater in Venice, and at the University in Milano, Professor Daniele Paolin. Daniele Paolin translated major texts by Polieri in Italian as well as some conferences that I have given all over the planet. It is not only a work of translation but a reflection on the background of Polieri's archives in Paris and how we can produce, for example, a semantic map which will not just be an illustration for this book. In one of my talks the scenography of Stéphane Mallarmé's Book by Polieri is studied, which is anything but a book. Those manuscripts of Mallarmé are now kept at the Houghton Library in Harvard and not in France. Polieri's collaboration with the IBM company, for the creation of a show installation based on a word bird by the still-living painter, Miro, is not only historic for media arts, but a zerographic track for future books.

From New-York, Tokyo and Cannes to the communication games

During the Covid pandemic across the planet, video streaming meetings have made a breakthrough. Polieri's events between New York, Tokyo and Cannes seemed important to remember exactly forty years ago. Of course, you know " Good Morning Mister Orwell " by Nam June Paik one year after, in nineteen eighty-eight, but it was not a TV show by Jacques Polieri. We can see in Paris some video copies of the program designed by this scenographer with the subject of "Human Machine Interface" with images from SIGGRAPH and MIT at Polieri's funds on the French national Library.

From Venice to network

From Venice we can open a work that crosses not only a semiology of media with Federico Biggio or even the translation of texts of Jacques Polieri from French to other languages such as Italian with Daniele Paolin. In the UK, Rachel Hann did some investigations into the use of computer-based 3D visualization as a research methodology for example about the *Endless Theater* of Frederick Kiesler. And we could imagine the same with the archives of Jacques Polieri. But more than an update, it is an infinite work in collaboration with other research laboratories in the world to create immersive devices of the models at the same time of artificial intelligence or art of memory.

The first happening in Europe was made here in Venice by an artistic group as an eternal network, from a gondola, that sent artwork into the canal. By chance, I lost my glasses in the canal during an event of Media Art History and I learned later that the place is famous in the film about love "Anonimo Veneziano".

So, do You need augmented glasses to write the history of media arts today? Certainly not, time is now to reconnect media arts with an oldest story or culture as the Italian renaissance, not only with our eyes but more with all our senses and perhaps mindfulness.

BOGDANKA POZNANOVIĆ

The Art of Communication and The “Mainframe Arte Povera”

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ABSTRACT

Bogdanka Poznanović (1930–2013) was a Yugoslav media art pioneer and a professor at the Academy of Arts in Novi Sad (Yugoslavia), where she founded the Visual Studio For The Intermedia Research (1979) one of the first academic intermedia programme in Europe. The intermedia and video works of Bogdanka Poznanović were a symbiosis of visual, verbal and sound codes. She used different media as the tactical information channels—postal network, telephone network, talkie-walkie systems, art magazines or Tv screens. This article has been written by her student from the standpoint of the appliance of media art epistemological tools she provided for the digital migration of generation X. An outline of Bogdanka Poznanović pioneering work—environment art, video art, communication art and networking—is given in relation to the evolution of cybernetic patterns in the arts and the position of technologically augmented artist within the global socio-ecological system. Special focus is put on newly detected phenomena “mainframe arte povera”, i.e., the historical examples of artworks created from computer consumables in the time of mainframes scarcity.

CCS CONCEPTS

- Pioneers of Media art

KEYWORDS

site-specific media art history; intermedia; postmedia; Yugoslav video art, networking, media art education, Media Art Histories of Eastern Europe

Introduction

Bogdanka Poznanović (1930–2013) studied at the Faculty of fine art in Belgrade, Yugoslavia (1956). As a representative of the Council for Culture of Vojvodina for fine art, Bogdanka Poznanović was part of the working group that established a regional section of professional fine artists of Vojvodina during 1957. The primary aim of the association was to improve social and working conditions of the artists, and to distance themselves from the art practice of socialist realism and agitprop cultural policy. [1] Together with her husband Dejan Poznanović,

Bogdanka was among the founders of the public organisation Tribune of the Youth (1954–55), which became one of the hubs of the Novi Sad neo-avant-garde artists. The cultural policy of Novi Sad in the 1950s—the separation of the “cultural front” from the “ideological front” within the communist party in Vojvodina—was influenced by the 8th congress of the Communist Party of Italy “the Italian road to socialism” (Bologna, 1956).

Bogdanka Poznanović worked as an editor-curator of Tribune of the Youth exhibition space (1956–57) and a member of the editorial board of the magazine *Polja*. In art magazines *Polja* and *Új Symposion* (Novi Sad), she had run the columns “Information on Visual Art” and “Information of Atelier DT 20 / b&d poznanović.” She worked as a professor at the Academy of Arts in Novi Sad (1965–1996). She was influenced by the work of the international community of fluxus artists and the Italian *revolutionary art* movements from the 1960–70s. She received the six-months grant from the Italian ministry which she spent in Florence and Rome (1968/69) and three-months specialisation in Venice (Archivio Storico delle Arti Contemporanee, 1977). She was visiting professor at the University of Contemporary Art in Bologna (1984). The early texts about Bogdanka Poznanović’s conceptual works were written by Vojvodina neo-avant-garde artists (Szombathy, Radojičić), the later research included monographs by Miško Šuvaković [2] and Sanja Kojić Mladenov [3], her work was mentioned in the numerous articles (Lukić, Srebotnjak-Prišić, Stepanov, Ćurčić, etc.). The momentous interview with Bogdanka Poznanović was made within the framework of a project coordinated by Svenka Savić (Novi Sad, 2001) on the life stories of women from Vojvodina. [4] Museum of Contemporary Art of Vojvodina (MSUV) holds a collection of her artworks, e.g., *Heart* (1970) and *Computer Tape Bodies* (1973). An online collection of Bogdanka Poznanović work is accessible at The Institute for the Research of the Avant-Garde. [5] The award of Novi Sad video art festival Videomedeja carries the name of Bogdanka Poznanović.

Following text is an output of a research on the site-specific media art history of Novi Sad (AP Vojvodina, SFR Yugoslavia) at MEMODUCT posthuman.archive. Research on Bogdanka Poznanović is based on Artists-Archiving-Artists (3A) methodology that focuses on data related to the employment of tools, the development of iconography, the formation of professional identities and the emergence of personal epistemology of an artist.

Environment Art

The major structural reconfiguration of the Autonomous Province of Vojvodina took place within the first cybernetic wave of *homeostasis* by the construction of the hydro system Danube—Tisa—Danube (1957-1977) which established equilibrium in the environment and created a safe habitat by the water regulation. Artists' respond to the environmental change was immanent to the Vojvodina art informel of the 1960s, specifically artists' colony in Zenta (Ács József, Pal Peterik, Benes József) as well as the early works of Bogdanka Poznanović (1961/62). From 1968, Poznanović focused on the relation *Space—Action—Communication* and introduced feedback as the constitutive segment of her work. The processuality of visual communication became the focal point of her study.

Reflexivity, a cybernetic coupling of environment and self, Bogdanka Poznanović reflected as communication with the Earth and communication with the city where she lived (Novi Sad). She positioned herself as an information-processing being within the global ecosystem: "The rivers are very important for me, they connect, they are like a bloodstream!" [6] The artworks *Cubes-Rivers* (Novi Sad, November 11, 1971) and *Rivers Transmission* (Novi Sad, Jun 29, 1972), performed at the banks of Danube, were examples of the personal epistemology of an artist embedded in the larger homeostatic system. In *Rivers Transmission*, the names of Yugoslav rivers were printed on transparent foliage and thrown into Danube, modification of this work was made on Geneva lake at the "Montreux espace situation" (July 29, 1972); the documentation of the action *Rivers Transmission* was shown at the exhibition „South Atlantic Ocean“ (Buenos Aires, 1974).

Video Art

Bogdanka Poznanović was introduced to video as an art form, electronic camera as an art tool, and videotape as a new medium within the framework of *The Nights of An Alternative Film* (1970/71), a programme held by filmmaker Lazar Stojanović at the *Tribune of the Youth*. [7] In 1970, she made her first visual communication piece, a filmed action *Heart-Object*. During the Novi Sad rush hour at 15:00, a group of friends carried a human-sized heart from the bank of Danube to Tribune of the Youth. The object amalgamated visual and sound signals—a red heart had an incorporated metronome that marked time at a perpetual series of 76 pulses per minute. The video recording of the process transmitted temporality of collective street action into a mediated visual communication event. *Heart-Object* became emblematic artwork of the Novi Sad neo-avantgarde, often referred by artists (Tucić, Matković), and singled out by daily newspaper *Dnevnik* (ДНЕВНИК see pict. *SRCE | HEART*, 1970) as a viral artistic phenomenon that had "started an epidemic" of intermedia in Novi Sad.

The most of Bogdanka Poznanović early video works were produced as self-made documentation of artworks recorded by camera super 8, e.g. *Collage* (1973), *Stone—Water—Light* (1974); short experimental video followed: *Expansion of Light*,

Pulseimpulse – Electronic Environment, *Onoric ring*, *Obductio coram* and *Vita Lattea*.



SRCE | HEART, 1970. Action, colour photography, 8 pcs. ©Bogdanka Poznanović & MSUV. Artwork is part of the MSUV collection

Television Novi Sad started broadcast in November 1975, but at the time it did not have a direct impact on the local video art production; Tv influence became visible by way of music video during the 1980s. A documentary on Bogdanka Poznanović methodology and Visual Studio experimental media art practice was made by Tv Novi Sad in 1982.

The interconnection between Bogdanka's approach and the work of the pioneers of Yugoslav video Nuša and Srečo Dragan (Ljubljana) was stressed by Miško Šuvković, a theoretician and protagonist of the second wave of Belgrade conceptual art. The aspect of "female video" had drawn attention of the Generation X—highlighted by the curators of Museum of Contemporary Art of Vojvodina Sanja Kojić Mladenov (2006-) and Kristian Lukić (2007-2013)—specifically a video-performance *Poemim* (1979/1980) which she made with performance artist Katalin Ladik (Novi Sad). This an example of transmedia work produced as *Poemim* (1978) body art photo session of Katalin Ladik photographed by Imre Pot, *Poemim* (1979) live performance by Katalin Ladik in Budapest, and *Poemim* (1980) video of Katalin Ladik realised by Bogdanka Poznanović.



POEMIM, 1980. Video, VHS, colour, 10''41'. Video realisation: Bogdanka Poznanović. ©Katalin Ladik & MSUV. Artwork is part of the MSUV collection

Media based works of Bogdanka Poznanović thematized information as an artistic entity on micro/macro level, often introducing organic body imprints into the technological structure, such as “cardioline” or “respiromessaggio.” In *Conceptus respiratio* (1975) she asked participants for *breath-writing*, i.e., participants had to make 2 min and 45 sec of breath-recording on the magnetic tape. Each tape was then labelled with the name of breath-writer and stored. She furthered communication research into the field of intermedia by combination of performative writing and print/stamp making, as was the case of *Labyrinth*: “As

I write this text, the tape registers the rhythm of my breathing. In this way, the manuscript is simultaneously produced by *breathwriting* and *handwriting*. Slowly, it is organised into two fields: a sheet of paper and a tape; two processes: mental and organic; two means: manual and technical; there are two participants in this communication: the sender and the receiver. I integrated the surface of the paper, the handwritten flow and the recorded tape and thus realised a unique breath-handwriting-labyrinth structure.”

Networked Artist

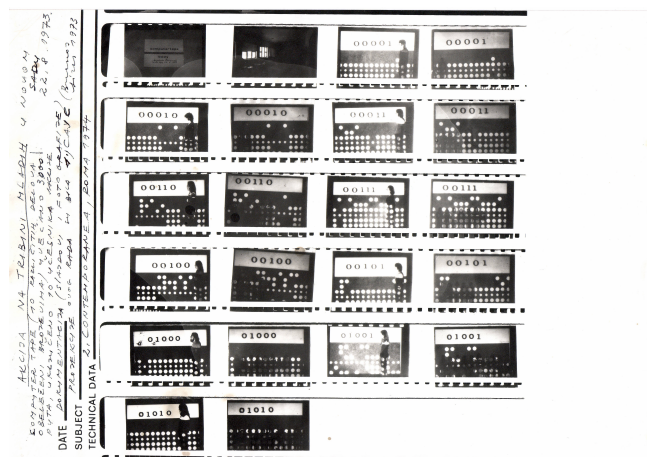
During the 1970s, The Atelier DT20, a studio of Bogdanka and Dejan Poznanović was an art-hub for the Novi Sad neo-avant-garde scene. They had a status of “influencers” regarding the promotion of conceptual art, arte povera, mail art and video art. Networking for Bogdanka Poznanović was “a communication in planetary coordinates,” [8] which had a special importance for the artists residing at the Eastern Bloc. In 1973, Bogdanka Poznanović participated in the project *A.R.T. order: Was ist Kunst?* of Hans-Werner Kalmann from the German Democratic Republic. During 1973/74 she initiated an international mail art project *Feedback Letter box: Information—Decision—Action*. She sent a photograph of her letter box and received a feedback from artists: Joseph Beuys, Klaus Groh, Ken Friedman, László Beke, János Urbán, Clemente Padín, Paul Neagu, Miroljub Todorović, Bálint Szombathy, Predrag Šidjanin, Andrej Tišma, etc. The notion of an informal artistic message which was passing through the formal system of state control had a subversive impact for artists. The mail art communication was a way to subordinate provincial isolation and socio-political divide made by the Iron Curtain. The formation of the divisions Fluxus West and Fluxus East was an attempt to overcome art scene cut up. The East-West antipode connection brought an *autopoiesis* in the discussion and problematised position of an artist within the worldwide network. In 1978, Bogdanka Poznanović made a *reaction-action* photo performance *Where is north to someone?* The worldwide standpoint became a matter depended on the specified conditions, she was facing different sides of the World uttering a question: *Where is east to someone? Where is west to someone? Where is north to someone? Where is south to someone?*

The focus of Bogdanka Poznanović’s work was the networked artist and the art of communication which she visually formalised as stamp-logotype “contact art.” The characteristic example was the case of multi-cycle photographs *Art—Interpersonal Communication*, when she took photos of her encounters with artists. The aesthetics of photo documentation of *Interpersonal Communication* relates to the contemporary selfie culture on social networks. She made *Talkie-walkie communication* (1974) with Nuša and Srečo Dragan, whose goal was transmission of the space via *talkie-walkie*. While standing on the roof of the building they exchanged information on the space that surrounded them: height, width, colours, materials, etc. She cooperated with the pioneer of Yugoslav electronic art Vladan Radovanović on *Telephone-Art project*, a live broadcast on III Programme Radio

Belgrade. At the beginning of the 1980s, telematics and long-distance transmission of information via computer was a point of convergence. In the Visual Studio of the Academy of Arts in Novi Sad, together with artist Stano Filko (Czechoslovakia), she realised *Bioelectronic Communication* (1980), a work on the topic of telepresence technology, which simulated the form of video chat through a TV screen.

The “mainframe arte povera”

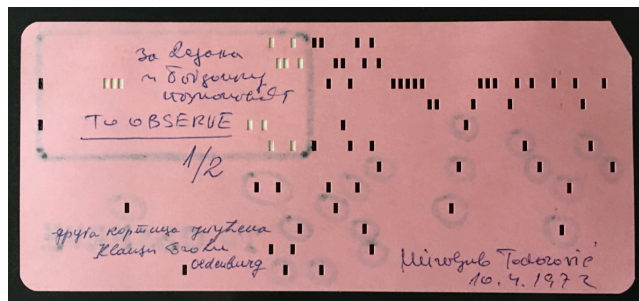
The first *Electronic Computer Centre* started to work in Novi Sad on January 15, 1971. At the *Tribune of The Youth*, on August 22, 1973, Bogdanka Poznanović made a participative photo-performance *Computer tape & body*. She photographed participants of the action whose bodies were marked with the projected content of slides — a segment of computer tape accentuated with a binary-digit serial number. The outcome of the performance was catalogued documentation consisting of slides and photographs of 10 individuals exposed to computer artefact under the concept “to mark humankind with numbers.” The public was integrated into the virtual environment via diapositive. The artwork was restaged as a projection at the exhibitions: *CAYC* in Buenos Aires (1973) and *Contemporanea* in Rome (1974). 1971.



Computer Tape Bodies, 1973. Intermedia performance (photo documentation). ©Bogdanka Poznanović & MSUV. Artwork is part of the MSUV collection

The term *mainframe arte povera* was sampled—by Violeta Vojvodic Balaz while she was studying digital migration of generation X—to label the historical examples of artworks created from computer consumables in the time of mainframe scarcity. It marked a low-fi art production that problematised state-of-the-art technology. The term emerged from a need to have an unique signifier that connects varied intermedia computer related practices important to study evolution of the site-specific media art history, information art and tactical media. In Yugoslavia, beside the work of Bogdanka Poznanović, *Computer Tape Bodies* (Novi Sad, 1973), among the examples of such works were the graphic interventions on computer paper by Slavko Matković,

Processing of discarded computer material (Subotica, 1970) and signalist intervention on punch cards by Mirosljub Todorović, *Signalist book – Fortran* (Belgrade, February, 1972). Todorović also made an exhibition of computer poetry in 1969 (Atelje 212).



TO OBSERVE 1/2 For Dejan & Bogdanka Poznanović, 1972. The second card was sent to Klaus Groh (Oldenburg), Mirosljub Todorović 10.4.1972. Punch card with an inscription. Document is part of the Bogdanka Poznanović manuscript collection at kuda.org archive (Novi Sad)

Visual Studio for Intermedia Research

In 1979, professor Bogdanka Poznanović formed a Visual Studio For Intermedia Research at the Academy of Arts Novi Sad and introduced a quarter-inch AKAI video camera into the school practice with an argument that video-camera was actually “an electronic brush.” Studio was equipped with photo and video cameras, slide projectors, copying machine, devices for optical rescaling and other accessories. The Visual Studio for Intermedia Research emerged from her course “Theory of shape and space with visual research” (1976) which was rooted in fluxus practice of intermedia (performance, video, mail art, visual poetry, etc). The collective work of students was based on the processuality of interpersonal communication, while the individual exercises fostered interdisciplinarity and multimedia set as an integration of subject, object and environment by new technological means, i.e., old media technologically extended with new media in line with Bogdanka Poznanović’s catchphrase “painting at the speed of lite.”

Since the 1970s, the main European place for the promotion of emerging artists, interdisciplinary practice, video and performance art had been “Paris Biennale: International Manifestation of Young Artists.” It was of special interest for socialist Eastern European countries, and Yugoslavia officially participated from 1959. The Visual Studio for Intermedia Research participated at XII Paris Biennale in 1982. “What we do is not a medium of representation but a medium of communication”—on that occasion four students had made international video-communication with the Biennial participants —“That’s it. Communication without intermediaries” Bogdanka Poznanović stated (*Dnevnik*, 16. 5. 1982). The students’ works from Visual Studio were also shown at ŠKUC (Ljubljana, 1981), *Video C.D. 83* at Cankarijev dom (Ljubljana, 1983), *La Video Novi Sad—New York* at Gallerie civiche d’arte moderna (Ferara, 1984), XIII Youth Biennial (Rijeka, 1985), and *Index* at

Faculty of Philosophy (Novi Sad, 1987/88). [9] The last show of Bogdanka Poznanović with her students was “LIBER” at the Gallery of Zuzka Medvedova (Bački Petrovac, 1992) in the course of the Yugoslav wars. She insisted on an ambiguous title, due to the Latin word double meaning LIBER - BOOK / LIBERO - FREE. She exhibited LIBER IN LABYRINTHUS, the segments of an installation she made back in 1986 at the Contemporary Gallery Subotica (“Likovni susret – Palić,” SFRJ).

The formation of the Visual Studio overlaps the cybernetic phase tagged as *Virtuality*. In an interview “In The Visual Studio of the Academy of Arts Novi Sad: The Electrons From The Fortress Went to Paris” (*Glas omladine* No. 295, 1982) she described her pedagogical approach: “In this kind of work, students have an opportunity to expand their sensibilities and media awareness, to bring ideas to fruition and to realise projects in a wide range of ways: from manual work to creation of images at the speed of light [...] a student has to do more introspective research of the phenomenal self and the surrounding world [...] There is no predetermined aesthetic orientation, because that would be wrong. We are not going to create an aesthetic school. In our work, we mean the currents of art of the 20th century, and precisely those tendencies that remained on the margins, outside the official currents. However, above all, we nurture the unique expression of each individual, striving to go as far as possible in the process. From the grammar of audio-visual language to very complex design of environments, intervention in an urban space, performance, multi-vision, etc.”



Bogdanka Poznanović: “I don’t know what art is, that’s why I do it”, *Glas omladine* No. 295, 1982. Archive of the Academy of Arts in Novi Sad

The optical culture and media art epistemological tools which Bogdanka Poznanović provided for the digital migration of generation X, included: Fluxus Intermedia, “Multi-vision” and Postmedia. Her students were protagonists of the Novi Sad New Media Scene after 1995, as the members of association APSOLUTNO, team Petrić—Dautović—Maruna, and Urtica art and media research group. [10] By learning through the symbolic game, Bogdanka Poznanović provided students with the framework for understanding of an electronic environment, a

camera lance as a common boundary between two states of the matter observed (real space and electronic image), a notion of *observed observer*, a transmission of space via signals and a position of an artist within the worldwide network.

In conclusion

Bogdanka Poznanović was an artist deeply embedded in the Yugoslav social system. She acted as the representative of Council for Culture of Vojvodina for the fine art, the protagonist at the Tribune of the Youth, the influencer at the Novi Sad neo-avant-garde scene, the professor at the Academy of Arts, the international networker and the disseminator of information on contemporary art. The pioneering work path of Bogdanka Poznanović follows the long conjuncture of Yugoslav art—from informal to video art and communication experiments—relevant to the site-specific media art history study. Considering the perspective of generation X, her major contribution was the introduction to optical culture based on an intuitive fluxus-based pedagogical practice, and the formation of the Visual Studio for Intermedia Research at the Academy of Arts Novi Sad, the first of this type in Yugoslavia. Research on Bogdanka Poznanović work—*Artists-Archiving-Artists* methodology—will be continued by Violeta Vojvodić Balaž and Memoduct Group during 2024/26; it will involve digitalisation of manuscripts collection in cooperation with kuda.org archive (Novi Sad) and a research project in co-production with Academy of Arts Novi Sad.

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- [7] Savić, 302.
- [8] Savić, 308.
- [9] Lidija Srebotnjak Prišić, 2008. “Visual Studio,” *Academy of Arts Novi Sad 1974-2004*. Academy of Arts Novi Sad, Novi Sad, 1973-77.
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Beyond the Dominant Narrative:

Ellen Pau and Media Art in Hong Kong from the 1980s to the 2000s

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Abstract

Ellen Pau (1961–) has been instrumental in the development of media art in Hong Kong. As a self-taught, openly queer female artist, Pau embraces the latest technology – from Super 8 to high-resolution digital video – in her artistic practice. With a small group of like-minded creatives, she co-founded Videotage in 1986, the first and now longest running artist-run non-profit organisation in Greater China dedicated to film, video, and new media. In doing so, Pau inspired Hong Kong artists exploring experimental film, video art, and video installations – mediums that were initially overlooked in the prestigious fine art degree programme at The Chinese University of Hong Kong, where ink painting and other classical Chinese art forms prevailed. Through Videotage, Pau invited artists and curators active in the international media art world, including the American video artist Gary Hill, Museum of Modern Art's video curator Barbara London, and Taiwanese Internet artist Shu Lea Chaeng, to participate in artist residencies, workshops, and exhibition programmes, while at the same time providing an alternative learning and exhibition platform for young Hong Kong artists in the 1990s and early 2000s. In 1996, Pau established the Microwave International New Media Arts Festival – one of the only events in Asia dedicated to the mix of art and technology. Furthermore, Pau has been a role model for women and LGBTQ artists in socially conservative Hong Kong. In the 1980s and 1990s, while her contemporaries experimented with narrative and technique or reflected on the handover of Hong Kong to China, Pau was boldly exploring gender identity and queer love in works such as *Video Vogue* (1992) and *Song of the Goddess* (1992). This paper studies Ellen Pau's oeuvre from the 1980s to the present day, highlighting the impact of her art and her advocacy for the development of alternative video, experimental art forms, and new media art in postcolonial, transitional Hong Kong.

Keywords

video art, contemporary art, Hong Kong contemporary art, alternative video, postcolonial art, LGBTQ art, feminist art

In Asia, when one thinks of the history of video art, the name that immediately comes to mind is Nam June Paik. Without seeking to discredit Paik's work, the aim here is to point out that post-war Asia contains multiple artistic histories occurring alongside the dominant Western narrative promoted in art

history books and museum collections. My effort is to spotlight a lesser-known figure, Ellen Pau, who is arguably one of the most important artists to emerge from Hong Kong's young contemporary art scene. I explore her efforts as both a practitioner and an advocate for video and media art. I argue that Pau's artistic practice, not only in creating her distinct body of video works but also by forging connections, networks, and opportunities for like-minded artists, including women and LGBTQ practitioners, has been instrumental in the development of media art in Hong Kong as a serious genre.

The socio-political environment of Hong Kong in the 1980s and 1990s – the time during which Pau developed as an artist and when international contemporary art practices, such as video, emerged on the scene – impacted the overall development of artistic practice as well as many artists' works made during that time. Hong Kong was one of the main beneficiaries of Deng Xiaoping's Opening-up and Reform policy of 1978. These economic innovations increased trade between the mainland and Hong Kong, with Hong Kong acting as a gateway to China for the world, and vice versa. Trade between the mainland and Hong Kong grew at an average rate of 28 percent per annum between 1978 and 1997.¹ This contributed to the growth of a strong middle class in the British colony: one that could, for instance, afford to send their children to art schools in Hong Kong and overseas. This golden age saw a boom in cross-border business along with a vibrant commercial film industry, making movies that helped form the now iconic images of Hong Kong's bustling cityscapes lit by glowing neon signage for restaurants, hotels, and luxury brands.

That same era was punctuated by the historic – but ominous, to some – signing of the Sino-British Joint Declaration in 1984 between the British Prime Minister Margaret Thatcher and Chinese Premier Zhao Ziyang, which set out the terms by which the British would transfer control of the colony back to China. Five years later, the devastating Tiananmen incident left many in Hong Kong feeling uncertain about the impending handover of the territory to China, which resulted in a huge exodus of Hong Kong residents just before the handover on 30 June 1997, although many later returned following years of stability and economic growth.²

Born in 1961 to a middle-class family, Pau became a self-taught artist during Hong Kong's golden age. Like most early practitioners of video art in the British colonial city, she had no previous training in film or cinematography; but unlike the few other artists that experimented with media, Pau also had no

¹ Jean-Francois Minardi, *Hong Kong: The Ongoing Economic Miracle*, Montreal: Montreal Economic Institute, 2013, accessed 8 Sep 2023: https://www.iedm.org/sites/default/files/pub_files/notes/113_en.pdf

² Many who returned also obtained foreign passports and green cards. For more see: Christopher K. Tong, "'Hong Kong Is Our Home': Hong Kongers Twenty-Five Years After the Handover", *Education About Asia* 27, 3 (Winter 2022), 6.

visual or liberal arts background. Instead, she studied medical radiography (she could operate the equipment and read the results but was not a medical doctor) in the early 1980s at Hong Kong Polytechnic, and even as a young girl she loved to tinker with radios and cameras.³

Pau did not study film or video in 1980s Hong Kong, but this was not out of choice: it was impossible to do so. The development of contemporary art in Hong Kong is a relatively recent and gradual phenomenon compared with neighbouring Japan, Korea, and the Philippines. Hong Kong's art scene both pre- and post-Second World War was dominated by practitioners of Chinese ink painting. Among the handful of significant artists during this period were Luis Chan, often cited as the pioneer of modern art in Hong Kong and noted for his colourful, surrealistic Chinese landscape paintings;⁴ Lui Shou-kwan, one of the founders of Hong Kong's New Ink Movement; and Irene Chou, one of the very few female artists active at that time and a protégé of Lui. That group was mostly concerned with modernising an art form long associated with Chinese art and culture.⁵

Furthermore, the first undergraduate degree programme for fine art, established at New Asia College in 1957 and incorporated into the Chinese University of Hong Kong (CUHK) in 1963, continued to emphasise ink art. To quote the CUHK Department of Fine Art's website, 'Since its inception, the Department has promoted the study of Chinese art and culture and the exchange of Chinese and Western art'.⁶ The first chair of CUHK's Department of Fine Art was the artist Liu Kuo-Song, another pioneer of new ink art. Liu was the co-founder of the Fifth Moon Society in Taiwan in the mid-1950s, which embraced incorporating Western modern aesthetics in traditional Chinese artforms. While at CUHK, Liu established the 'Modern Chinese Ink Painting' curriculum.⁷ Although many more art schools emerged in the territory around the turn of the millennium, CUHK's Department of Fine Art still ranks as the most prestigious in Hong Kong, and painting – ink painting in particular – continues to be the dominant practice at the school.

What were the options for Pau and anyone else who was interested not in ink and brush but rather in alternative forms of art making, and more specifically moving images? There was the Phoenix Cine Club, which was an informal, private film club that emerged in 1973.⁸ Founded by the CUHK film lecturer Kam Ping Hing, Phoenix had no official venue to operate from; instead, it rented spaces around the city, often with the support of the Urban Council (a government department that oversees everything from sanitation to cultural events), to screen avant-

garde films. Its members savoured the avant-garde films of the 1960s and 1970s (the French New Wave, Italian Neorealism, and the New German Cinema), while it also provided a platform for young filmmakers in Hong Kong, who explored Super-8 and other equipment, including video, available to the local mass market.⁹ After one of Phoenix's last events, 'Videotage – the Montage of Four Video Filmmakers at City Contemporary Dance Company', in July 1986, the informal film collective ceased operating.¹⁰ Shortly thereafter, those members who had organised the 'Videotage' event, including Ellen Pau, banded together to fill the void by forming another artist-run collective under the same name: Videotage.

Artist groups that did not follow in lockstep with the established art forms being promoted in the few art schools and cultural institutions active in Hong Kong at that time, namely those engaging in experimental practices including performance, multimedia installation, and lens-based practices, created their own opportunities in the same spirit as Phoenix. The artist-run organisations Zuni Icosahedron, Videotage, and Para/Site Art Space were among the most important platforms for these alternative art practices at the time.¹¹ Zuni, co-founded by Danny Yung in 1982, focused primarily on performance but included video and installation in its productions and exhibitions. Videotage, as previously mentioned, was established in 1986 after Phoenix folded. Initially housed in the premises of Zuni, Videotage was founded by the former Phoenix Cine Club members Ellen Pau, May Fung, Wong Chi-fai, and Comyn Mo. It supported film, video, and eventually new media, with Pau playing the most active role. Finally, Para/Site, established by artists Patrick Lee, Leung Chi-wo, Phoebe Man Ching-ying, Sara Wong Chi-hang, Leung Mee-ping, and Kith Tsang Tak-ping in 1996, exhibited contemporary visual art forms including installation, performance art, and other conceptual practices. Many of the local artists interested in non-traditional art forms were active in all three groups, particularly Pau.

To round things out, in 1996 the Hong Kong chapter of the International Association of Art Critics (AICA) was founded. Its inaugural conference included art critics and curators as well as artists such as Zuni's Danny Yung and Para/Site's co-founder Kith Tsang. Advocating for video art was Pau, as she stated in her conference presentation:

As an artist that came from the eighties, a period of transition – politically from the Joint Declaration to the post 97, technologically moving over from super-

³ Freya Chou, 'Ellen Pau: What about Home Affairs? – A Retrospective', *Ellen Pau: What About Home Affairs – A Retrospective*, Hong Kong: Para Site, 2018.

⁴ Anthony Yung, 'Luis Chan: A Strange Little Island', *LEAP* vol. 11, 2011, accessed 10 Sep 2023: <http://www.leapleapleap.com/2011/11/luis-chan-a-strange-little-island/>

⁵ Eliza Lai, 'Lui Shou Kwan and the New Ink Painting Movement in Hong Kong', *Ideas Journal, Asia Art Archive*, 3 Nov 2020, <https://aaa.org.hk/en/ideas-journal/ideas-journal/shortlist-lui-shou-kwan-and-the-new-ink-painting-movement-in-hong-kong>

⁶ Chinese University of Hong Kong, Department of Fine Art (website), About Us – History, accessed on 8 Sep. 2023: <https://www.arts.cuhk.edu.hk/~fadept/about-us/history/>

⁷ Ibid.

⁸ Emilie Sin-yi Choi, 'A Critical Study of *The 70s Biweekly* and Its Political

Cinematic Practices," *The 70s Biweekly: Social Activism and Alternative Cultural Production in 1970s Hong Kong*, Hong Kong: Hong Kong University Press, 2023, 185–186.

⁹ Esther M.K. Cheung, "Authenticity and Independence: Fruit Chan and Independent Filmmaking," *Fruit Chan's Made in Hong Kong*, Hong Kong: Hong Kong University Press, 2009, 22–23.

¹⁰ For more details, see Gina Marchetti, 'Interview with Yau Ching: Filming Women in Hong Kong's Queerscape', *Hong Kong Screenscape: From the New Wave to the Digital Frontier*, eds Esther M.K. Cheung, Gina Marchetti, and Tan See-Kam, Hong Kong: Hong Kong University Press, 2011, 214; 'Phoenix Cine Club presents "Videotage – The Montage of Four Video Filmmakers"', (flyer), July 1986, Ellen Pau Archive, Asia Art Archive, Hong Kong, accessed 10 Sep 2023: <https://aaa.org.hk/en/collections/search/archive/ellen-pau-archive--organisational-files/object/phoenix-cine-club-presents-videotage-the-montage-of-four-video-filmmakers>

¹¹ Elaine W. Ng, 'An Introduction', *dye-a-di-a-logue with Ellen Pau*, New York: Monographs in Contemporary Art, 2004, 6.

8 to video 8, I have seen the development of video art [sic]. Video art is reflected not only popular culture, but also in the ever changing political and alternative culture [sic].

Both super 8 and video 8 were launched as home movie consumer product [sic]. They did not, and still is not, infiltrate [sic] into the education system. The potential users of these time-based media come mostly from the middle to upper class people. On the side line [sic], the Chinese University's Fine Arts Department just opened its photography course one year ago [sic]. And it is doubtful when there would be a course on video [sic].

Between 1960s – 1970s [sic], only 10% of the students could go to university. Subsequently, a lot [of] independent film makers, who were university students then, were part of the elite. They engaged in film criticism and academic studies. Most of their references in these fields were based on borrowed social or cultural theories from the West.¹²

In many ways, the development of video art and its ability to reflect 'not only popular culture, but also ... the ever changing political and alternative culture', which Pau described at the AICA conference, went in tandem with her own creative output. At that time, contemporary practices, such as installation, video, and conceptual art, were seen as 'Western', compared with traditional ink art, which was the dominant artform taught at art schools and exhibited in the few galleries active at the time in Hong Kong. Similarly, the University of Hong Kong, which was and continues to be the only university in the city offering art history as a specific discipline, at the time focused on traditional Asian art and the established canon of Western art.¹³ Hong Kong's aspiring filmmakers and film critics and those interested in Western media history enrolled in universities in North America and Europe for their studies. Hong Kong artists who experimented with video in the 1980s were autodidacts and only received exposure to the work of such artists as Nam June Paik, Bill Viola, and Steina and Woody Vasulka through art journals published in the West. It was only during her six-month Asian Cultural Council (ACC) residency in New York City in 1991 that Pau became aware of the early practitioners of video in Europe and North America.¹⁴ Despite this, her work shares similar approaches and themes to other contemporary video artists such as Paik and Viola, whose work dominated the pages of the prominent art magazines at the time alongside significant female practitioners, including Joan Jonas, Dara Birnbaum, and Pipilotti Rist.

In her earliest pieces, Pau explored the formal characteristics of video, including feedback of the video signal along with other visual and sonic possibilities. This is evident in one of her first videos, *Disenchantment of Statue* (1987), an experimental documentary on white noise around the location of an installation at the Fringe Festival, which was a popular arts event

at the time. Pau's works from this period were abstract and minimalist, with an emphasis on the formal qualities of the medium. These works incorporated alternative music and resembled music videos.

From 1988 to 1996, Pau produced a series called *Drained*. *Drained I* (1988) is a three-minute documentary of flames running from one end of a small corridor to the other. A year later, she created *Drained II* (1989) in collaboration with a Zuni Icosahedron performance. Although unaware of the American video artist Joan Jonas' seminal work *Vertical Roll* (1972) and her experiments with video feedback, Pau's piece was similarly innovative in its DIY process, utilising her own basic equipment – a video camera, a Betamax machine, and a TV monitor – and creating an electronic wipe in parallel with the staging of the performance. The figure seems to appear and disappear behind the black curtain, multiplying endlessly into repeated frames, or what Pau described as 'a closed cycle of production and discourse', in which 'the electronic medium itself becomes the source of creation'.¹⁵ Pau combined her handmade visual effects for this performance with a menacing industrial soundtrack of electronic guitar and percussion.

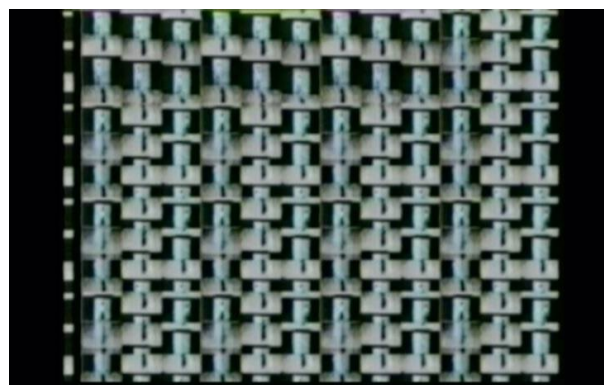


Figure 1: *Drained II* (1989), 5'49", video 8, single-channel, 4:3, colour and sound, courtesy of the artist

Pau's *Game of the Year*, created in 1990, captures the pessimism that pervaded the city in the aftermath of the Tiananmen incident and awaiting the impending handover. Parodying interview segments on national broadcast networks in Hong Kong and across the border in mainland China, Pau incorporated the game 'Simon Says', with her friends and colleagues – many of them fellow artists and members of Videotage – playfully impersonating important political personalities at the time. Again, unaware of video artists such as Dara Birnbaum who used video to critique American mass media and power, Pau's aims were nonetheless similar: to poke fun at the Chinese premier Li Peng and his speech justifying his decision to use martial law to clamp down on the pro-democracy student demonstrations. Pau's piece was one of the most explicit examples of political art in Hong Kong at that time, and the video continues to have an underground following among Hong

¹² Ellen Pau, 'Development of Hong Kong Video Art' (presentation, inaugural opening conference of International Art Critics Association, Hong Kong, 14 December 1996).

¹³ University of Hong Kong, Art History Department, About Us, accessed on 14 Jan 2024: <https://arthistory.hku.hk/index.php/about/departement-history/>

¹⁴ Pau's Asian Cultural Council residency in New York City was an important

opportunity for the artist. Not only did she make *Song of the Goddess* (1992) during the residency, but this was also a time where she saw many examples of video art by artists working outside of Hong Kong, particularly single channel works available for private viewing at the New York Public Library. Previously, Pau had only read about the works through art magazines like *Art in America* and *Artforum*. Interview with the artist, 5 January 2024.

¹⁵ Ellen Pau, *Drained II* (1989), *dye-a-di-a-logue with Ellen Pau*, op. cit. 232.

Kong residents, who self-organise small roving events to commemorate the fourth of June.

Diversion (1990) explores Hong Kong as a city in transition from a British colony to just another city in China, searching for its own distinct identity. The video starts with a panoramic view of Hong Kong taken from a popular documentary television programme of the 1960s called *Hong Kong Today*. The British voice over states, ‘This is no ordinary ferry crossing: on one side is Hong Kong Island and the City of Victoria, on the other, Mainland China and the City of Kowloon, all part of Hong Kong’. Incorporated into this eight-minute video is archival footage of the city from the Public Record Office. This includes the popular Victoria Harbour swimming contests, happy beachgoers, and other government-sponsored leisure activities and TV programmes to promote a sense of community and well-being among its colonial subjects during the 1967 riots against colonial rule, which also coincided with the Cultural Revolution (1966–1976) in China. This archival footage is interspersed with Pau’s own images of an endless stairwell, a female swimmer in a pool, and a dancer who struggles to remain upright on a cobblestone pavement. The work captures the persistent collective tension in Hong Kong, a city built by migrants – whether Chinese migrants who made Hong Kong their home in the first half of the twentieth century or the Hong Kong residents who relocated to Canada, Australia, and the US in the leadup to the 1997 handover – with an unknown future.



Figure 2: *Diversion* (1990), 5'40", VHS, single-channel, 4:3, colour and sound, courtesy of the artist

Also exploring the socio-political specificity of Hong Kong is *Expiration* (1997–2000), a six-minute video of Pau going out on the streets of Camden in North London and asking random passers-by, ‘What is your best-before date?’ The responses include moments that represent life, death, victory, hope, or disillusionment. She created this work not only to mark the 1997 handover but also as a farewell tribute to the Oil Street Artist Village, an abandoned government supplies department building

in which Videotage and other arts groups squatted for two years (1998–2000).¹⁶

In addition to experimental and socially critical works, the woman’s body is another recurring theme of Pau’s, through which she explores issues related to gender and sexuality. Although marginally aware of Swiss artist Pipilotti Rist, who also began her career in the mid-1980s and could be considered her peer within the framework of ‘global art history’, Pau also uses humour, irony, and surrealism with a feminist touch. Consider one of her earliest video installations, *Video Vogue* (1992), which debuted in 1992 at the Hong Kong Museum of Art’s first exhibition dedicated to contemporary local artists, whose title, ‘City Vibrance: Recent Works in Western Media by Hong Kong Artists’, clearly reflected the dichotomy between traditional Chinese culture and non-traditional artforms from the West.¹⁷ The work consists of a small video monitor covered in a faux fur wrap – popular in Hong Kong in winter despite the sub-tropical climate. Upon closer examination, the video reveals a close-up of a woman’s lips covered in lipstick and puckering up for the camera. As Pau mentioned in her address at the AICA conference, video can reference popular culture – and in *Video Vogue*, Pau refers to Madonna’s 1990 chart hit *Vogue* – but also the ‘ever changing political and alternative culture’.¹⁸ Pau’s installation also addressed women’s pressure to conform to societal expectations of beauty and fashion. In an interview, Pau remarked that it was also a response to video as an artistic medium, ‘a vogue to be aestheticized by the image world in today’s museum’.¹⁹

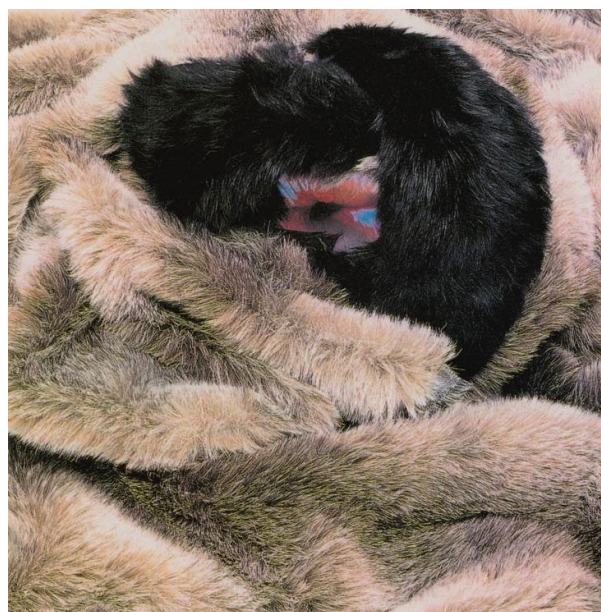


Figure 3: *Video Vogue*, 1992, video installation

Song of the Goddess (1992) is considered one of Pau’s most significant works. The single channel video explores two famous Cantonese female cinematic opera performers, Yam

¹⁶ Sun-man Tsang, Alisa Shum Kam Sin, and Yun Ming Wai, ‘Mixed Mode Artist Village: The First of its Kind (Oil Street)’, *Future Research of Artist Village in Cattle Depot*. Hong Kong: Hong Kong Arts Development Council, 2010. 41–44. Accessed 10 Sep 2023: https://www.heritage.gov.hk/filemanager/heritage/en/content_246/CDAV_finalversionjun10.pdf

¹⁷ This dichotomy did not go unnoticed within the tight-knit art community. Nigel Cameron, the Hong Kong-based art critic of *South China Morning Post*, responded

to the title in his review with ‘Just what is Western about works in terra cotta that admits them to an exhibition of artists working in “Western media” I fail to comprehend—but perhaps it doesn’t matter’, *South China Morning Post*, 18 April 1992, p. 23.

¹⁸

Pau, ‘Development of Hong Kong Video Art’ (Ibid.)

¹⁹

Pau quoted in *City Vibrance: Recent Works in Western Media by Hong Kong Artists*, Hong Kong: Hong Museum of Art, 1992, 72.

Kim Fai and Pak Suet Sin. In Cantonese opera, the main characters – male and female – were played primarily by women. In the many popular romantic opera films in which Pak and Yam performed together, Pak would always play the female role, while Yam would play the male lead in drag. They were in fact lovers both onscreen and off, and legend has it that over their 40-year relationship they were never apart for more than four days. When Yam died in 1989, Pak openly declared her love for Yam in a written banner at her funeral, stating, ‘I would die a hundred times to bring you back to me’.



Figure 4: *Song of the Goddess*, 1992, 6'39", Hi-8, single-channel, 4:3, colour and sound, courtesy of the artist

Song of the Goddess stitches together dreamlike scenes from Yam and Pak's 1968 film *The Emperor Lee* with Pau's own footage shot in New York City during her residency with the ACC in 1991, including a tender scene of two Asian women (in fact Pau's lover at the time and Pau herself) with one washing the other's back. The work was deeply personal to Pau, as an openly lesbian artist who boldly advocated for gay rights; made one year after homosexuality was decriminalised in Hong Kong, *Song of the Goddess* explored the city's deep rooted societal taboos and is now considered one of the earliest works addressing LGBTQ issues in Hong Kong and Asia.²⁰

Other explorations by Pau related to gender include her 1993 work *Bik Lai Chu*. In this video installation, one encounters the back and frontal view of Pau, seated. Her video is projected underneath a woman's low dressing table, where it appears as if Pau is repeatedly trying to sit up, but instead she is repeatedly banging her head against the bottom of the table. Every time her head hits the table, there is a sound as if it is slamming against

metal. The title *Bik Lai Chu* has two cultural references: *Chu* ('jade' or 'pearl') is a popular girl's name, while the three characters together are the Chinese name for the brand-name furniture polish Pledge. The work visualises suppressed female frustrations regarding societal norms and expectations imposed on women in conservative Hong Kong society.

Within five years of creating these significant works, Pau's dream of an art degree programme that would incorporate art, media, and technology was realised in 1998 with the establishment of City University of Hong Kong's School of Creative Media. Pau's creative output and ongoing community efforts helped pave the way for other artists who were committed to using media as an artistic tool. Her growing recognition as a veteran promoter of video art in Hong Kong was signalled by an invitation to present her video installation *Recycling Cinema* at Hong Kong's inaugural pavilion at the 2001 Venice Biennale. This mesmerisingly quiet work utilises footage from a fixed surveillance camera that mechanically pans an anonymous Hong Kong highway for moving cars along with her own handheld video footage while driving alone at night. Together, these images poetically capture the solitude and sadness of life in the city. Created shortly before Videotage relocated from the Oil Street Artist Village, and during the waning of a significant romantic relationship, Pau described *Recycling Cinema* as a love letter to both Oil Street and to her lover in the form of a video.²¹ In many ways *Recycling Cinema* is a summation of the three recurring themes found throughout her work: the constant exploration of video as a medium, a reflection on the socio-political situation of Hong Kong, and an intensely personal meditation on love and intimacy.

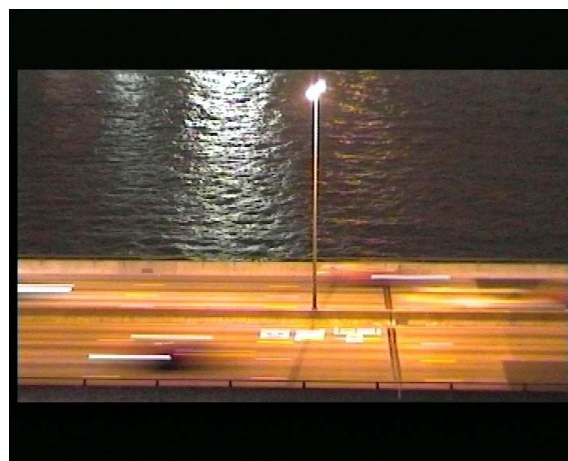


Figure 5: *Recycling Cinema*, (2000), 14'16", DV, video installation, 4:3, colour and sound, courtesy of the artist

As mentioned earlier, Pau's contributions to the development of video art extend beyond her own individual creative practice. Of the four original co-founders of Videotage (May Fung, Wong Chi-fai, Comyn Mo, and Pau), she is the only artist that has continued to be involved in the art world. She is widely acknowledged by the larger art community as single-handedly positioning Videotage as a home for like-minded artists, a platform for curators who want to organise screenings

²⁰ For more on this topic, see Sai-Lok Chan, 'Queer Art in Hong Kong', *Ideas Journal, Asia Art Archive*, 20 May 2020, <https://aaa.org.hk/en/ideas-journal/ideas-journal/shortlist-queer-art-in-hong-kong>

²¹ Alice Ming-wai Jim, 'Urban Rhythms and Moving Images: The Media Art of Ellen Pau', *dye-a-di-a-logue with Ellen Pau*, op. cit. 87.

and exhibitions of media art, and a de facto school and library for those who want to learn more about media-based art forms.

In the push to keep media art relevant, Pau established the Microwave Media Festival in 1996. Initially dedicated to video, it subsequently grew to include new media art. During the month-long events, overseas artists Shu Lea Chang, Eder Santos, Camille Utterbeck, Christa Sommerer, Laurent Mignonneau, and many more have been invited to exhibit, hold talks, and lead workshops. The festival continues to operate without any regular funding, leaving it as an uncertain and precarious cultural event in the city. In a recent interview reflecting on the role that Videotage and Microwave have played in the community, Pau remarked, ‘I treasure the experience working with the art communities in Hong Kong and internationally. I learned a lot through them—they are my teachers’.²² Prior to the acceptance of video or media art in art schools in Hong Kong, both Videotage and Microwave were seen as the main incubators for the understanding, appreciation, and production of media art in the city. After her participation in Venice, and with the curatorial demands of Videotage and Microwave drawing her attention away from her personal practice, she resigned from Videotage’s board of directors in 2013 to pursue her own artistic projects again. This move was marked by a small retrospective exhibition, *Ellen Pau: What About Home Affairs?*, at Para Site in 2018, where a younger generation of Hong Kong artists, cultural workers, and collectors discovered her work for the first time.

Pau’s most ambitious work to date, *The Shape of Light*, was commissioned in 2021 for the façade of the M+ museum to coincide with Art Basel Hong Kong. As the city’s first public institution dedicated to contemporary visual culture, which opened in late 2021 to international acclaim, M+ in many ways ‘put Hong Kong on the international cultural map’.²³ Projected on the museum’s façade, which overlooks Victoria Harbour, her work can be seen from multiple vantage points on Hong Kong Island.²⁴ Pau’s work, completed in 2022, was inspired by lighthouses as a beacon for direction, resilience, and overcoming obstacles, particularly as Hong Kong emerged from some of its longest and most oppressive restrictions during the COVID-19 pandemic. For the projection, she asked a female performer to translate the *Heart Sutra* into sign language. This essential Buddhist scripture reveals the path of interconnectedness and the nature of emptiness. It encourages practitioners to let go of attachment and notions of self to transcend suffering. Its Sanskrit mantra, *gate gate paragate parasamgate bodhi svaha*, translated as ‘gone, gone, everyone gone to the other shore, awakening’, encapsulates waking up, through love and compassion, to reach enlightenment. As Pau explained, ‘Hardships suffered by everyone during the pandemic drove me to create something that I hope could bring comfort, in the form of light’.²⁵ Although her

massive video projection is silent and performed only in sign language, the work incorporates a live-durational performance. She experimented with the visualisation of electromagnetic waves from both nature and from machines, along with a sound bath using Tibetan singing bowls and gongs performed at sunset from 5 pm to 6 pm at the museum. Together, these elements incorporate her longstanding interest in combining video with performance, sound, and the community, like much of her early work and her collaborations with Zuni Icosahedron, Videotage, and Microwave. Receiving the first major collaborative commission from M+ and Art Basel has only confirmed the public and private recognition of Ellen Pau’s concern and efforts for the acceptance of media art in Hong Kong, considering that in 1996 at the first AICA conference she had doubted that video would ever gain academic recognition in the territory.

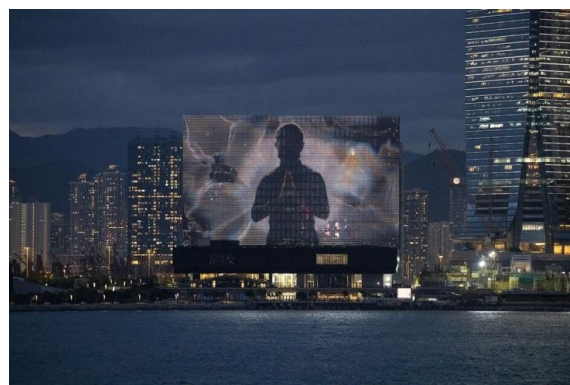


Figure 6: *Shape of Light*, 2022, screening of *Shape of Light* on the M+ façade, M+, West Kowloon Cultural District, Hong Kong, 2022, courtesy of the artist and M+. Photo: Lok Cheng M+, Hong Kong

Much like her earlier video works, *Heart Sutra* summarises Pau’s three-decade interest in experimentation with the medium, the female body, and the socio-political changes impacting Hong Kong. In her most recent exhibition at Kiang Malingue in Shanghai in October 2024, she exhibited important works from the 1990s, including *Diversion* and *Video Vogue*, as well as a new work *Speculative Generations of Flora (0)* (2023), part of an ongoing series she began in 2015. The video installation charts the history of Bauhinia, the floral emblem of Hong Kong, a hybrid flower that was discovered in Hong Kong only in the late nineteenth century. Over the years it has been noted in both the popular press and academic journals how the Bauhinia serves as a strange, even inauspicious, symbol for Hong Kong, as it not indigenous to the island-city and does not bear fruit or seeds to reproduce or grow.²⁶ Pau’s *Speculative Generations of Flora* investigates not only this sterile hybrid East-meets-West flower but also Hong Kong itself. In short, to understand the

²² Ellen Pau and Ulanda Blair, ‘Healing through the Heart Sutra: Ellen Pau on the “The Shape of Light”’, *M+ Magazine*, 23 May 2022, <https://www.mplus.org.hk/en/magazine/an-interview-with-hong-kong-artist-ellen-pau/>

²³ In the making since 1999, M+ opened in 2022 with a dedicated building designed by Swiss architects Herzog & de Meuron. Its initial budget was USD 770 million that went towards the construction of the 65,000-square metre space and assembling its core collection of 8,000 works, including the world’s most extensive collection of Chinese contemporary art, most of which was donated by Swiss collector Uli Sigg. Sigg assembled his collection starting in the 1970s while he was a businessman working in China, and later as Swiss Ambassador to China, North Korea, and Mongolia. M+ also collects the work of Ellen Pau, and Phoenix Cine Club members donated their archive to the museum in 2019.

²⁴ The building was designed by Swiss architecture studio Herzog & de Meuron to include state-of-the-art exterior cladding that provides louvre shading for the interior spaces as well as grooves for LED lights. For more information, see Alison Fung, ‘Behind the Screen: The M+ Façade’, *M+ Magazine*, June 2023.

²⁵ Ibid.

²⁶ For more details, see Robert Peckham, ‘Hygienic Nature: Afforestation and the greening of colonial Hong Kong’, *Modern Asian Studies* 49, 4 (2015), 1179; and Zabrina Lo, ‘How Did the Bauhinia, a Sterile Flower, Become the Symbol of Hong Kong’, *Zolima City Mag*, 27 June 2019, accessed 14 Jan 2024: <https://zolimacitymag.com/how-did-the-bauhinia-a-sterile-flower-become-the-symbol-of>

history of video and media art in Hong Kong, one can track Pau's sustained commitment to the experimentation and craft of video, especially during the twilight years of Hong Kong's radically changing status.

Acknowledgements

I would like to thank Ellen Pau for offering her time as a primary resource in the research of this paper. I would also like to offer my gratitude to Anthony Yung of Asia Art Archive and Lorraine Kiang for insights into Pau's practice and to Dr Isabelle Frank, Dr Noit Banai, and Don Cohn for their encouragement and feedback on the paper.

Beyond Narcissus - Seeing the Self in the Other

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Abstract

Through the lens of *Liquid Views* (1992) by Monika Fleischmann and Wolfgang Strauss, this essay explores the transformative encounter between the self and the other, realised through media art's first high-resolution multi-touch installation, realised as an interactive, algorithmic, generative, water-screen, performative, audio-visual interface, and proposes a reframing of the Narcissus mirror in the media age. Conventional notions of the self are challenged to reflect on identity, connectivity and the interplay between the tangible and the virtual. In the early 1990s, *Liquid Views* demonstrated a new way of seeing as observer and observed by looking at ourselves while simultaneously becoming publicly visible to others. A more recent example of seeing the self in the other is *Mirror* (2022), a street art commentary on the Israeli-Palestinian conflict by Norwegian artist AKF. Like *Liquid Views*, it captures the essence of self-discovery in the other, recalling Carl Gustav Jung's observation in *Modern Man in Search of a Soul* (1933). It raises the question of whether the narcissistic self-image of the past can be transformed into an aesthetic of the empathetic gaze. This could be an extended act of mirroring, corresponding to a world that is tele-present.

Keywords

Narcissus, interactive, transformative, real-time, morphing, performative interface, virtual, mirror, perception, touch, virtual self, identity, tangible, virtual, image, generative art, art and science, mixed reality, audience, participation.

Accessing the Virtual World - The Interface

Interactive media art requires the active participation of the audience. It is an invitation to become part of the artwork. The possibility of access to such a work underlines the importance of the interface as the link between the real and the virtual world. Interactive works, whether visual, auditory or kinetic, require interfaces that respond to movement, touch or other forms of input. Since the mid-1980s, the authors have pursued the goal of creating sensual interfaces between human and machine for media art works, which they refer to as *performative*. This means that the interface is seen as a solution to one of the main problems of interactive art: direct and intuitive access to the work without complicated instructions. The term *performative interface* describes an interface that goes beyond traditional human-machine interaction and actively engages the audience in a *participatory experience*. This type of interface communicates the content and structure of an interactive digital work as a cognitive and sensory encounter.

If the *performative interface* is seen as something that leaves a trace of something yet unknown, the reading of traces becomes a prerequisite. The notion of *performative* includes not only external speech or action, but also internal speech. In this inner dialogue, meanings are performed as interpretations. Interactivity appears here as a kind of hermeneutics, where the term *game* does not refer to competition, but to role-playing.

Participants are encouraged to see, think, and interpret for themselves, using their senses and emotional intelligence to discover the hidden meaning of a work (Fleischmann and Strauss 2023:3). *Performativity* involves both the physical body and the data body represented by the interface in digital performances. 'What is seen is not just an impression, but an externally induced reaction of inner determination', as philosopher Olaf Breidbach puts it in his book on neural aesthetics - an inner dialogue of interpretive reflection. (Breidbach 2013:119). Interactivity is not about following instructions to operate a system. Rather, it is about exploring the interactive work and allowing it to emerge. The context of the interaction should be understood intuitively, without the need for written explanations.

< Insert Figure 1 >

Figure 1: Left side: Michelangelo Merisi da Caravaggio, *Narcissus*, 1597. Oil on canvas. 110 cm × 92 cm. Galeria Nazionale d'Arte Antica. Courtesy of Galeria Nazionale d'Arte Antica Rome.

Right side: Monika Fleischmann and Wolfgang Strauss, *Liquid Views*, 1992. The gaze observed. Interactive Installation. ZKM Karlsruhe. © Monika Fleischmann and Wolfgang Strauss

Filename: Figure_1

The digital mirror plays a central role in *Liquid Views*. Touching the screen causes one's own reflection to dissolve. This symbolism extends the traditional mirror metaphor by integrating digital interactivity and virtual reality to create new dimensions of self-perception and identity reflection. It is a tactile experience.

Liquid Views - Narcissus Virtual Mirror

Created in the early 1990s as a contemporary interpretation of the *Narcissus* myth in the media age, the work remains relevant today. The touch interface combines the real and the virtual with poetic elegance, telling the story of Greek mythology as an interactive experience. Originally the work was simply called *Liquid Views*. But at a time when interactive media art was unheard of and it was strictly forbidden to touch exhibits in museums, an allusion to *Caravaggio's Narcissus* gazing at himself in a watery mirror encouraged visitors to explore and touch.

The viewer's live image is overlaid with physically generated water on a high-resolution touchscreen. A miniature video camera integrated into the touchscreen records visitors as they look into the virtual water. The software superimposes the visitor's image onto the water simulation, creating a reflective mirror of the water. The implementation uses a horizontal touchscreen and a Silicon Graphics International (SGI) Reality Engine, which calculates the water using *generative algorithms*. (Fleischmann and Strauss 1992: n.pag.)

The imaging mechanism in *Liquid Views* works on three levels. First, it generates algorithmic waves that create a realistic appearance. Second, it integrates the video stream from the

camera containing the viewer's face into the wave texture. Third, it reads touch screen signals into the wave generator. The experience of immersing oneself in the screen and witnessing the real-time morphing of the reflected image provides a tangible sense of touching the real with the virtual. The captivating sound of the water, the virtual waves and the mirrored self, invite participation and intuitive touch. The touchscreen interface facilitates interaction between the virtual reflection, the real-time wave algorithm and the viewer's gaze. By touching their reflection in the artificial water, visitors create ripples that transform their image into a shadowy second self through a *real-time wave morphing algorithm*.

This exploration of touch as a form of tactile seeing and hearing subconsciously immerses the viewer in a situation where the physical and virtual worlds merge. Rather than inviting interaction with a 'Click Me!' button, the artists referenced the well-known story of *Narcissus*, with its psychological, visual and cinematic models, to provoke reflection on the real and virtual self through a performative interface. The viewer's active engagement becomes an integral part of the artwork, revealing the phenomena of mixed reality, where the moment captured in the melting image is perceived as now. In that moment, so many levels come together to create the aesthetic appeal of the work. It becomes a sensual experience. (Fleischmann and Strauss 2015b: 20)

As media scholar Mark B.N. Hansen has noted, in this case the mirror becomes an actor, turning the interface, not just the visitor, into something performative. Viewers become producers of performative events, with the digital mirror not only presenting their outward appearance, but also potentially revealing the state of their subconscious through distorted images. A young woman stares at her reflection in the artificial water. The young man pretends to swim and dance. This performative interface is not just a tool. It acts as a medium that enhances human sensory interaction, offering a digital narrative as a tactile encounter that intensifies feeling, hearing and seeing.

< Insert Figure 2 >

Monika Fleischmann and Wolfgang Strauss, *Liquid Views*, 1992.
Examples of performative Events. ZKM Karlsruhe. © Monika
Fleischmann and Wolfgang Strauss

Filename: Figure_2

Mark B.N. Hansen about *Liquid Views*: 'What is striking about the experience of *Liquid Views* is that the image's scattering, far from ending engagement (as we might expect), in fact catalyzes a transition to another realm – to the realm of the disintegrated image. (...) the "mirror becomes the actor ... It acts necessarily in conjunction with the embodied spectator, whose immersion in the situation is enabled by self- reflexivity characteristic of touch as the most primordial of the senses, as the root of premodal sensation. The spectator's touch – touch as trigger for the image's scattering – materializes the power of imaging qua dimension of organismic being'. (Hansen 2006:18)

However, another level exists, as the artists explain in an interview: 'At first glance, *Liquid Views* might be about experiencing oneself in a possible other being (...). Only in the second moment, the viewer realizes that his intimate act of reflection, is publicly visible to others. (...) The vivid image, that involves the viewer emotionally and intellectually, is actually a system of control. A public eye that betrays the viewer at the very moment when we are completely submerged in ourselves.

Then we become immersed in the interactive plot. This is the moment in which the fiction starts a creative process. (...) With the dialogues that emerge between the self and the other/s we construct a "new reality" following own aesthetic rules'. (Fleischmann and Strauss 2015c: n.pag.)

According to media theorist Ryszard Kluszczyński, 'the perception of Fleischmann's and Strauss' installations becomes transgressive; an activity in one environment with effects in another. The results feed back to the interactors, building a developing context of interactions, motivating their further behaviors', and co-creating the structure of an interactive work event in this way'. (Kluszczyński. 2011: 13) The viewer is invited to consider his or her intimate act of reflection while acknowledging its public visibility by examining the living image as a system of control. Immersion becomes the starting point for a creative process of commenting on the work. A new reality is constructed according to individual aesthetic rules.

Narcissus in the Age of Self and Surveillance

The contemporary iteration of the early 90s *Media Narcissus* transcends mere self-reflexive observation, inviting participants into a performative realm that involves visual, tactile and intellectual reflections on digital presence and consciousness. When participants raise their gaze, they encounter not only their reflection in the artificial water, but also a background projection that magnifies their image as if viewed through a magnifying glass. At the same time, their introspective gaze is transformed into a public observation for others - the observing audience. The once introverted gaze into the pool of water is now turned outwards, towards the surrounding spectators and observers, creating a reciprocal dynamic. In contrast to *Caravaggio's* view of *Narcissus*, *Liquid Views* presents a double view. This shift marks the initial recognition of the self in the face of the other. And this is in a double sense: the other within you, as you - the acting performer - now see yourself from the outside, and the other visitor watching you.

In her exploration of the *Narcissus Effect*, art historian Marta Smolińska emphasizes the gaze in *Liquid Views* and brings attention to the sense of touch—a sensory aspect often neglected in art in favor of sight.

'*Liquid Views: The Virtual Mirror of Narcissus*, places the viewer in two potential situations: either exactly in *Narcissus's* position or as a voyeur sneaking a peek at his intimate relation with his own reflection. Leaning over a horizontally mounted monitor, we perceive our own reflection. And then when we touch it, the picture sharpness is disturbed, and the image gets blurred. This is accompanied by a sound simulating the contact of a hand with water, i.e. the characteristic splashing sound." ... "At the same time, the image is projected onto a wall, magnifying the face of the person in *Narcissus's* position. This setup creates directional tension between the viewers in the role of *Narcissus* and their own reflection and between the gaze of all *Narcissuses* and the viewers watching the projection'. (Smolińska 2017:174)

Smolińska notes the entrapment of *Narcissus* in a closed system of gazes, observed by external viewers who insert themselves between the reflected person and their reflection. The setup gives viewers the choice of either becoming *Narcissus* or observing from a distance, disrupting the intimacy of the relationship and subjecting it to surveillance - a metaphor for our contemporary era of constant surveillance. 'Relying on the

findings of the iconology of the gaze, one could conclude that *Monika Fleischmann and Wolfgang Strauss* used artistic strategies which turn a gaze into an object, making it, such as it is, the centre of attention' (Smolińska 2017:175). According to *Smolińska*, the artists confront the viewer — 'Narcissi by choice, irrespective of gender — with the mythological phase in which the perception of one's own image as someone else arouses a haptic fever and a desire to contact the figure in the screen pool. Touching the screen disrupts the sharpness of the image, mirroring *Narcissus'* awareness of the presence of a medium. The interactive computer technique allows for a real-time experience, from clear reflection to disruption by touch, from a smooth surface to a rippled one. A seamless bridge between the known and the unknown, *Liquid Views* offers a performative experience that introduced the pioneering concept of a visual touchscreen simulating water back in 1992'.

Touching the screen became the gateway to the virtual world, allowing for physical and sensory engagement. This was a critical component in creating a true mixed reality experience. At the same time, *Liquid Views* introduces a virtual double, offering an intimate perspective to other viewers, with this double image being greatly magnified, effectively turning the viewer into the observed. Anticipating the future of digital and contemporary selfie culture, this dynamic creates a dual gaze, suggesting that one's intimate introspection becomes a public display. Yet *Liquid Views* emphasises the poetic and spiritual aspects of the self as an ever-changing stream of possibilities, while maintaining a sense of embodiment. Foreseeing the ambiguity of image and self that is prevalent in today's selfie age, the artists reinterpret the theme of *Narcissus* in this New Media Era of the early 1990s to point to the situation of an emerging selfie culture that lies somewhere between immersion and surveillance.

Narrative Expression and Human Perception: The Medium Matters

A book, a painting, a film, a VR piece, and even an interface like a touchscreen can tell the same story but in different ways, offering distinct modes of reception and sensory engagement. The story is shaped by the medium used, which affects how the work is received. *Caravaggio's* painting of *Narcissus* (1597-99), for example, uses light and shadow to capture the tragic story's moment of self-reflection. Against a black background, a young man appears bent over water, dressed as a 16th-century style page. In *Jean Cocteau's* 1949 film *Orphée*, *Jean Marais'* iconic reach through the mirror serves as a special moment of entry into the afterlife. In the movie, we see *Jean Marais* as *Orpheus* putting on a pair of surgical gloves left behind after *Eurydice's* death. A tank filled with mercury creates the illusion that *Orpheus'* hand is moving through the mirror. It is one of the most famous scenes in film history. (Insdorf 1984: 17)

Much like in *Liquid Views*, this scene encapsulates a suspended state of reality, dissolving the barrier between the tangible and the mystical. The act of reaching through the mirror becomes a metaphorical gesture. It transcends the physical limits of mortality. The mirrors in the film are portrayed as doors. Death enters and exits through them. *Cocteau* suggests that constant self-reflection, is a contemplation of mortality: 'Mirrors are the doors through which death comes and goes. Look at yourself in a mirror all your life and you'll see death do its work' underscores the idea that mirrors serve as symbolic thresholds between life and death. (Ebert 2000: n. pag.). The mirror in *Cocteau's* film turns into a symbolic and metaphysical

portal between living and dying. In *Caravaggio's* painting, the water mirror signifies beauty and desire. In *Liquid Views*, the mirror screen symbolises the unconscious soul and the discovery of the other within oneself - a process of immersion, looking and observing. *Liquid Views* seamlessly integrates the real world with a 3D virtual world, allowing anyone standing at the edge of the water to enter it in real time by touching the glass and seeing their reflection.

< Insert Figure 3 >

Figure 3: Left side: Orpheus (Jean Marais) enters the underworld through a mirror. Jean Cocteau (dir.), *Orpheus*, 1950. France. © Films du Palais Royal

Right side: Monika Fleischmann and Wolfgang Strauss, *Liquid Views*, 1992. Iconic Reach Through the mirror. ZKM Karlsruhe. © Monika Fleischmann and Wolfgang Strauss

Filename: Figure_3

People experience the world through the five primary senses: sight, hearing, touch, taste, and smell. Each sense has its own art: eyes have visual art, ears have music, even nose and tongue have perfume and gastronomy. But the art of touch is often overlooked. We don't train our hands to touch as we train our eyes to look or our ears to listen (Gopnik 2016: n. pag.)

Touch is defined as the stimulation of receptors in the skin that sense pressure, vibration, temperature, and pain. Think of touch as the skin that interacts with the rest of the world, our sensitivity to external stimulation, a primary sense for human interaction. In *Liquid Views*, digital life comes to life through touch. It is an intuitive experience at your fingertips. Touching the screen activates multiple human senses, including haptics and kinesthetics. Visual elements change as you swipe, activating the visual sense. The sound of water and a water sound on the fingertip provide haptic feedback by hearing a drop of water. Swiping creates a direct physical connection for an immersive experience that combines touch, movement, sight, and haptic feedback.

Liquid Views uses a specially designed capacitive touch screen. It is the result of the authors' research and development efforts at GMD in 1992. The touch screen tracks dynamic gestures in two dimensions, as well as hand or finger position and multiple taps or swipes. The device is constructed by placing a mesh of very thin copper wire transmitter and receiver electrodes between two sheets of glass on top of a flat panel display. Each surface pixel is linked to a pixel of algorithmically simulated water, so that the surface image changes with each tap or swipe of the hand over the output image with extreme brilliance. Unfortunately, it could not be patented at the time because people in Germany did not understand that it could also be 'useful'. *Sony's SmartSkin* (Rekimoto 2002: n. pag.) followed a decade later.

In addition to the pose of the interface, the work alludes to the mind within the machine. The artificially simulated water in *Liquid Views* appeared so real that visitors thought they could smell and hear water that was not there, highlighting the Culture of Simulation (*Sherry Turkle*). Only by touching the reflective screen did people question the reality of the water, demonstrating how our senses can be fooled. The malleability of the water waves and reflections can be manipulated in real time. By touching the digital image in the artificial water, *Liquid Views* changes the viewer's reflection. Previously, facial morphing had only been seen in films or computer animation in

the SIGGRAPH Electronic Theatre. For example, *Michael Jackson's* 1991 music video *Black or White*, directed by *John Landis*, featured morphed faces of people from different cultures.

Liquid Selves, a computer animation of human forms and faces, was created by *Karl Sims*, a renowned digital media artist and visual effects software developer, for *Art Futura* and the *Memory Palace* at *Expo 1992*. (Sims. 1992: n.pag.) Exploring "the coming battle between the virtual and physical sides of ourselves, where our bodies are left behind as technology enhances our ability to exist in purely virtual worlds," *Sim's* animation depicts faces like underwater death masks.

In the same year, *Fleischmann* and *Strauss* presented *Liquid Views* for the first time at the annual *GMD/Fraunhofer Castle Day* at *Birlinghoven Castle* (1992). The second time was at the iconic *Machine Culture Show* curated by *Simon Penny* at *ACM SIGGRAPH 1993*. (Penny 1993: n.pag.) *Fleischmann* and *Strauss* explore the self and the other in the emerging digital world, inspired by a critical look at *Narcissus* in the New Media Age.

Cultural Responses to Liquid Views

In over 100 exhibition venues around the world, the artists have observed fascinating variations in how visitors interact with their work. Before mobile phones, there were more cultural differences in how people interacted with the installation. In *Mexico*, people were respectful and simply admired the blue shimmering water. From *Madrid*, where visitors engaged in intimate acts such as kissing in front of the water, to *Los Angeles*, where people approached the installation with the enthusiasm of surfers, each cultural context added its own twist to the experience. One notable observation was in *France*, where some men expressed reluctance, feeling that they were not beautiful enough to look into the mirrored water. The images captured by the computer in moments of contemplation or self-forgetful playfulness were framed and displayed, becoming an unexpected focus of subsequent exhibitions. In fact, traditional curators considered these displayed images not only as an integral part of the artwork, but as the artwork itself.

< Insert Figure 4 >

Figure 4: Monika Fleischmann and Wolfgang Strauss, *Liquid Views*, 1992. *Liquid Views* Archive. © Monika Fleischmann and Wolfgang Strauss

Filename: Figure_4

The act of touching one's own reflection in *Liquid Views* allows the viewer to transform the image by moving it from one phase to another. Visitors to the Interactive Media Festival at the Variety Arts Theater in Los Angeles in 1994, such as video producer *Coco Conn*, commented on this tactile interaction. She compared this sense of touch to an intimate experience with the computer. The performative aspect of *Liquid Views* becomes apparent in the process of approaching, exploring, and seamlessly transforming the virtual image. The recipient's experience becomes an integral part of the artwork, revealing the phenomenon of *Mixed Reality* as affirmed by *Marc B.N. Hansen* in *Bodies in Code*: 'Let us say that mixed reality appears from the moment that tools first delocalized and distributed human sensation, notably touch and vision'. (Hansen 2006: 9) '*Liquid Views* explores the transition from (external) image to (internal)

imaging power, from an observational to an operational perspective. This transition renders their mixed reality works allegories of mixed reality as the minimal condition of 'phenomenalisation', Hansen continues. (Hansen 2006: 19)

The *Liquid Views* installation combines the touch screen, the camera, the algorithmically simulated water and an archive of images as a digital medium all in one. It records, reflects and stores us. With its swipe gesture, the interface may remind us of a smartphone that was introduced more than a decade later. In the 1990s, there were significant cultural differences in how people in different countries approached the artwork. It was a revelation for media artists to learn about different cultures through such interactive work. But with the advent of smartphones, there are fewer differences and more similar behaviour in many places. People see what they can do, pull out their smartphones and take a selfie in the virtual water. If the exhibition space does not provide an intimate environment, the performativity of previous exhibitions is now reduced to the private viewing of the camera image at home, without being publicly observed by others. Later, however, the images are publicly displayed again on social media - albeit with self-selected images. These images are now conscious and staged, no longer the unconscious ones produced by the computer almost unnoticed by the actors. But much depends on the installation in space. If it is more intimate, the computer images observe a much more performative enactment by the visitor. With the iPhone and today's selfie culture, the self is often reduced to a product to be consumed by others. (Fleischmann and Strauss 2015a: 309)

In his book *Digital Performance* (2007), *Steve Dixon* describes *Liquid Views* as one of the most influential media art works of the 1990s. He emphasises the naturalness of the interaction and the new ways of engaging with one's own reflection. Dixon notes that *Liquid Views* shifts the narrative of *Narcissus* from a passive gaze to an active, participatory experience between viewer and being watched. The former actor, who is now president of the LASALLE College of the Arts in Singapore, goes on to describe it:

'The piece epitomizes the digital double as a narcissistic mirror reflection of Lacanian misrecognition (meconnaissance); the body appearing as lines of fragilization that define the anatomy of phantasy. (...) The user/spectator becomes not only an interactive participant but also the primary subject and performer, since her digital double is also projected (...), to be watched by other visitors'. (Dixon 2007: 245)

Dixon recalls *Marshall McLuhan's* reflections on the myth of *Narcissus* and that the name comes from the *Greek* word *narcosis* (numbness). The nymph *Echo* calls his name, but he was numb. He had adapted to his extension and had become a closed system. *McLuhan* argues that media encompass all extensions of human potential, psychic and social. Thus, the wheel extends the leg, the radio extends the voice, and the camera extends the eye. Similarly, the computer extends the brain, and the Internet extends the nervous system. In essence, each of these media extends our capabilities.

'The digital reflection effectively effaces its live double to emerge as the dominant force. The performer stages the play and is staged at the same time. He or she becomes one with the digital reflection

and therefore presents a truthful experience as an authentic play on the mirror stage. The installation setting as performative environment, as a process of acting and an act of perceiving, recognizing and playing is a new narrative format, maybe a mixture of theatre play and interactive cinema'. (Dixon 2007: 248)

Recognised as a landmark work of media art, *Liquid Views* has had a global impact. It challenged how we perceive and promoted an interactive, participatory experience. Its legacy endures as an embodiment of the convergence of art, technology and cultural reflection.

Conclusion

The exploration of *Liquid Views* in 'Beyond Narcissus - Seeing the Self in the Other' illuminates the metaphorical significance of being online. As the authors argue in the SIGGRAPH '93 catalogue, *Liquid Views* represents our immersion in the digital realm, in our second nature as navigators immersed in the world of telecommunications: 'On the high seas of cyberspace, each individual's identity is transformed into a flow of variable and interchangeable data in which viewers are completely free to change or redefine their identities'. (Fleischmann 1993: 124)

Liquid Views transcends the human/computer barrier. The virtual mirror takes on an active role as a performing interface where touch becomes a form of visual interaction. *Narcissus'* passive gaze is transformed into an active one through a participatory experience involving both the observer and the observed. Across the physical and digital realms, it challenges the notion of self-perception. From the ancient story of Narcissus to the contemporary interactive experience, the evolution of the narrative spans the centuries. It is a symbol of the fusion of physical and virtual realities, where self-observation becomes a public performance and leaves traces of personal interaction. The encounter with the other within oneself - a second self-evident in the curiosity aroused by the morphed faces presented to the audience - is the essence of *Liquid Views*.

In October 2023, a poignant piece of street art circulates online, a painting by Norwegian street artist AFK. It shows two innocent children looking at each other through a barbed wire fence. Mirror - The Boy with the Striped Pyjama' is a commentary on the Israeli-Palestinian conflict. (AFK 2022: n.pag.) The painting shows a Jewish boy squatting opposite a Palestinian boy. As they look at each other, the Jewish boy appears to be cutting through the barbed wire to free the Palestinian boy. This touching composition, were it not for the BDS inscription on the sole of his shoe, could be seen as a symbol of empathy and hope for both Israeli and Palestinian society. The painting is reminiscent of John Boyne's book 'The Boy in the Striped Pyjama' [2006] and the film of the same name [2008].

The painting 'Mirror - The Boy in the Striped Pyjama' captures the essence of discovering the self in the other, echoing psychologist Carl Gustav Jung's observation in *Modern Man in Search of a Soul* (1933) that interpersonal encounters transform both individuals: 'The meeting of two personalities is like the contact of two chemical substances: if there is a reaction, both are transformed. Every time we meet another person, we can learn a great deal about ourselves, Jung suggests, and relationships are like mirrors that allow us to see ourselves'. (Jung 1933: n.pag.)

Jung's comment about seeing the self in others points to the notion of projection and the interconnectedness of human experience. This notion suggests that through our interactions with others, we not only perceive reflections of ourselves, but also undergo a process of self-discovery. *Liquid Views* as an art installation captures the essence of this dynamic, providing a platform for individuals to engage in an interactive and participatory experience that reflects aspects of themselves. By creating images through the interactive installation, visitors are essentially projecting their thoughts, emotions, and perceptions onto the medium. These images, when later displayed in the exhibition space, act as a mirror reflecting the collective psyche of the participants. Much like interpersonal relationships, this process can be transformative, allowing individuals to see themselves reflected in the expressions of others.

Narcissus fell in love with his own reflection in the water, but in the case of the two children depicted in 'Mirror - The Boy in the Striped Pyjama' the encounter is not a trap but an opportunity to emerge strengthened by the experience of the other. The important concepts that might hover over this image of the two children are autonomy and community. What we need to do is to acknowledge our differences by seeing ourselves in each other. This is the essence of the *Liquid Views* project. It is here, in the encounter with oneself and with others, that art holds the potential for profound revelation. The same is true of interacting with one's own reflection in the virtual water mirror and having others comment on it. It seems reasonable to suggest that the interactive and stimulating qualities of *Liquid Views* may influence how individuals see themselves and recognise the presence of others in their own perceptions, thereby encouraging them to reflect. The impact could go beyond the immediate artistic encounter. It could spark a dialogue about the complexities of identity and interconnectedness.

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Digital Art in Croatia (1968 – 1985)

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Abstract

The essay provides an overview of the project focused on the early years of digital art in Croatia, spanning from 1968 to 1985. The project aims to shed light on a largely unexplored aspect of Croatian art history, particularly the use of digital technology in artistic creation during this period. The authors have faced the challenge of limited documentation and the passing of key figures, resulting in gaps in historical knowledge.

The chosen timeframe, 1968 to 1985, marks the inception and development of digital art in Croatia, coinciding with global shifts in politics, society, and technology. The period reflects a unique blend of techno-utopian and techno-dystopian discourses that have been integral to media and digital art.

Access to digital technology during the 1960s and 1970s was restricted, with artists often required to write custom programs for their creations, and the assistance of programmers was essential. Notably, many early digital artists were not formally trained in art but came from scientific and engineering backgrounds.

Key figures in early Croatian digital art include physicists like Vladimir Bonačić, Vlatko Čerić, and Vilko Žiljak, as well as artists like Tomislav Mikulić and Miljenko Horvat. The project explores the contributions of figures like Andrija Mutnjaković and Velimir Neidhardt, who applied digital technologies to architecture and urban planning.

Access to computer technology was facilitated through academic and research institutions playing a pivotal role in providing support and access to digital equipment. The socio-political context of Yugoslavia emphasized technological development and access to technical sciences, fostering a favourable environment for digital art.

The "New Tendencies" (NT) movement in Croatia significantly impacted the development of digital art, with distinct phases: international NT movement formation, the introduction of the computers and visual research section, and the introduction of the conceptual art section. NT provided a platform for artists to explore programmatic visual research, scientific methods in art, and the convergence of cybernetics, information theory, and art.

The essay emphasizes the social and critical dimensions of early digital art in Croatia. Notably, the "bcd - cybernetic art team" created socially engaged digital art, such as the "Palestine, a Homeland Denied" posters. Additionally, the intersection of art, science, and technology found expression in architecture and urban planning.

Digital art pioneers faced numerous challenges and limitations, as access to personal computers and components remained restricted until 1984. Early digital art and the legacy of the NT movement have left a lasting impact on contemporary

digital art practices in Croatia and beyond. The intersection of art, science, and technology, once championed by NT, has experienced a resurgence in the 21st century, contributing to a more interconnected and socially conscious approach to digital art.

Introduction

Early digital art in Croatia is a topic that has largely gone unexplored until now. This project aims to shed light on the use of digital technology in Croatian art between 1968 and 1984. The selection criteria for the artworks featured in this project are simple: they must have employed digital technology in at least one phase of their creation. Given the lack of existing texts or documentation on this subject, our research began from scratch, requiring us to gather information and connect the dots.¹ Some of the key figures in early digital art in Croatia have passed away, and the networks and institutions involved have undergone significant changes, making some information inaccessible or difficult to verify. As a result, there may be gaps in our understanding of this history.

The years that frame this project, 1968 to 1984, were chosen for several reasons. 1968 marked the beginning of digital art in Croatia, with the first digital works exhibited to the public. This year also symbolized a global turning point in politics, society, and art, with events like the student protests in Paris and the Warsaw Pact invading Czechoslovakia. Meanwhile, 1984, the title of George Orwell's dystopian novel, took on new significance in the promotion of Apple's Macintosh computer, emphasizing the message against totalitarianism and surveillance.² In the domestic context of Yugoslavia and Croatia, 1984 marked a shift in policies that allowed citizens to import limited computer equipment for personal use, albeit with high customs duties. This change paved the way for wider access to computer technology and the democratization of digital art.

From 1968 to 1984, a unique utopian and dystopian space existed, shaping interpretations of digital art then and now. Techno-utopian and techno-dystopian discourses have always accompanied media art and culture, of which digital art is a part. Media art continually evolves in its definition and subject matter, sometimes aligning with or diverging from contemporary art discourses, which also evolve at their own pace.

Today, nearly all artworks incorporate digital elements in some capacity, whether in their production, presentation, or documentation. Understanding the technological and social contexts of the 1960s and 1970s is crucial for contextualizing early digital art. During this period, artists had to write specific programs for each work, as user-friendly software didn't exist. Access to equipment was a major challenge, and artists often needed the assistance of programmers, whether they were artists

¹ The first systematic discussion of media art in Croatia is: Darko Fritz, *Media Art*, thematic segment, the portal Culturenet, 2002. It consists of the essays "A brief overview of media art in Croatia (since 1960s)" and two databases: *Institutions*, *events*, *data bases* and *Publications*. Accessed 1. 7. 2020, <<https://www.culturenet.hr/default.aspx?id=23004>>

² In a TV commercial directed by Ridley Scott, after the staging of a scene from the novel, the message appeared: "On January 24th, Apple Computer will introduce Macintosh. And you will see why 1984 will not be like '1984'".

themselves or collaborators. It's worth noting that many early digital artists were not formally trained in art but were scientists and engineers driven by creative impulses.

Several notable figures contributed to early digital art in Croatia. Physicists like Vladimir Bonačić, Vlatko Čerić, and Vilko Žiljak ventured into digital art alongside their scientific pursuits. Tomislav Mikulić and Miljenko Horvat, on the other hand, were among the few artists trained in art who engaged with early digital art. Andrija Mutnjaković and Velimir Neidhardt were architects who explored digital technologies in their fields during the 1960s and 1970s.

Creativity knows no boundaries and can manifest in various fields, including science, business, hobbies, and conscious artistic endeavours. One example is Nikola Šerman, a mechanical engineer who, between 1969 and 1971 at the Zagreb Faculty of Mechanical Engineering and Naval Architecture, created a series of computer drawings purely as a hobby. These drawings, generated on an analogue computer, aimed to facilitate artists' work in descriptive geometry. Similarly, cinematographer Nikola Tanhofer, a classic figure in film, dabbled in computer graphics on his personal computer in 1982 out of curiosity and personal enjoyment, diverging from his usual cinematic expertise.

The Access to Digital Technology

Access to computer technology played a pivotal role in enabling the production of digital art. However, in the early days of computer development during the 1940s and 1950s, this technology was shrouded in secrecy, and primarily used for state and military purposes. Consequently, the notion of digital art was virtually non-existent, except for rare exceptions. Digital art found its origins in scientific institutions and universities where computers were first introduced.

The 1950s saw the emergence of computers on the market, but they remained prohibitively expensive for all but a few select companies and institutions. In Yugoslavia, access to advanced Western digital technology was limited, primarily due to the country's unique position during the Cold War. The Western NATO member nations had more advanced digital technology compared to the Eastern Warsaw Pact members. However, unlike other socialist countries, Yugoslavia allowed partial access to this technology. In the Ruđer Bošković Institute (IRB) in Zagreb, Branko Souček devised and led the construction of the first computer in Croatia in 1959: the project of the *256 channel analyser, memory, logic and programmes*. After that, the IRB produced specially devised computers for the business world. It was not until 1960 that Yugoslavia installed 30 electronic computers, a number that grew to 56 by 1966, and 95 by 1968, marking the inception of digital art in Croatia.

The University of Zagreb played a crucial role in providing access to digital equipment through its university computing centre known as "Srce" (also meaning "heart"). Established in 1971, Srce offered advisory and educational support to academic and research communities for the application of information and communication technology in education and research. This centre became a hub for digital exploration, and its building opened in 1974.

One of the major challenges for early digital art was the need for programming skills, as each artwork required custom coding. In 1968, Zagreb University's Electrical Engineering Faculty

acquired a computer, marking a pivotal moment. The university also introduced a major in Computer Technology and Information Science in the same year.

The socio-political context in Yugoslavia was influenced by socialist ideology, emphasizing technological development and the popularization of technical sciences. President Josip Broz Tito underscored the importance of technical sciences in the creation of socialism. This ideology led to the establishment of National Technology of Yugoslavia, which published "Technology to the People" from 1948, along with organizations in various republics, including Croatia.

Yugoslavia's technical clubs served as essential learning centres for mastering technical skills and equipment usage. These clubs covered a wide range of activities, including photography, radio technology, and worldwide amateur radio communication. Film clubs, such as Kino Club Zagreb, produced notable experimental films and launched the GEFF International Experimental Film festival in 1963.

Access to digital technologies before the advent of personal computers was primarily confined to scientific institutions, universities, and large corporations. Before the appearance of personal computers, access to digital technologies, on which some artistic work could be produced, was possible only in scientific institutions, of the kind in which Vladimir Bonačić worked (IRB), universities, where Tomislav Mikulić studied, and where Vilko Žiljak and Miljenko Horvat worked (in Montreal), with which Andrija Mutnjaković collaborated, in the big business corporations where Vilko Žiljak and Vlatko Čerić worked. Recognizing the difficulties artists faced in accessing digital equipment, the organizers of the "tendencies 4" event in 1969 offered a unique prize: the "possibility of using a computer in Zagreb" alongside the publication and exhibition of the resulting work.³

In 1972, the Multimedia Centre (MMC) of the University of Zagreb's Referral Centre opened doors to broader public access to digital technology. Thanks to Branimir Makanec's advocacy for computerized education, MMC provided access to the HP2000E time-sharing computer, offering thousands of citizens their first introduction to computers and information technology. MMC made education more accessible by allowing remote work for schools and faculties via modem and telephone signals, enabling up to 16 simultaneous users. This initiative facilitated free access throughout workdays, creating opportunities for late-night work as well. Among the attendees there were also artists; fine artist Tomislav Mikulić, who did the first digital animations in Croatia and the multimedia artist and cineaste Vladimir Petek. In the MMC in 1977 electrical engineer Damir Boras developed, after ideas of the architect Velimir Neidhardt of the Urbanistic Institute of Croatia, URBAN the first computer language for the requirements of urban design and spatial planning in Croatia.

During the 1980s, the development of microprocessor technology and the introduction of personal computers (PCs) democratized information technology. Young enthusiasts, mentored by Branimir Makanec, initiated local PC production, establishing several small companies alongside state-owned and self-management models. These privately owned firms played a significant role in introducing PCs to Yugoslavia. Croatian-made computers, such as the "KAG A3" and "GALEB YU 101," entered the market. Zorislav Šojat designed the IVEL Z-3, starting the first large-scale production of computers in

³ "Computers and visual research, jury decision about the competition", *tendencies 4*, exhibition catalogue, GCA, Zagreb, 1970, n.p.

Yugoslavia. The "ORAO YU 102" developed by Miroslav Kocijan became a standard in Croatian elementary schools due to its compatibility with educational software.

However, restrictions on personal imports of foreign electronic components and computers remained in place in Yugoslavia until 1984. It was only in that year that Yugoslavian citizens could legally import electronic components up to a maximum value of USD 200, subject to high customs duties. More advanced computers or components were often smuggled into the country illegally. This restricted access to personal computers was a challenge for artists and technology enthusiasts.

Artworks as Hybrid Analogue-digital Systems

Artists like Vladimir Bonačić created their initial works using oscilloscopes, which allowed the depiction of vector lines rather than pixel-based images. In the early 1970s, Vilko Žiljak and Vlatko Čerić utilized ASCII image technology for their digital images. However, these methods had limitations in terms of presentation possibilities. To bridge the gap between digital programs and tangible, sensory experiences, artists had to create hybrid analogue-digital systems. Artists employed a range of techniques: punched computer tape processed with a photographic repro camera and printed in traditional printing techniques (visual *t4* of Ivan Picelj); computer graphic subsequently printed (in colour) on paper with serigraphy (Horvat, Mikulić); offset or printing on silk (both Žiljak); sequences of digital images depicted on an oscilloscope and shot with still (Bonačić) or movie camera (Petek, Mikulić) and enlarged printouts of digital drawings that were used as schemas for building in other materials (Mutnjaković). Vladimir Petek developed hardware systems for multimedia presentations, such as readers for computer-punched tapes, decoders for computer signals, and modifications for personal computers. These systems aimed to control multimedia devices.⁴

Vladimir Bonačić devised and produced special custom-made computers and custom-made monitors designed according to the requirements of artworks. His dynamic light object *DIN.PR18*, a computer-generated 36-metre-wide luminous object, in 1969 temporarily was placed on the façade of a Nama department store in Zagreb. The work was controlled by a computer designed by Bonačić and specially made for it, made by a team of expert electrical engineers and computer programmers at IRB where the work was programmed on the SDS-930 computer.

In the context of creative digital technology usage, it's essential to highlight early robots. Branimir Makanec, a student at the Electrical Engineering Faculty in Zagreb, constructed TIOSS (standing for "remote-controlled executive organ of a self-organising system"), the first robot in Croatia, in 1961. This robot was made primarily from parts of American military planes and had motors in its legs, along with a binary computer controlled by relays. TIOSS moved with agility and even had a sense of touch in its fingers. While full computer autonomy was not achievable at the time due to the size of computers, TIOSS was remotely controlled using a portable radio transmitter and a wireless remote-control unit. It made its public debut in 1965.⁵

In today's context, artists have access to standard mass-market devices for easier production and cost reduction.

However, during the discussed period, artists had to design, build, and innovate their hybrid analogue-digital systems, emphasizing a do-it-yourself (DIY) or do-it-with-others (DIWO) approach. These early pioneers laid the foundation for contemporary digital art and technology integration.

[new] tendencies, computers and visual research

During the years 1961-1978, the development of digital art, particularly in Croatia, was deeply influenced by a movement known as New Tendencies (NT). This movement played a pivotal role in fostering domestic digital art and integrating it into international networks and exhibitions, breaking away from the Cold War's confines. I propose to look separately at three phases of NT through the formation of three different networks, people and institutions:

1. the formation of the international NT movement and its dispersal, 1961-1965,
2. the introduction of the computers and visual research section, 1968,
3. the introduction of the conceptual art section, 1973.⁶

In the 1960s a new generation of artists emerged, focused on rational approaches, and identified under labels such as Concrete Art, neo-Constructivist Art, Lumino-kinetic art, Gestalt Kunst, arte programmata, and Op Art. These artists actively contributed to the global art scene through the New Tendencies movement, presenting diverse rational approaches to art through exhibitions, publications, and symposia from 1961 to 1978. The movement began with a 1961 exhibition in Zagreb, which showcased a wide range of avant-garde tendencies, including tautological and monochromatic painting, object-based art, and algorithmic works. This event facilitated international collaboration and led to the formation of a network of artists and theorists interested in continuing biennial exhibitions. In 1963, *New Tendencies 2* solidified the movement as an international platform for forward-thinking, socially engaged art. The movement embraced programmatic visual research, influenced by Gestalt theory, and explored themes of movement, light, and interactivity in art. NT continued to evolve, with *New Tendency 3* (NT3) in 1965, which emphasized the scientification of art and its convergence with science and technology. This phase introduced systematic categorization of artworks based on various criteria, such as spatial, material, and functional characteristics. NT3 also marked the beginning of discussions on the relationship between cybernetics, information theory, and art. As NT gained international recognition, exhibitions were held in Venice, Leverkusen, Paris, and New York, showcasing the work of NT artists. Up to 1965, NT brought together more than 150 artists, artistic groups, theorists, critics and gallerists. However, as the movement expanded, internal disagreements arose, leading to a crisis in the mid-1960s. In response to this crisis, the organizers briefly abandoned further NT events but later reconsidered their stance. They embraced new ideas related to information theory and computers, reintroducing the unique combination of theory and practice that defined the New Tendencies movement.

In 1968, the New Tendencies exhibitions underwent a significant transformation, shifting away from their biennial format. Instead of using the term "new" in their exhibition titles, they adopted the title "*tendencies*" to reflect their commitment

⁴ "Filmografija Vladimira Peteka, Petek – Inova", *Hrvatski filmski ljetopis*, no. 36, 2003, pp. 36–37.

⁵ Branimir Makanec, *Kako je nastao robot TIOSS*, digital text document, 2020., unpublished.

⁶ Darko Fritz, "Nove tendencije", *Oris*, no. 54, god. X, Arhitektst, Zagreb, 2008, pp. 176–191.

to radical ideas. During the biannual event known as *Tendencies 4*, which took place in 1968 and 1969, a series of exhibitions and symposia were organized under the theme of "*Computers and Visual Research*". These events were instrumental in advancing the discourse around computers and visual aesthetics. Max Bense and Abraham Moles played a pivotal role in shaping the direction of this discourse, presenting their information aesthetic in the magazine "*bit international*" (nine issues came out from 1968 to 1972) and during symposia presentations. They applied this aesthetic to analyze the new visual research conducted with computers, suggesting that the aesthetic value of these artworks could be scientifically measured using information aesthetics methodologies.

The political upheaval of 1968 had a significant impact on the art world, influencing artists' perceptions of societal engagement. Discussions among artists at the 1968 seminar "*Computers and Visual Research*" often touched on political and social issues. Alberto Biasi, an artist from the first NT grouping, engaged in a heated debate with digital artist Frieder Nake about the political situation, student protests, and artists' social responsibilities.⁷

Ivan Picelj, the artist and designer, created the visual for *Tendencies 4* in 1968, using a collage of computer perforated tape to represent digital data storage. This artwork marked the creation of the first digital art piece in Croatia. Picelj's work visualized binary code, and he incorporated the text "t4t4t" in reference to *Tendencies 4*. This visual was published in "*bit international*" magazine and later used for posters in 1969.

During the preparation for *Tendencies 4*, organizers sought collaboration with scientific institutions in Yugoslavia using computers for scientific visualization. In 1968, a meeting at the Institute for Scientific Research in Zagreb led them to Vladimir Bonačić, a physicist who combined visual research with mathematics. Bonačić started incorporating art into his scientific work, and he presented digital graphics created on an oscilloscope during the *Computers and Visual Research* exhibition in 1968. Picelj and Bonačić collaborated to create an electronic object titled "t4" in 1969. This object featured a dynamic grid of aluminum tubes with small bulbs controlled by an onboard computer. It was the first digital interactive work in Croatia. The *Tendencies 4* exhibitions in 1969 featured a series of computer-generated photographs by Vladimir Bonačić and a large computer-generated light installation in Kvaternik Square in Zagreb.

The *Tendencies 4* program spanned various locations in Zagreb from 1968 to 1969 and included exhibitions, symposia, and publications. It showcased a total of 189 digital works by 33 artists or interdisciplinary groups. In 1972 an international

seminar entitled *Art and computers '71*⁸ with 23 participants was held in the Moša Pijade Workers' University in Zagreb. An international side exhibition was held in the GCA, which also organised the events, while Vladimir Bonačić presented new luminous installations in public space in Zagreb.

The exhibition *tendencies 5*, held in 1973, consisted of three parts: "constructive visual research", "computers and visual research" and "conceptual art". The accompanying symposium which was also an AICA congress, was held in the Hotel International and was called *Rational and Irrational in Visual Research Today*. The organisers of the NT attempted to link up various art practices via the understanding of the concept of the programme in the context of artistic work.⁹ Radoslav Putar, director of the Gallery, used the phrase "data processing" to describe the methods of conceptual art,¹⁰ although this possible link was never taken any further. Frieder Nake remarked on the similarity between digital and conceptual art at the level of "separation of head and hand", also being critical of this production structure following the logic of capitalism.¹¹ Radoslav Putar and Boris Kelemen emphasised the importance of constructive and computer visual research, while the papers of Nena Dimitrijević and Marijan Susovski put forward positively inclined theses about conceptual art through the promotion of non-object and non-material art and the non-visual.¹²

As for Croatian digital artists, there were Vladimir Bonačić with the luminous object *G.F. E (16.0) – NS*, and Miljenko Horvat, Tomislav Mikulić and Vilko Žiljak with works of graphic art. As they did with Bonačić in 1968, the organisers again boldly opened up a high-quality international exhibition context for new Croatian artists. Physicist Vilko Žiljak at this exhibition for the first time showed his works, and the twenty-year-old student of both the art academy and of Electrical Engineering Tomislav Mikulić exhibited for the second time ever.

The event *tendencies 6* was planned for years, but ultimately was never held integrally; in 1978 just a symposium was held, called on the poster *international meeting, t–6 = art and society*. The only digital artists taking part were Vladimir Bonačić (*Man, language and matter*) and Jean-Claude Marquette. The idea of the organisers to re-examine social problems was still in evidence, but art practice and the cultural and political trends of the time came down heavily on the side of conceptual art, which was vigorously to assert its discourse and establish the still dominant canons of contemporary art.¹³

The NT movement had a lasting impact on Croatian digital artists, as they continued to participate in international digital art exhibitions and events in subsequent years. Croatian authors in

⁷ Matko Meštović, "O situaciji", *bit international*, no. 3, City of Zagreb Galleries, Zagreb, 1968, pp. 43.

⁸ 26 – 27 June 1971.

⁹ Darko Fritz, "Notions of the Program in 1960s Art – Concrete, Computer-generated and Conceptual Art", address at the symposium *Art-oriented programming 2 (Programmation orientée-art 2)*, Amphithéâtre Richelieu, Sorbonne, Paris, October 20, 2007. Published as: Darko Fritz, "La notion de « programme » dans l'art des années 1960 – art concret, art par ordinateur et art conceptuel", *Art++*, ed. David-Olivier Lartigaud, Editions HYX (Architecture-Art contemporain-Cultures numériques), Orléans, 2011, pp. 26–39, and Darko Fritz, "Notions of the Program in 1960s Art – Concrete, Computer-generated and Conceptual Art / Program jako koncepcja w sztuce lat 60. XX w. – sztuka konkretna, komputerowa i konceptualna", *The Art+Science Meeting*, ed. Ryszard W. Kluszczyński, LAZNIA Centre for Contemporary Art, Gdansk, 2016, online.

¹⁰ Radoslav Putar, untitled, *tendencies 5*, exhibition catalogue, Zagreb: GCA, 1973, n. p.

¹¹ Frieder Nake, "The Separation of Hand and Head", *Computer Art*, 9 pages, reader of the symposium *Rational and Irrational in Visual Research Today*, t–5, June 2, 1973, GCA Zagreb, n. p.

¹² In: *tendencies 5*, exhibition catalogue, GCA, Zagreb, 1973, and audio archive of the symposium *Rational and Irrational in Visual Research Today*, t–5, June 2, 1973, GCA, Zagreb.

¹³ For example, in a similar general survey, *Art since 1900*, by Hal Foster, Rosalind Krauss, Yve-Alain Bois, Benjamin H.D. Buchloh, Thames and Hudson, New York, 2004, NT was not even mentioned, apart from a tiny reference in the mention of participants of GRAV in the significantly recontextualising chapter entitled "French Conceptualist Painting".

the following years were actively exhibiting at important international digital art shows such as *ARTEONICA*, São Paulo, 1971 (Bonačić), *Computer Art Exhibition*, Toronto, 1971 (Horvat), *Exposition internationale d'art a l'ordinateur*, Montreal, 1972 (Horvat), *Sigma 9, Kontakt II*, Bordeaux, 1973 (Bonačić, Žiljak), *Ars Electronica*, Linz, 1979 (Bonačić, Mikulić) and *Computer Art*, Tokyo, 1979 (Mikulić). Miljenko Horvat was co-publisher of the first album of computer art *Art ex Machina* (1972), Vladimir Bonačić organised the symposium *The Interaction of Art and Science* (Jerusalem, 1974), and Tomislav Mikulić was the curator of the international exhibition *Computer Animation* (Zagreb, 1980), in which it was mainly the numerous artists of the NT network that were featured. NT contributed to the development and recognition of digital art in Croatia and beyond.

Social and Critical Dimension of Digital Art

One notable example of socially engaged early digital art was a series of 35 posters titled "Palestine, a Homeland Denied," created by the bcd - cybernetic art team (Vladimir Bonačić, Miroljub Cimerman, Dunja Donassy) in 1978. This series was exhibited in Zagreb in 1979, organized by the coordinating committee of the Republican conference of the socialist alliance of the working people of Croatia.¹⁴

The intersection of art, science, and technology also found expression in architecture and urban planning during this period. Andrija Mutnjaković, for instance, explored the relationship between machines and architecture, developing concepts like kinetic architecture. He incorporated digital technologies in the design of various architectural projects, such as the reconstruction of the Old City Town Hall in Zagreb and the National and University Library of Kosovo in Prishtina.

Architect Velimir Neidhardt, during his time at MIT in 1974-1975, explored the use of computers in urban design and planning, publishing a paper titled "Discourse for Physical Planning."¹⁵ In collaboration with electrical engineer Damir Boras, he developed URBAN, the first digital language used for urban and spatial planning in Croatia.¹⁶ URBAN allowed planners and urban designers to describe environmental transformations and test various criteria for planning purposes, resembling a pioneering geographic information system (GIS).¹⁷

In the realm of digital art, some creators in Croatia contributed to socially significant activities, often beyond the art world, leveraging their technical knowledge and digital skills. For example, Vladimir Bonačić developed a digital multimedia library for the National and University Library in Zagreb in 1978-1979. The bcd-cybernetic art team developed technology for dynamic graphs used in German elections in 1980, 1983 and 1987, which set a precedent for real-time data visualization in electronic media.

¹⁴ *Palestina, oduzeta i negirana domovina*, Studio galerije Forum, Zagreb Culture & Information Centre, 1979.

¹⁵ Velimir Neidhardt, *The possible application of Discourse in: 1. The simulation of Household's Location Decision 2. The simulation of Large Retail Facilities' Location*, Massachusetts Institute of Technology, Department of Urban Studies and Planning, 11.85 Special Topics in Computer Application, Assistant Professor Chuck. J. Libby, Spring 1975.

¹⁶ Velimir Neidhardt, Damir Boras, "Upotreba kompjutera u urbanističkom i prostornom planiranju – Meta jezik URBAN", *Zbornik simpozija "Regionalno i prostorno planiranje"*, Jugoslovenski institut za urbanizam i stanovanje, Belgrade, 1977, pp. 121–157.

Vilko Žiljak and Vlatko Čerić participated in various projects involving simulation modelling of complex systems and digital technologies. Žiljak introduced new graphic technologies in security printing and applied computer modeling to design industrial systems like the Coking plant in Bakar, the Yugoslav Oil Pipeline, and the Port of Rijeka. Čerić used digital technologies in planning and managing the construction of Krško Nuclear Power Plant and in simulating internal transport at Zagreb University Hospital.

Television played a significant role in showcasing digital images in Croatia until 1984. Tomislav Mikulić, the author of the first digital art film in 1975, served as the head of the TV graphics department at Zagreb Television from 1980 to 1992. His animations were a regular feature in television broadcasts. Mikulić's work extended to international events, as he created the animated logo for the *Eurovision Song Contest* in 1979 and an animation for the 1984 Winter Olympics in Sarajevo.

Dis/Continuum of Developments of Early Digital Arts

In the Croatian context of the 1980s, only a few artworks utilized or established hybrid digital technologies, such as the *Cathedral* project in 1988 at the PM Gallery in Zagreb. Digital technologies began to modestly appear in graphic design and pre-press operations in the mid-1980s but faced limitations in processing large-format pixelated images.

The 1990s brought significant challenges due to the war following the breakup of Yugoslavia. Digital art remained scarce during this period. Rare examples of digital art in the 1990s are listed in *A brief overview of media art in Croatia (since the 1960s)* published on the Culturenet portal in 2002.¹⁸ The exhibition *New Networks of New Media* (2008) showed events in the area of culture and art of the new media in Croatia from 1990 to 2005 through three chronological lines: political, informational and artistic.¹⁹ The most widespread everyday digital visuals in Croatia were the computer graphics that from 1994 were part of the design of banknotes.²⁰ The naming and designing of banknotes were accompanied by numerous controversies. It wasn't until the 21st century that digital technologies became more prevalent in Croatian artistic production.

In the 1990s, the synergy between science and art, once championed by the New Tendencies movement, experienced a resurgence. This revival combined social activism, computer technology, and global networking, echoing some of the key themes of NT. However, early digital art, a part of NT, was only critically reassessed within the context of media art in the late 1990s, especially with the emergence of low-tech media art.

Historically, NT and most (new) media art practices had looked toward the future and the latest technological capacities. Looking back at the first NT phase (1961-1965), the words of

¹⁷ Filip Šrajcar, *Suvremene tehnologije dokumentiranja i analize izgrađenog okoliša*, seminar paper, doctoral course in architecture, Architecture Faculty, Zagreb University, Zagreb, 2018, pp. 4.

¹⁸ see footnote 1

¹⁹ Galerija Galženica, Zagreb, curator Klaudio Štefančić. Accessed 1. 7. 2023. <<http://galerijagalzenica.info/node/2065>>

²⁰ Vilko Žiljak and associates were responsible for digital techniques being used in the design of Republic of Croatia documents such as passports, citizenship certificates and identity cards in the Croatian Printing Institute in Zagreb in 1991.

Radoslav Putar from 1969 seem to apply to media art in general. He noted that as the NT were entirely future-oriented, the negation of their existence began under their influence. However, he also foresaw the challenges of cultural imperialism and marginalization. Putar mentions that the “germ of the phenomenon of that event (NT) was conceived, developed and emitted in this milieu” and that “there are already signs that both elements of provincial limitedness on one hand and cultural imperialism on the other, are very aggressively actually shrouding this in the fog of silence and preparing a definitive negation”.²¹ After practitioners of media art and media culture of the 1990s, the academic reassessment of the NT started only in the 21st century, looking at NT in the context of the history of contemporary art, and of the media art that is a substantial part of it.²²

In the 1960s, Matko Meštrović's ideas about the scientification of art, as a starting point for the overall scientification of society, gained new dimensions through digital art. It offered hope of breaking free from the confines of art and realizing the avant-garde dream of equating life and art. Early digital artists actively participated in the information society, contributing to innovative software and hardware development and their creative application. However, the Cold War era created an unfavourable environment for building a better world in collaboration with scientific, corporate, military, and state establishments, which largely controlled computer technology. In the anti-technological climate of the 1960s and 1970s, marked by events like the 1968 student protests, the potential for emancipatory technology was hindered. Efforts were made to bridge the gap between technologically oriented artists and political activism, such as the exhibition *tendencies 6* in the mid-1970s, which called on video activists worldwide. However, the response was insufficient, and the convergence of these different ideas, despite sharing the goal of societal improvement, remained challenging due to distinct sensibilities and approaches to social change. These diverse ideas briefly intersected within the NT. The science of cybernetics, which emerged in the 1960s, contributed to an awareness of global ecology as a positive example of synergy across various social discourses.

²¹ Radoslav Putar, untitled, *tendencies 4*, exhibition catalogue, GCA, Zagreb, 1970.

²² Ljiljana Kolečnik, "The Transition of New Tendencies from Neo-Avant-Garde Subculture to Institutional Mainstream Culture. An Example of Network Analysis", 2018, *Modern and Contemporary*

Artists' Networks. An Inquiry into Digital History of Art and Architecture, pp. 84–122.

Notation, Dynamism, Transformation

Lillian Schwartz's Morphogenetic Computing

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Abstract

Lillian Schwartz, known as one of the most significant pioneers of computer art, has, throughout her career, disassembled and reconfigured the affordances and limitations of computational machines. During her more than thirty-four-year residency (1968-2002), at Bell Telephone Laboratories in Murray Hill, New Jersey, Schwartz demonstrated how artistic conventions and mediums could reframe the ways computer scientists, chemists and physicists viewed and interacted with the technological systems they designed, and how these systems, from lasers to light pens to programming languages, could undergo radical metamorphoses beyond their intended use-value. For Schwartz, mediums are not isolated or stable; instead, they are like chemical elements that take on new properties combined into mixtures or compounds. Underlying all of Schwartz's work, at Bell Labs and beyond, is a fascination with the computer as a tool for expanding creative and imaginative horizons. This paper explores Schwartz's early investigations into real-time visual and interactive programming, and her pivotal role in re-envisioning computers as engines of artistic transformation.

In the 1970's, Schwartz's particular mode of engagement with computational tools earned her the title of specialist in morphodynamics. This appellation was concocted by Max Mathews, Director of the Acoustical and Behavioral Research Center at the Bell Telephone Laboratories (1962 to 1985), whose own research was driven by his goal to achieve real-time sound synthesis and visual programming. Mathews' innovations and collaborations before, after, and during his Directorship at Bell Labs and his appointment at Scientific Advisor at IRCAM--Institut de Recherche et Coordination Acoustique/Musique, Paris--(1974-1980) identify him as a forerunner in the development of hardwares and softwares for real-time gestural control. Fast-forwarding through a labyrinthine history, multiple versions of what is now the ubiquitous Max/MSP visual programming language were named in homage to Mathews' exhaustive research.

Evidence of collaborations and mutual influence between Schwartz and Mathews are key components in tracing shifts in Schwartz's own research and practice, and in identifying her direct and indirect contributions to the development of real-time computing. Even in her early non-computational practice, and particularly in her so-called kinetic sculptural work, Schwartz experimented not only with movement and perception, but also with the production of experience in real time generated by user

interaction. Prior to her first forays into computing, occasioned by her introduction to Leon Harmon, a Bell Labs researcher in neural processing and pioneer in collaboratively developed computer art, Schwartz began designing and constructing technological systems that facilitated transformative experiences for individual viewers/users/participants in real time.

Keywords

Lillian Schwartz, morphodynamics, pioneers of computer art, computer animation, digital animation, computer-generated art, computer-aided art analysis, media art history, media studies, multimedia, Bell Labs, generative art, Max Mathews, digital aesthetics, notation, visual programming, real-time synthesis, IRCAM, creative computing, computer art, creative coding

1. Just What is it that Makes Computer Art so Different, So Appealing?

In 1968, Schwartz's 3D interactive, kinetic sculpture *Proxima Centauri* [Fig. 1] was selected for inclusion in MOMA's 1968 landmark exhibition "*The machine, as seen at the end of the mechanical age.*"¹

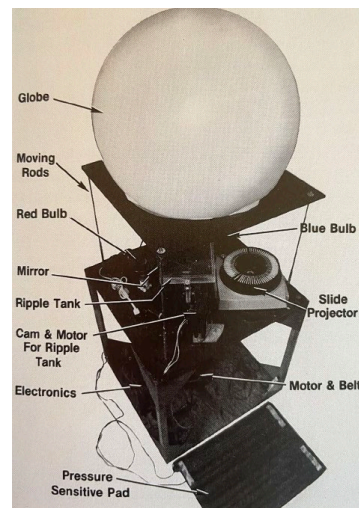


Figure 1: Lillian Schwartz *Proxima Centauri*, 1968, internal mechanics. Photograph by Alan Kaplan.

¹ See exhibition catalog *The machine, as seen at the end of the mechanical age*. Pontus Hultén, K.G. Greenwich; The Museum of Modern Art: Distributed by New York Graphic Society, 1968

Proxima Centauri stood alongside works by Marcel Duchamp and Leonardo DaVinci, who she credits as her greatest influence. At the exhibition opening, Schwartz encountered *Computer Nude: Studies in Perception*, a computationally programmed artwork by Leon Harmon and Bell Labs colleague Ken Knowlton.²

Harmon and Schwartz, equally compelled by the other's work, entered into a dialogue that resulted in her thirty-four-year residency at Bell Telephone Laboratories, located in Murray Hill, New Jersey. Bell Labs was, as computer art historian Zabet Patterson describes, "a crucial site in an epochal intersection between modern art, science, and technology as important as anything since the Bauhaus of the 1920s." Starting in the early 1960s, artists were invited to join the four thousand scientists and engineers conducting cutting edge technological research.³ Among them were Robert Rauschenberg who, with engineer Billy Kluver founded Experiments in Art & Technology (E.A.T.) at Bell Labs in 1966. The facility itself was "designed to facilitate fortuitous and unexpected encounters, long hallways housed entire research divisions. Walking between corridors, in the atrium, and in the cafeteria, people encountered colleagues, digressions, and problems."⁴

During her tenure at Bell Labs, relationships based on mutual respect and trust between Schwartz and resident scientists and engineers fostered a collaborative ethos. Researchers and inventors shared their new technologies with Schwartz and spent time teaching her how to use them and how they operated; meanwhile, her understanding of the tools enabled her to see, and manifest, creative possibilities her collaborators could not have otherwise imagined. Ultimately, their exchanges revealed how artistic vision could reframe the ways computer scientists, chemists and physicists interacted with the technological systems they designed, from lasers to light pens to programming languages.

Upon her first visit to Bell Labs, Schwartz was, by her own account, initially dazzled by the lights and array of machines, and much less interested in the tedious task of learning punch-card programming and machine language. Nevertheless, Schwartz was sufficiently intrigued by Leon Harmon's images to set up camp in his office and learn how to use a computer under the tutelage of John Vollaro, a technical staff member. "He patiently explained the underlying concepts, the hows and whys of bits, transistors, processing units, and cathode-ray tubes, but I was admittedly inattentive. I was mesmerized by the dots of light I could create on the monitor."⁵ Catalyzed by her fascination with the discrete, atom-like symbols in *Computer Nude*, Schwartz's persistent attraction to dots led her to identify an art historical parallel between computer-generated graphics and 19th century pointillist painting.

In this instance, she drew the historical connection not through punch-card programming, but rather through a white-knuckle determination to master a device named, appropriately, the light pen. Her first attempt to draw with the light pen—an apocryphally glorious moment—is far less romantic when reported firsthand. "My early use of a light pen was not satisfactory. I wanted to use a pen my way. Which meant rapid movements. But that was impossible because the pen was

attached to the computer by a wire that restricted the series of motions required to use it: leaning toward the monitor carefully, selecting a point on the screen, and then pressing the pen onto that point."⁶ In her workplace between monitors, cables and flashing lights, her awkward manipulations of the device eventually yielded an unexpected discovery—a remediation of the technics of pointillism. Schwartz viewed the facility of the light pen for "technological pointillism"⁷ as an opportunity to work in a way similar to Seurat's—to manipulate dots so that they could appear as distinct from one standpoint and then merge from another standpoint. This modality of technological pointillism achieved visual effects that paralleled *Computer Nude* but accomplished through an entirely different series of mediations than either punch-card programming or oil painting.

In the first stages of what would become a deep investigation of computers as tools for creative practice, Schwartz began learning computational language by making simple drawings on graph paper, cut exactly to the size of a punch card. She would then translate, by hand, these drawings into code on punch cards. More than one of these drawings, including *Head* (1968) [Fig 2] are canonized in the history of computer art.

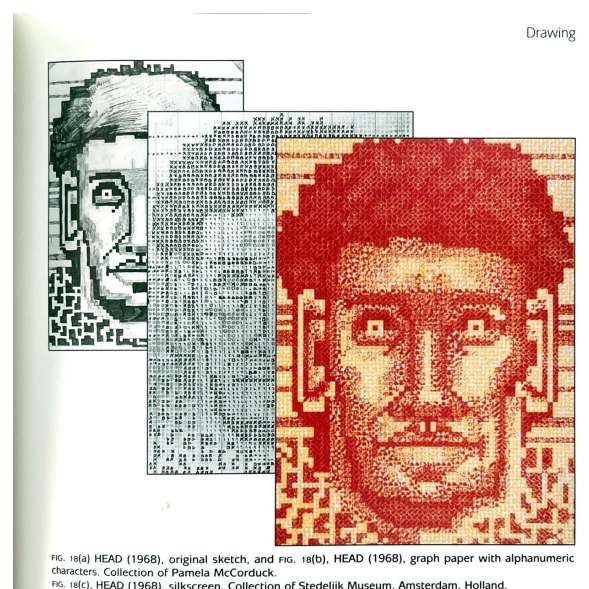


Figure 2: Lillian Schwartz *Head*, 1968. Schwartz, Lillian and Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York; W.W. Norton & Company, 1992

Schwartz was drawn to the experience of observing a smooth, resolved picture at a distance dissolve into a field of symbols at a more proximate vantage point. Both Schwartz's *Proxima Centauri* and Harmon and Knowlton's *Computer Nude*—though dissimilar in most respects—depended on the viewer's willingness to move towards and away from the image/object to achieve the intended sensory, kinetic effect. As Schwartz describes *Proxima Centauri*, "the concept was for the observer to see at first a highly polished black box. As he approached, the observer stepped on a pressure-sensitive pad,

² "Computer Nude was photographed during the press conference and prominently featured in the New York Times's write-up of the event, "Art and Science Proclaim Alliance in Avant-Garde Loft" (fig. 2). As if to quell any potential backlash, the article included an enlargement of Computer Nude's graphical notations alongside a reproduction of the work" Shaskevich, Helena. "Encoded Perception: Remapping Vision in Lillian Schwartz's Computer Art." *Feminist Media Histories*, Vol 7, Number 1, Berkeley, University of California Press, 2021, pps 172-196, 174.

³ Patterson, Zabet. *Peripheral Visions: Bell Labs, the S-C 4020, and the Origins of Computer Art*. Cambridge; MIT Press, 2015

⁴ *Ibid.* p xv

⁵ Schwartz, Lillian & Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York; W.W. Norton & Company, 1992 p 5

⁶ *Ibid* p 26

⁷ *Ibid* p 12

triggering motors that generated a number of vigorously dramatic effects. A ripple tank (a plastic container filled with fluid) was agitated every thirty seconds, causing wave patterns through which a sequence of slides containing my abstract paintings was projected, as a translucent globe slowly rose from the depths of the box. The globe was the screen, its shape and motion were conjoined with the changing images that themselves were never static.”⁸

Unlike a nude rendered in continuous lines of paint on canvas, Harmon and Knowlton’s *Computer Nude* was comprised of discrete units; independently of the technology used to make it, those discrete, interchangeable units define the image as aesthetically digital. Within the theoretical framework of Harmon and Knowlton’s investigations, *Computer Nude* is also notational.⁹

Harmon and Knowlton’s research into notation and figuration was driven by the question of how little information one would need to perceive an image. “Harmon was interested in determining the least amount of information required for conveying a recognizable face. If you think of a picture as rows of dots of a certain size and so many color values or levels of gray, then you can measure how much information is contained in the picture by calculating how many pictures the dots could potentially represent.”¹⁰ Notational systems, theorized in the context of “languages of art” by Nelson Goodman in 1968, are syntactically and semantically distinct and unambiguous.¹¹ In a notational symbol scheme all the members of a character are interchangeable; a letter “a” in the roman alphabet will signify the same thing regardless of the word or typeface in which it is used. In contrast, analog systems of representation and measurement are continuous. Any degree of articulation is approximate: take measuring a half-cup of flour or 3 mm of fluid as examples.

In contrast, artistic/aesthetic value has traditionally been associated with ambiguity and free play of the imagination. Digital and/or notational precision appear too mechanistic or soulless to fit within dominant categories of the Western art historical canon. Schwartz, however, refused such a distinction, and levied her institutional, artistic, material, conceptual in-betweenness as a springboard to reveal the porousness and artificially imposed boundaries separating technological and non-technological media. In her 1970 16mm animated film *Pixillation*, exuberant colors and patterns, generated via a deft interweaving of drawing, programming, and frame-by frame painted animation, demonstrate Schwartz’s ability to create intimate and intuitive relationships to, and between, the tools she used, including paintbrushes light pens, lasers, pencils, and electronic computers. The aesthetic, technological and formal plurality of Schwartz’s artistic career blends mediums, materialities, protocols, and languages, and shows that computers, more than rapid calculating machines, are also engines of transformation.

Another pioneer of computer-generated graphic art and also a Bell Labs Researcher, A. Michael Noll wrote in 1966 that the logical progression of computer art “was to animate the picture and then to produce moving, three-dimensional objects or kinetic sculptures. The use of computers in communication research has uncovered techniques which can be applied to other areas of the visual and performing arts. For example, the same technique may be used to simulate or record choreography for

dance. New computer languages are being developed which will make it very easy for the artist to communicate instructions to the machine.”¹² Although Schwartz had already delved into the territory of 3D kinetic sculpture, exemplified in *Proxima Centauri*, before she was introduced to computers at all, Noll’s statement shows the timeliness, and significance, of Schwartz’s creative engagement with the ever-changing landscape of computer-generated motion.

2. What Science can Learn from Art/What Art Can Learn from Science: Collaborations in Real Time

One day, passing by Don White’s laboratory, Schwartz saw beautiful colors emanating through the sliver of a barely opened door. White walked out and closed the door behind him, not to protect his scientific secret but because he was concerned about damaging her eyes. He didn’t know what could be done with the lasers. She asked if they could be projected onto a wall, which was the beginning of a process of learning and collaboration between artist and scientist that led to the production of the 1972 animation *Mutations*.

Schwartz’s exchange with Don White and his laser pen was another opportunity to channel surprise. This time, the chance encounter was not with a glitch in the system, and not with a stranger—Schwartz worked closely in different ways at different times with most of the Bell Labs researchers. By handing Schwartz the laser pen, White opened a new channel for Schwartz to add layers of depth and complexity to her process. Through this exchange with Schwartz, White discovered that his invention, in the artist’s hand, becomes a catalyst for imaginative, experiential transformation.

In *Mutations*, delicate traces of lasers and incursions of solid crystalline forms have synaesthetic effects. Where the mood in music is changed by cadence, timbre, volume and tempo, in Schwartz’s animation, slow-growing crystals temper the playful, dancing, but also frenetic speed of the laser-generated imagery. [Fig. 3, Fig 4]

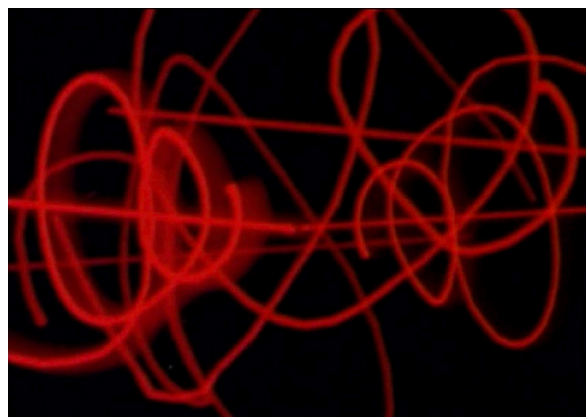


Figure 3: Lillian Schwartz, *Mutations* 1972 © Lillian Schwartz. Screenshot <https://lillian.com> February 11, 2024

The shapes in Schwartz’s 2013 digital animation *Exalt*, heavily outlined and rendered in 3D, nevertheless resonate with the fluidly gestural forms in *Mutations*, generated forty years

⁸ Ibid p 10

⁹ Hoy, Meredith. *From Point to Pixel: A Genealogy of Digital Aesthetics*. Hanover; University Press of New England, 2017

¹⁰ Cf Harmon, Leon D. and Julesz, Bela, “Masking in Visual Recognition: Effects of Two-Dimensional Filtered Noise,” *Science*, June 15, Vol. 180, 1973 pp. 1194-1197. cit. in Schwartz, Lillian “Computer-aided

illusions: ambiguity, perspective and motion. *The Visual Computer* 14 pp 52-68 Springer-Verlag, 1998 p 52

¹¹ Goodman, Nelson. *Languages of Art: An Approach to a Theory of Symbols*. Indianapolis; The Bobs-Merrill Company, Inc, 1968

¹² Noll, A. Michael. “Computers and the Visual Arts” *Design Quarterly*, 1966, No. 66/67, Design and the Computer (1966), pp. 64-71

earlier using Don White's laser pen. *Exalt* presents the viewer with a return to Schwartz's earlier work. However, this is a revisitation that is more than referential or recursive. [Fig. 9]



Figure 4: Lillian Schwartz *Exalt*, 2013 ©Lillian Schwartz. Screenshot <https://lillian.com> February 11, 2024

Exalt, which, in contrast to *Mutations*, was born digital, for digital projection. In a digital camera, image sensors convert light waves into current–electronic signals—that are then processed and stored as a digital file. In contrast, analog cameras capture images through a chemical reaction, in which exposure to light alters the properties of emulsion-coated celluloid and produces a succession of negatives. After the negatives are developed in a chemical bath, the positive stills projected at 24 images per second appear as a moving picture. Digitizing analog film requires an optical scanner that will read and convert individual frames into digital files. Analog film captures details and nuances that cannot be replicated in digital images or will be lost in the process of digitization. Put more simply, a digitized projection cannot achieve the fineness of resolution achieved by projecting light through celluloid. While digital and analog machines are both used for projection, their physical principles and materials are sufficiently distinct that the image is only partially translated.

The programme for the 2014 EYEO Film Festival in Minneapolis included a tribute to Lillian Schwartz's pioneering work in computer animation. As part of the event, Schwartz attended, remotely, a conversation between herself, the moderator Jen Thorp, and members of the audience. After a screening of her 1972 abstract animation *Enigma*, Schwartz commented "I truly appreciate your response to the films, but it saddens me—I said film, because that's what it is originally—and it's now in digital format and you do not have the resolution you have in film, so you're not seeing it in the way it should be seen, even though with the digital format I've done color correction."¹³

Despite Schwartz's practice of merging multiple mediums and technologies, for her the work of art is still intrinsically tied to the materiality of the substrate and the tools used in making it. A 16 mm film—itsself a transfer from 35 mm film— will produce a specific and different kind of perceptual experience for the viewer than a born-digital animation. However, *Exalt* is not only about the distinct properties of analog and digital images and

projection; it is also about relationality itself. It references her shared early experience with Don White and his laser pen, and also speaks to her relationship to herself in a state of flux, specifically to health issues that limit or restrict what her body could do.

In 1955, after serving as a cadet nurse during WWII she contracted polio; her "limbs were paralyzed, and the conclusion of Western science was that nothing could be done."¹⁴ While in hospital, she was introduced "by a Japanese attendant who had taken a liking to me" to a Zen master, Tshiro, with whom she began studying meditation and, first, the philosophical principles and eventually the practice of calligraphy.¹⁵ During their lessons, Tshiro instructed her to visualize each motion and brushstroke needed to create complex calligraphic forms. Unable to pick up a brush, Schwartz "studied these brushes for weeks. I had to isolate each brush and contemplate its peculiar function, its shape, how I would hold it. My entire focus was on the act of creation. I had to know the composition I wanted and then select the appropriate brushes, ink, and paper. It was only months later that the Zen master slid a brush onto my hand, saying it was now time to work."¹⁶ According to Schwartz, this practice of detailed visualization helped her regain her ability to walk, and importantly, expanded her artistic imagination; "I learned to paint in my head before I even put a line on the paper."¹⁷

During the same conversation at the EYEO festival, after the screening of *Enigma*, Thorp announces his intentions to show one more film: *Exalt*. Schwartz responds, "I think that's a good idea because well in 1955, I developed an eye disease—chorioretinitis. I'm known as an atomic vet. I was in WWII after the bombing in Japan, and, things have gotten worse, so I'm still working, and have students and graduates who with me because it's difficult—I know what I want and they carry it out for me....By the time I reached that point, I was losing resolution and color perception."¹⁸ When Schwartz's vision began to deteriorate, she compensated for this in her practice by reducing her color palette to RGB/CMYK, the color values she could most easily perceive. Additionally, with her limited eyesight, her production process itself needed to change. In this context, her statement "I know what I want" is particularly striking. Having compiled, in her mind, the precise forms and movements for each artwork, she verbally translates the details of the animation she sees clearly "in her head." Her account reflects, uncannily, her training by the Japanese master calligrapher during her polio-induced paralysis.

3. Insect Assemblages

In writings, interviews, films, and other media productions, Schwartz lauds the unpredictability of computing systems. For her, bugs make working with systems enjoyable precisely because they expose facets of that system that would have otherwise remained invisible. Moreover, because their use-value is initially unclear, they pose a question—what to DO with the appearance of the unexpected. She used random number generators "to see what would happen, just as Writers and Picasso require muses: The green eyes or the flare of nostrils"¹⁹ and collected bugs, which do not sting as in real life, to push her to see in new ways. In an email to Rebekah Rutkoff, Lillian's

¹³ "EYEO 2014: Lillian Schwartz Conversation." Minneapolis, Minnesota. Moderated by Jen Thorp with Mark Hansen. Accessed February 3, 2024

¹⁴ Schwartz, Lillian & Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York: W.W. Norton & Company, 1992 p. 5

¹⁵ Ibid p. 5

¹⁶ Ibid p. 6

¹⁷ Thorpe, Jen and Schwartz, Lillian "EYEO 2014: Lillian Schwartz Conversation." Minneapolis, Minnesota. With assistance from Ben Rubin and Mark Hansen. <https://vimeo.com/116553250> Accessed February 3, 2024. See also Schwartz, Lillian & Schwartz, Laurens R. *The Computer Artist's Handbook* p. 6

¹⁸ Thorpe, Jen and Schwartz, Lillian "EYEO 2014: Lillian Schwartz Conversation." <https://vimeo.com/116553250>. Accessed February 3, 2024

¹⁹ Ibid <https://vimeo.com/116553250> Accessed February 3 2024

son Laurens recounts that Schwartz “roamed the long hallways of Bell Labs in search of stimulations; in a chemist’s trash can she once found sequences of images animating atoms and molecules at a moment when FORTRAN couldn’t produce the circular shapes she needed for a film.”²⁰

Schwartz’s practice of collecting bugs in computing systems is essentially a practice of collecting glitches. The glitch may be used—as in contemporary glitch art—to disrupt continuities and to de-habituate the artist’s relation to her work as a whole or to a particular work.²¹ Upon the invention of random number generators, Schwartz incorporated them into her practice, viewing this as an opportunity to learn and to further develop her skills in creative computing—not only using the computer as a tool, but expanding the known boundaries of what the tool can do and what it can reveal. Although coding in and of itself does not always execute as predicted, glitches and random number generators inject chance outcomes into computational processing. In the 1960s and 70s, Conceptual artists relied on chance and to remove authorial intention (and decision) from their process, and in so doing to challenge the lionization of artistic genius. In the early 2000s, Generative artists encoded chance and randomness into programming languages to underscore the creative, even liberatory potentiality of computers and computer-generated art.²² Although the results have a distinct aesthetic sensibility, their employment of chance critiques a false equivalence of digital computing with logic, linearity, and productive efficiency.

For Schwartz, control of process and outcome inheres in creative decision-making; if she prefers an unexpected outcome, she activates her preference by making use of it rather than letting it direct the work without her. In contrast, the core principle of Generative coding is that the system must direct the work without the programmer’s intervention. Further, Schwartz maintains that over-reliance or adherence to one method forecloses upon the greatest feature of computing devices as tools for artists; the continual development of and changes in hardware, software, peripherals and programming languages. The computer is the one tool that has the capacity to show her what she did not already know. A master of computer art, then, is always simultaneously a novice.

By disimbricating unexpected outputs and loss of control by the artist, Schwartz describes, if indirectly, an important distinction between code that executes chance operations in real time and programs that require input from the user in real time to generate visual and/or sonic output. Just as a painter might prefer oils to acrylics, or a sculptor might use porcelain to achieve a specific conceptual and aesthetic end, an artist who uses computing as their primary tool will often favor a particular programming language. For example, a Generative artist using Casey Reas and Ben Fry’s programming language Processing²³ writes code in advance and sets it in motion. Because chance is written into the code, the movement of graphic elements on the screen is unpredictable. In contrast, because the user moves objects, connected by patch cords, directly on the screen instead of writing lines of code, Max is considered to be a visual language. Processing analogizes the algorithmic erasure of the

artist’s hand most famously articulated by Sol LeWitt’s statement that “the idea is the machine that makes the art.”²⁴ In Max, a variety of settings exist for encoding chance into the program, but Processing is generally the language employed by Generative artists. [Fig. 5, Fig. 6]



```
void setup() {
  size(480, 120);
}

void draw() {
  if (mousePressed) {
    fill(0);
  } else {
    fill(255);
  }
  ellipse(mouseX, mouseY, 80, 80);
}
```

Figure 5: Processing Sketch
<https://processing.org/tutorials/gettingstarted>
 February 11, 2024

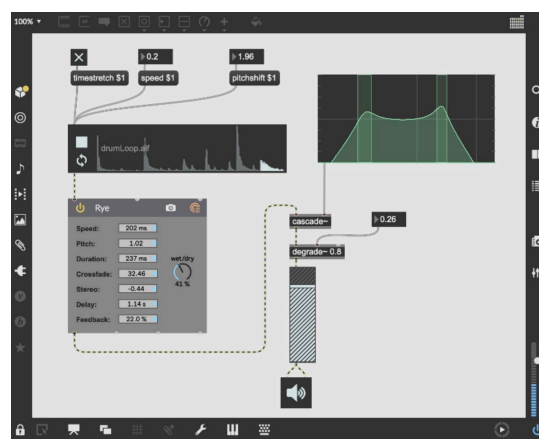


Figure 6: Max Interface Image Cycling '74 Product Website
<https://cycling74.com/products/max> February 11, 2024

The affordances and limitations of any system will not only dictate what it can do, but also how it looks, moves, and sounds. In their discussion of “the mutual mediation of aesthetics and digital technologies,” Joe Snape and Georgina Born contest “the discourse that surrounds Max, [which] constructs the software as aesthetically neutral, transparent and infinitely reconfigurable – a mirror reflecting back pure authorial intention....[However,] Max and similar computer music environments are powerful mediators. They are not neutral channels supporting human musical imagination and labour; rather, they have particular proclivities.”²⁵ In both Processing and Max, or indeed in any other graphic programming language, the aesthetic properties of any artwork—whether generated through computers or paint on canvas—will be inflected by the shapes, textures, and other

²⁰ Rutkoff, Rebekah. “Painting by Numbers: The Art of Lillian Schwartz” *Artforum* Vol. 55 No. 2 October 2016. <https://www.artforum.com/features/painting-by-numbers-the-art-of-lillian-schwartz-230796/> accessed February 4, 2024

²¹ The scope of research and creative practice related to the glitch is vast. For a primary reference, see Rosa Menkman’s iconic “Glitch Manifesto” <http://rosamenkman.blogspot.com> Amsterdam/Cologne; 2009/2010. Accessed February 4, 2024

²² For a foundational writing on Generative Art, cf Galanter, Philip “What is Generative Art? Complexity Theory as a Context for Art Theory,” *International Conference on Generative Art*. Milan, Italy 2003

²³ Cf Reas, Casey and Fry, Ben. *Processing: A Programming Handbook for Visual Designers and Artists, Second Edition*. Cambridge; MIT Press, 2014

²⁴ LeWitt, Sol “Paragraphs on Conceptual Art” *Artforum*, Vol 5, Issue 10 (Summer 1967), pp. 79–84

²⁵ Snape, Joe and Born, Georgina. “Max, music software and the mutual mediation of aesthetics and digital technologies” in *Music and Digital Media: A Planetary Anthropology*, Georgina Born, ed. London; University College London Press, 2022.

characteristics of the distinct hardware/software and analogy/digital tools used to make them.

Snape and Born go on to argue that working within constraints and ready-to-use files creates *assemblages* [emphasis mine], and that, “the challenge of analysing a human-music-technological assemblage like Max poses the need for a double historicity: it requires that we engage not only in tracing the technological genealogies immanent in the assemblage, but also the specific aesthetic genealogies being drawn on in contemporary practices” Snape and Born’s nomenclature—their description of Max as assemblage—recalls Schwartz’s habit of scavenging and repurposing materials found on the streets of New York, as well as her affiliation with the Trash Art movement in the 1960’s. Following Snape and Born, “we cannot equate materiality in digital music assemblages, then, solely with physical objects, but have to consider the materialities of code, of electromagnetic waves, indeed of sound itself – entities that stretch or defy orthodox definitions of an ‘object’.”²⁶ core principles of assemblage pervade Schwartz’s bodies of work in animation and beyond, most famously in her hybridization of punch-card programming and painting for the production of her now-canonical 1970 animation *Pixillation*. Though not a product of digital computing, *Proxima Centauri*, is an assemblage that moves across a range of social, cultural, art historical, and technical milieux. Schwartz’s animations, which integrate computer generated graphics, peripheral, hand painting, and other systems, are as concrete and material-specific as a sculptural assemblage constructed from cast-aside materials harvested from the streets.

At Bell Labs, many of the tools Schwartz found most rewarding were cast off or abandoned: programs, peripheral devices, or strips of magnetic tape. Moreover, in part because computer time was expensive, Schwartz would recycle film sequences similarly to her habit of collecting and repurposing found materials on the streets of New York City for pre-computational artworks including *Proxima Centauri*. Reusing a single sequence ten times in different films would enable her to change “motion color and editing until I could make a computer into a tool for art and science and free myself from those early years of fighting for each computer sequence and trying to make something out of geometry.”²⁷ A caveat here is that while this freedom from geometry might suggest that Schwartz abandoned notation altogether in favor of a more lyrical fluidity, Leon Harmon’s *Computer Nude* has not itself been cast aside or forgotten. Despite its abandonment of the traditional curvatures and pose of the nude figure, the seductiveness of *Computer Nude*’s poetic, aesthetic, and technological sensibilities remains visible in many of Schwartz’s artworks.

4. The Art of Running

Any moving image is, of course, time-based, but many of Schwartz’s figurative artworks, including her 1971 animation *Olympiad*, [Fig.7] enter into art historical conversations. Duchamp’s *Nude Descending a Staircase, No. 2* (1912) [Fig. 8] or Giacomo Balla’s *Dynamism of Dog on a Leash* (1912), [Fig. 9] for example, both represent or signify temporal progression through precise but necessarily static geometries. In contrast to the refinement and intricacy of Duchamp’s *Nude*, in *Olympiad*, blocky, lego-like humanoid figures rendered in red, green, and blue traverse the screen. At first, they move in a simple, linear pattern from one side of the frame to the other. But as the figures multiply with increasing rapidity, they break from the parameters of an invisible grid and scatter into disarray.

²⁶ Snape and Born p. 225

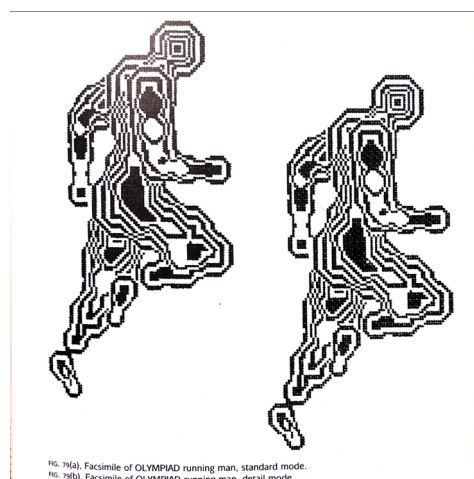


Figure 7: Lillian Schwartz, Facsimile of *Olympiad* 1971 Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York; W.W. Norton & Company, 1992 p. 139

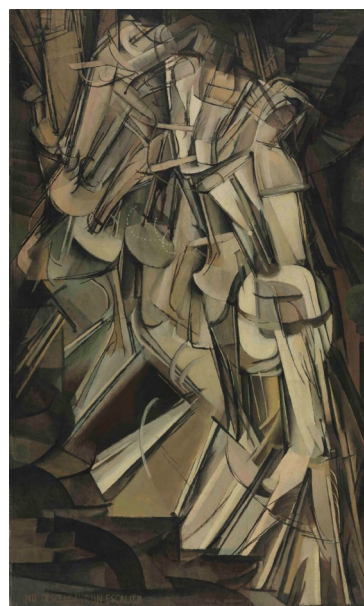


Figure 8: Marcel Duchamp, *Nude Descending a Staircase, No. 2*, 1912. Philadelphia, Philadelphia Museum of Art

²⁷ “EYEO 2014: Lillian Schwartz Conversation.” Minneapolis, Minnesota. Moderated by Jen Thorp with Mark Hansen. Accessed February 3, 2024



Figure 9: Giacomo Balla *Dynamism of a Dog on a Leash*, 1912. Buffalo, Albright-Knox Art Gallery

Amongst other works by Schwartz, both animated and still, *Olympiad* takes inspiration from late 19th century photographic motion studies by Eadweard Muybridge [Fig. 10] and Étienne-Jules Marey [Fig. 11]. Muybridge, a landscape photographer by trade, was hired in 1872 by Leland Stanford to settle a bet that all four legs of a horse trotting are suspended in the air for a split second. Unlike Muybridge, whose work circulated in the domain of professional photography, Marey was a scientist—a physiologist. “He wanted his work to provide measurable, indisputable scientific facts regarding the locomotion of humans and animals. He wanted to know how movement happened, not what movement looked like.”²⁸

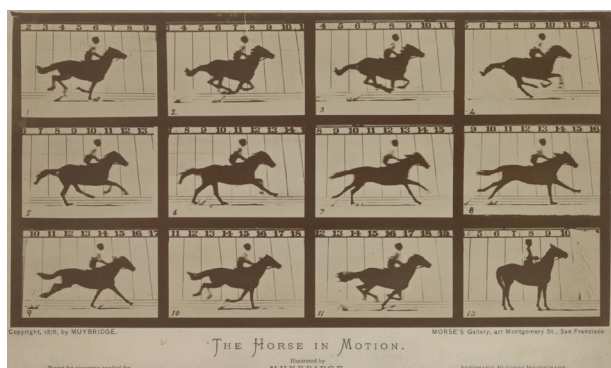


Figure 10: Eadweard Muybridge *The Horse in motion*. "Sallie Gardner," owned by Leland Stanford; running at a 1:40 gait over the Palo Alto track, 19th June 1878 / Muybridge, 1878. Library of Congress

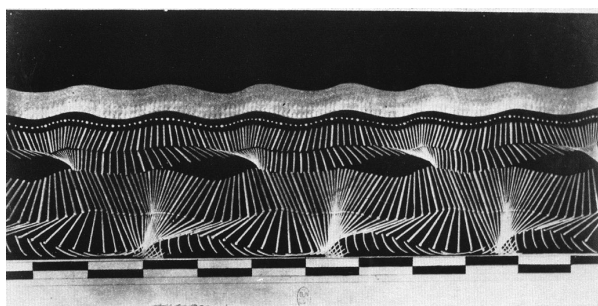


Figure 11: Étienne-Jules Marey *Soldier Walking*, 1883. Paris, Collège de France

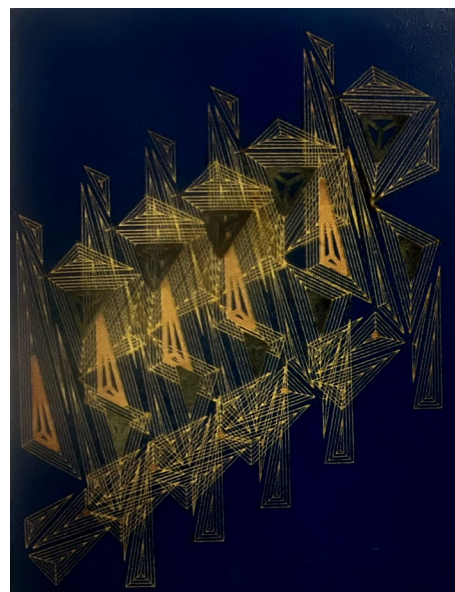


Figure 12: Lillian Schwartz *Homage to Duchamp: Nude Ascending the Staircase*, 1970. Schwartz, Lillian and Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York; W.W. Norton & Company, 1992, p 241

Although Muybridge cast himself as an artist, it was, paradoxically, Marey's chronophotographic anatomical and motion studies that made waves in artists' imagination at the time. His influence reached far beyond medical science to Futurist painters' studies of dynamism, and, critically, to Marcel Duchamp's *Nude Descending a Staircase No. 2* which would become the subject of Schwartz's computer-generated *Homage to Duchamp: Nude Ascending the Staircase* (1970), [Fig. 12] discussed in further detail below.

Nevertheless, Muybridge's studies are ever-present references in scholarship on the history of photography, film, and other fields under the broader umbrella of visual culture studies. His photographs, viewed even as simple silhouettes, proved that human vision could not perceive the full range of a horse's legs in mid-gallop. To capture the horses' movement, Muybridge set up twelve cameras, each pointing at a track marked with vertical lines. Horses would trigger electromagnetically controlled shutters by breaking thin threads as they passed. Muybridge's study made time visible, though not in a fluid way.

The system was designed like a program—it offered up a mechanism to show HOW to make visible what could not otherwise be seen. Schwartz too, sought to create and/or reveal the imperceptible through hybridization of mediums. *Olympiad* breaks with the techniques of Duchamp, Muybridge, and other influences. This break, however, is by no means a refusal, but rather a means to understand more fully the ways in which computation can function dialogically with the conceptual and technological worlds of her predecessors. As *Olympiad* unfolds, the pathways of the figures deviate from the striated intervals of a horse galloping across tripwires; linearity scatters as the screen is flooded by runners, whose movements in turn become increasingly haphazard.

²⁸ Robinson, Lisa. "History of Photography: Muybridge and Marey. Photofocus. <https://photofocus.com/inspiration/history-of-photography-muybridge-and-marey/> Accessed Oct 16, 2023

Though less well-known than her animations, Schwartz's computer-driven art analysis, first developed in 1980, and her computer-generated art appropriations present two more strategies for computationally activating time and transformation. Schwartz's work on computer-generated appropriations, beginning in 1970 with *Homage to Duchamp: Nude Ascending the Staircase*, spanned more than two decades. From the outset, her techniques alone complicated the conceptual and aesthetic frameworks typically used to define appropriation. And, as the capabilities of computers changed, so did her investigative methods. In producing *Homage to Duchamp*—her point of reference Duchamp's 1912 *Nude Descending a Staircase*—Schwartz did not simply scan the image into a computer and attempt to replicate Duchamp's techniques. Duchamp splintered representational norms in which motion is implied through expressive, gestural postures. In her strategic remediation of Duchamp, Schwartz eschewed figuration altogether by generating a series of abstract shapes that she arranged and rearranged them on the computer screen.

Wolfgang Ernst, in his discussion of the digital archive, cites George Stibitz who, in 1942 “defined the essence of the digital computer as ‘the ordering of computation steps in time’.... ‘Digital computation is dynamic in character.’” Painting is fundamentally and materially static. But, if motion cannot be actualized, rendering the figure as a progression of asymmetric geometries succeeds in fracturing the illusion that motion can exist in a state of wholeness. As the philosopher Henri Bergson averred in 1911, “the introduction of motion into the genesis of figures is ...the origin of modern mathematics”²⁹

Through her introjection of the computer, Schwartz was able to oscillate between motion and stasis. She “adapted a program, intended for drawing integrated circuits, to draw triangles in explicit locations.... Just as Duchamp shifted and overlaid a photographed figure to create movement in abstract shapes, [she] arranged the triangular shapes to represent motion in *Homage to Duchamp*.”³⁰ The finished product—a photographic negative that could be etched or printed onto a solid substrate—was a recursive formulation of Duchamp's static image. Later, Schwartz combined her studies of Duchamp and Muybridge, “to build on the idea of reducing a moving figure to mere lines for a cinematic effect. The resulting film [which we now recognize easily as *Olympiad*] shows a series of figures formed of octagons.”³¹

Schwartz's *Homages* series complicates the relationship between painting, photography, computation, and figuration. Artists' tools do not exist in isolation, but can also illuminate properties of the mediums for which they are most often used. In her essay “Computers and Appropriation Art: The Transformation of a Work or Idea for a New Creation,” Schwartz cites Duchamp's idea that “a specific placement of images in two dimensions can suggest motion.”³² And, in an unpublished memoir, she recalls thinking: “I can get flickering

surfaces like the Cubists, and capture the sensation of objects in motion like [Giacomo] Balla, like the Futurists.”³³ As I have argued, the affordances of any programming language will influence its aesthetic properties. In *Olympiad*, Schwartz capitalizes the octagonal units that structure the EXPLORs visual world. Pushing the code to approximate roundness—of a head, for example—resulted in figural distortions. Here, her experiments with EXPLOR's graphic limitations produced an unexpected behavior in the code, a happy accident that enlivened her visual and conceptual dialog with Duchamp's geometrical dissections of motion. The subtle irregularities encoded into *Olympiad* were a product of Schwartz's “desire to break up forms—to decompose them much along the lines the cubists had done. But [Schwartz] wanted to go further....”³⁴

In the 1980's, Schwartz, using her method of computer-driven art analysis, began extracting libraries of features from canonical images such as Leonardo's *Mona Lisa* (1503-19). Her library functioned as a database that could be sorted, rearranged, and recombined. Additionally, the database, hearkening back to the notational systems underlying early works *Head* (1958), the database provided a visual vocabulary with its own grammatical structure.

Schwartz makes clear, however, that art analysis—including the extraction of features for the database—is neither in principle not in practice a tool that serves technological reductivism. The database is only one facet in her complex and dynamic engagement with the artworks under examination. Much like the graphic interface in Max, features in the database can be patched together and distorted in real time. Schwartz is also careful to emphasize that color, in particular, resists grammaticalization. In certain cases, the insistent presence of color would occlude her point of entry into the artworks; “I...decided to divest [Van Gogh's *Starry Night*] of all color and then replace each color, one at a time. When examining the work's composition without color, I realized that Van Gogh did not paint this work in a state of emotional frenzy as is commonly suggested. *Starry Night* is a carefully constructed work of art.”³⁵ Moreover, “[t]his type of analysis can be as sophisticated as your system allows.... If your computer has enough storage capacity, you can...perhaps [achieve] a sense of why the artist chose one path over another.”³⁶ [Fig. 13]

29 Bergson, Henri. *Creative Evolution*. Arthur Mitchell, trans. Mineola; Dover Publications Inc. 1998, p. 32

30 Schwartz, Lillian. “Computers and Appropriation Art: The Transformation of a Work or Idea for a New Creation” *Leonardo* Vol. 29, No. 1 (1996), pp. 43-49, p. 44

31 *Ibid* p. 44

32 Schwartz, Lillian. “Computers and Appropriation Art: The Transformation of a Work or Idea for a New Creation. *Leonardo*, Vol. 29, No. 1 (1996), pp. 43-49

33 Schwartz, unpublished memoir, chap. 5, 25 cit in Rutkoff, np

34 Schwartz, Lillian & Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications*. New York; W.W. Norton & Company, 1992 p. 241

35 Schwartz, Lillian. “Computers and Appropriation Art: The Transformation of a Work or Idea for a New Creation” *Leonardo* Vol. 29, No. 1 (1996), pp. 43-49, p. 44

36 Schwartz, Lillian F. and Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications* p 268



Figure 13: Vincent Van Gogh *Starry Night*, 1889. New York, Museum of Modern Art

Data and code are used in Schwartz's art analysis to identify mutability in features and to bring alive—into the present tense—techniques employed by each artist. As in all her work, Schwartz emphasizes the complex potentialities of the computer as a tool for the artist. It can produce new knowledge by hybridizing its intended use—value—precise, rapid calculation—with its facility for generating often unexpected transformations in real time. The conceptual framework and methodology that guides Schwartz's analysis fuses art and computational technology to renew and renegotiate the way we see and understand works of art.³⁷ The polyvalent methodologies of art analysis grew out of Schwartz's desire to more fully understand the technical and creative processes employed by the artists she identifies as most influential to her own practice, including Leonardo, Piero de la Francesca, Duchamp, and Picasso.

Just as the Japanese master calligrapher taught Schwartz to control even the smallest muscle movements, art analysis zooms into the micro-level of a painting. Seeing where a brushstroke begins places the viewer in a temporal, rather than static relationship with the image. "The function of the artist is to provide imaginary scenes that would otherwise be impossible to see. The viewer, as collaborator, makes the illusions work."³⁸ Through art analysis, Schwartz considers how to provoke a viewer to consider painting as a real-time, fluid process of figuration and reconfiguration.

5. Dance & The Technics of Time

While musing on the pitfalls of choreographic notation in 1968, Merce Cunningham shifted his attention onto the subject of technology. "It seems clear that electronic technology has given us a new way to look. Dances can be made on computers, pictures can be punched out on them, why not a notation for dance that is immediately visual?"³⁹ Notational systems for dance get stuck in the slipperiness of dancers' interpretations and their unique ways of inhabiting their own bodies. A body in motion can never perfectly replicate its most everyday movements. To be alive is to be in flux, to move in time and space in ways that are contingent on the slightest change in atmosphere, in social dynamics, in physical health...etc.

³⁷ Taking into account that most of the artworks addressed by Schwartz in this context are drawn from the Western canon.

³⁸ Schwartz, Lillian. "Computer-aided Illusions: ambiguity, perspective and motion" *The Visual Computer* 14, p 52-68. Springer-Verlag, 1998. p. 68

³⁹ Cunningham, Merce. *Changes: Notes on Choreography*. Frances Starr, ed. New York; Something Else Press, 1968 <https://www.mercecunningham.org/the->

Writing about *Enigma* (1971), Schwartz underscores the relationship between color and the materiality of film itself—not to mention its resistance to digitization. Additionally, she notes the dancelike movement of linear patterns and their resemblance to states of motion in the human body. [Fig. 20]

"A minute into the film, I used traditional film techniques to slowly add colors to the frames where the false colors are observed. The result is that the frames with real colors seem more saturated. At the same time the lines appear to "dance" off the screen. When textures and clearly defined patterns are inserted into the lines, the shapes give the illusion of "sitting" in front of the lines.⁴⁰ We also see elements of dance in *Mutations* (1972), which indexes on sweeping gestures in tracelines of light that coalesce into tangled, enclosed forms, and then take flight into looping pirouettes and arabesques. At times, the juddering encroachment of solid crystalline shapes initiate duets with the nimble, spritelike lines.

My final example, *3°K #2* (1982), [Fig. 14] brings the metaphorical dimension of dance present in *Enigma* and *Mutations* into real-time interaction between the programmer (Schwartz) and live dancers. Here, I return to my initial claim that Schwartz, in collaboration with Bell Labs researchers, contributed to and/or influenced the early development of real-time visual programming languages. *3°K #2* illustrates, vividly, Schwartz's accomplishments as a specialist of morphodynamics; here, the programmer, in concert with her collaborators, generates a morphogenetic assemblage of interactions, gestures, and sensory perceptions.



Figure 14: Lillian Schwartz, *3°K #2*, 1982. ©Lillian Schwartz. Screenshot <https://lillian.com> February 11, 2024

Throughout her practice, Schwartz foregrounds not only the affective impact of color, but also its materiality. In her art analysis, color escapes the framework necessary to conduct the dis- and re-assembly of her database of features. Color is a beautiful occlusion that occupies space and seduces the viewer in a manner distinct from line or outline. In *3°K #2*, figures are surrounded and connected by auras of color, ranging across a spectrum of red to blue. Here, color reads, intuitively, as a visualization of heat-indexed energetic fields that emanate from and merge individual figures. Even a highly attuned viewer is unlikely to know that these shifting colors reference heat signature of a body infinitely larger than those of the dancers in motion; the auras, and their color spectrum, are a scaled down

work/writings/notations-from-merce-cunningham-changes-notes-on-choreography/ accessed February 4, 2024

⁴⁰ Schwartz, Lillian F. "Computer-aided Illusions: Ambiguity, Perspective, and Motion." *The Visual Computer*. 14:52-68Springer-Verlag, 1998. p. 56

visualization of cosmic microwave feedback from the birth of the universe. [Fig. 15]

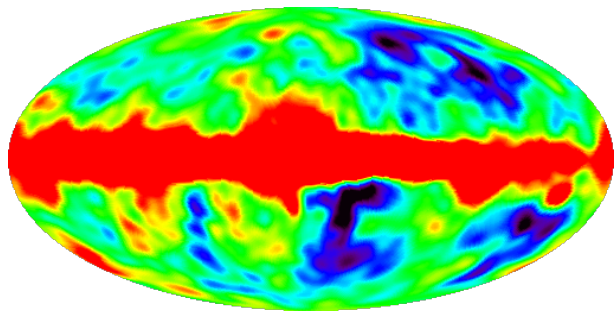


Figure 15: Cosmic Microwave Background. NASA Goddard Space Flight Center, Maryland

The Cosmic Microwave Background is a uniform fog of radiation that fills the universe. It is a remnant of the energy expelled at the moment of the Big Bang, still visible as a faint glow through a radio telescope at the low frequency range of microwaves. In the first moments of the Universe's existence, it glowed with the intensity of white-hot plasma. The heat was so great that subatomic particles were unable to fuse. As the universe expanded, the thermal density of the plasma dissipated. Electrons began to bind with protons, forming hydrogen atoms, when the universe cooled to 3000 Kelvin, or, 3K.

The existence of the Cosmic Microwave Background was an accidental discovery in 1965 by the radio astronomers Arno Penzias and Robert Wilson. Penzias, who won the Nobel Prize in 1978 for this happy accident, also happened to be a Bell Labs researcher who collaborated extensively with Schwartz. In the Foreword to Schwartz's *Computer Artist's Handbook*, Penzias writes: "Once you have finished reading this book, you may discover that you know more about everything than you ever thought possible....This careful weaving of art history, the development of technology, and the craft of art is aimed at one goal: the development of the artist's eye....Lillian does not drop a final curtain. Perhaps she sees herself as the person who dared rub the genie's bottle, working her way through the smokiness of dreams to find a set of magical commands....Personally, I believe she has hidden the bottle's stopper."⁴¹

In the production of *3°K #2* Schwartz, sitting in a room with a keyboard retooled as a musical instrument, live-recorded dancers using an "interactive, real-time computer video setup."⁴² The stage was small—she struggled to keep the dancers in the frame. She was part of the dance, just as she is, at all times, an artist fully absorbed in and thus a part of the work she is making. The fact that her tool is a computer does not diminish her integral process in the creative act.

The dancelike movements of forms in *Enigma* and *Mutations* spill over in *3°K #2* into a controlled chaotic environment of flux, presence, and programming. Although the strange auras emanating from, or surrounding, the dancing figures are added in post-production, the film reaches its hand into the future of the real-time audio-visual processing systems to which Max Mathews and other collaborators devoted their

careers. Though liveliness and dynamism play front and central roles across all of Schwartz's bodies of work, dynamics of multiplicity, ambiguity, and the unexpected are intensified and complicated in this space. Liveness itself is a bug, or a glitch, two otherwise unsavory characters already elevated by Schwartz into a space of artistic and technological potentiality. Schwartz, unphased by the smoke from the genie's bottle, transforms the magical commands she sees so clearly in her head into a visual world in which bugs, glitches, dancing lasers, cosmic radiation, and musical keyboards are all, finally, agents of creative possibility and engines of transformation.

Acknowledgments

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Also see Schwartz, Lillian F. and Schwartz, Laurens R. *The Computer Artist's Handbook* p. 189

⁴¹ Schwartz, Lillian F. and Schwartz, Laurens R. *The Computer Artist's Handbook: Concepts, Techniques, and Applications* p. xi

⁴² "I have always been interested in filming dancers. But for Juggler and Dancer [both 1977 and films I do not discuss within the scope of this paper], I was experimenting with a system that was built for the picture phone. A camera was hooked up to the computer; a colleague programmed the keyboard attached to the computer so that I could play it like a musical instrument. I could capture an image and combine it in many ways with an image already stored in the computer. I could also use light and colors in new and unique ways. This was very new in the early

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The Point Cloud Aesthetic: Defining anew visual language in media art

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Abstract

The development of remote sensing technologies, such as LiDAR and photogrammetry, accompanied by the exponential growth of easy-to-use 3D scanning applications and associated post-processing software, have made point cloud datasets accessible to a widening range of artists, designers, and creative technologists. Does this growing interest and increased accessibility indicate the emergence of a new digital art medium? This article offers an analysis of artworks that help define this Point Cloud Aesthetic as a distinctive visual language while contextually situating these contemporary artworks. After a brief introduction to key technologies in scientific and technical terms, we outline the medium's natural progression, from its use as a recording medium to an expressive one. We briefly address the visual similarity that point cloud-derived imagery has to Pointillism, noting the shared reliance upon the science of optics to inform both techniques. An aesthetic analysis of selected artworks follows, focusing upon four key elements proposed to distinguish the artwork's visual language: (i) subject matter (i.e., derived from a scanned 3D object or environment of the real world), (ii) transparency (i.e., the dissolution of objects and environments into data structures), (iii) ambiguity (i.e., technical artefacts, "glitches" or "mistakes" generated by the scanning process itself), and finally (iv) algorithmic shaping (i.e., data manipulated into expressive or representational forms as moving image, generative visualisation, virtual reality). Through an artist-led exploration of both the technical process and visual systems generated by scanning technologies, this article argues that by using a specific aesthetic, point cloud artworks challenge our way of "looking at" artworks that use scanning technologies and, in the process, indicate a new direction for this digital medium.

Keywords: point clouds; lidar; digital art medium; remote sensing; photogrammetry; visual language, aesthetic

1. Introduction

Earth science disciplines have been using remote sensing technologies for decades to collect highly accurate and rigorous information of enormous, often difficult to attain data, such as the estimation of deforestation levels, landslide hazard zones in a landscape, or the spatial mapping of archaeological sites (Figure 1) (Ivsic *et al.*, 2021). Using methods that measure electromagnetic reflection and transmission to identify, register,

and accurately measure the features of objects and environments of interest, this technology enables their visualization, interpretation, and manipulation, by digitally storing them as point clouds (Wehr and Lohr 1999). Therefore, the scanned physical object or area is represented through a collection of 3D points with highly accurate x, y , and z cartesian coordinates, known as point cloud datasets.

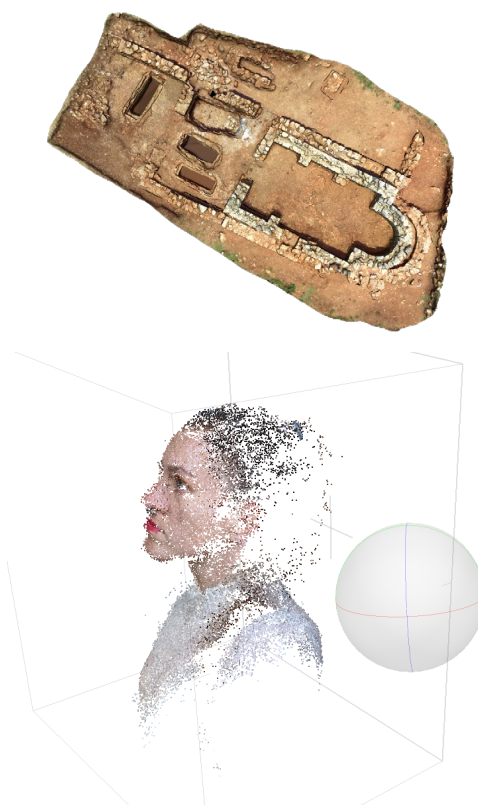


Figure 1. Archaeological site model (a) created from point clouds collected with terrestrial LiDAR data, and a photogrammetric raw point cloud model (b), generated from 57 individual photos, recorded with a phone camera (Google Pixel 4). Image credit: Lucija Ivsic.

Nowadays, upgraded and integrated with 360° cameras that also enable the collection of colour information, these rich datasets have the capability to create and regenerate scanned objects or areas in the form of highly detailed 3D models enhanced with full-colour rendering and precise real-world measurements (Fröhlich and Mettenleiter, 2004). Additionally,

recent LiDAR sensor implementations found in modern mobile phones permit everyday users to access this technology and create high-quality 3D models out of point clouds inexpensively and without prior experience with remote sensing. Hence, even through art practice, these point clouds are firstly used and celebrated for their high level of detail and precision, but, most importantly, for an almost perfect and truthful representation of scanned environments and 3D objects – something that was previously difficult or impossible using prior 3D modelling methods. These developments, along with the visual distinctiveness of the medium – including its transparency and sense of dissolution something we discuss in-depth in the next chapter) – have given rise to the evolution of point clouds in creative practice.

Early creative works using these digital technologies often focused on the technical aspects of point clouds. Take, for instance, *The Falstone Country Show* (2013) by ScanLAB Projects (Figure 2). This artwork captures an event in 3D resulting in a digital recreation that renders the scene as accurately as possible.



Figure 2. Point cloud excerpt of the work “*The Falstone Country Show*” by ScanLAB Projects (2013). Image credit: ScanLab Projects.

This ambition to use technical knowledge (and available technology) to perfectly imitate reality dates back at least to the Renaissance when it was instigated by the development of a simple camera obscura and colour theories. Initially used as an analytical model for the optics of the human eye and a guide for painters rather than a new aesthetic medium in its own right, the camera obscura ultimately revolutionized our means of representation (Kemp, 1990). This intense interest in light, shade, colour, space, and modes of representation among artists of the late 16th and 17th centuries can be best paralleled in Vermeer's paintings, such as *The Music Lesson* (1670) which utilized optical “mechanics” and was entirely informed by the process used with camera obscura (Arthur K Wheelock Jr, 1995). When placed in the context of the era within which this ambition flourished, it is no matter of chance that the utilization of new sciences, and new forms of art, were a top priority for European's striving for intellectual and material progress (Kemp, 1990). Further development in optical instruments around 1800 caused an important surge in both systems of imitation and amateur artists who were more focused on

producing small works as sensitive representations of admired scenes which contributed to the general aesthetic context of photography (Kemp, 1990). However, although these factors show photography as an organic part of historical progression and despite increased precision and fidelity of the images capable of being produced with successive technological advancements, distrust among the wider artistic community was created because of its lack of human “touch” and “artistic” expression (Kemp, 1990). The originality, personality, and expressive view coming from an individual artist took primacy and was far more appreciated than the dispassionate “machine eye” view present in photography.

Yet, a century and a half later came the birth of *photorealism*, a genre of late modernist painting in the 1960s (Meisel and Harris, 2018) which relied on photographs to create highly simulacra images. Characterized by the meticulous level of detail and precision, artists such as Richard Estes, Charles Bell, and Chuck Close, used the photographic image itself as their primary reference while seeking to de-aestheticize painterly technique to reduce any overtly expressive qualities that might betray the individual artist's “hand” in the execution of the work (*Photorealism Movement Overview*, no date). In contrast to the beginning of the 20th century, rather than celebrating authenticity and temperament found in expressive paintings, photorealists relied exclusively on the “machine eye” view, attempting to remove any human trace deliberately.

When translated to remote sensing technologies and their use in art practice, we may reasonably conclude how it is unsurprising that similar dilemmas present themselves in relation to early artworks created with point clouds. The natural progression of a new medium, such as remote sensing technology, inevitably starts with the utilization and exhaustion of the existing technical and systemic features, through which accidental and unanticipated results will occur and ultimately allow it to move forward to experimentation and expressive form.

Showcasing the versatile and hybrid nature of this new medium, in 2016, Marshmallow Laser Feast¹ collective (MLF) presented their new VR experience “*In The Eyes Of The Animal*” which was created by capturing the forest and animals using LiDAR, CT scanning, photogrammetry, and 360° aerial cameras (Figure 3). A binaural soundtrack of the surrounding forest was created to amplify the viewer's experience and in addition, the work itself was being exhibited within the forest. Here, the human intervention in the raw point cloud through technology-driven processing itself is evident and significant. This meticulous and rigorous collection of forest data – usually displayed in a very strict and uniform way by engineers – has now been manipulated, animated, and enriched with sound to tell an imaginative story about the forest inhabitants.

¹ Marshmallow Laser Feast collective (MLF) is a UK-based immersive art collective whose focus is on creating ambitious installations and mixed-reality works that dissolve barriers between ourselves and the natural world.



Figure 3. Excerpt from the “In The Eyes of The Animal” VR piece created by Marshmallow Laser Feast (2016). Image credit: Marshmallow Laser Feast.

In this article, we examine point clouds, the image-forming element of cutting-edge remote sensing technologies — or, as we call them, “machine eye” technologies — and document their transformation into a new digital art medium within the context of posthuman visions (Onishi, 2011). The shift from anthropocentric ontologies is just one element of posthumanism (Hayles, 1999). When extended to human-technological relationships, theories resonating with the aforementioned ontologies, such as postphenomenology as a philosophy of technology (Aagaard, 2016), consider machines as active agents in the co-creation of the work, rather than merely passive apparatuses (Ihde, 1990). After a brief introduction to Pointillism, a well-known art technique that shares reliance upon the science of optics with these new technologies, we use its visual similarity to the artworks created with point clouds to define key visual features of this new visual language. We then analyse these key features of the medium through a selective, but representative review of artworks that express the emerging creative practices using these technologies. This article concludes with a methodical summary of identified key aspects of point clouds in art practice, constituting a substantial and unequivocal understanding of this new digital art medium and its natural progression.

2. Point Cloud Visual Aesthetic

When pointillism appeared in the late 1880s as a new art technique, its capability to “trick” viewer’s perception by meticulously capturing reality without actually blending colours, revolutionized painting. Built upon the science of optics, more precisely on the way the light works, this state-of-the-art technique provided artists with a new, quasi-scientific (i.e., seemingly scientific, especially by using the “language” but not necessarily adhering to the methods or rigour associated with science), and technical type of tool to remodel and transform what art stood for at that time. Relying primarily on conveying the interaction of light and shadows to the human visual system which will turn discrete points of colour into other colours (Fahim and Hossain, 2017), paintings by post-Impressionist artists such as Georges Seurat and Paul Signac consist of several essential features such as colour juxtaposition, point size, and complementary colours and halos. Additionally, Seurat was known for his use of a relatively small number of colours when composing his paintings (Chuan-Kai and Hui-Lin, no date). While many other pioneers of this technique, such as Paul Signac made it look very simple, all these paintings were in fact quite complex technically to get right.

Similar features can be identified in artworks created out of dense point clouds representing carefully scanned physical objects, flora, and natural environments. By looking from afar, these images look relatively simple, resembling a human-made artefact such as a painting, yet, when looked upon more closely, an entire multifold structure reveals itself and shifts our perception into almost certain that this is done by a machine (Figure 4) (Ings, 2018). In the context of the current era, marked by the rapid development of various tools enabling users to amplify their digital presence, these “machine eye” technologies provide an aesthetically exciting departure from their generally acknowledged, purely technical purpose and equip the user with a powerful device to create digital art.

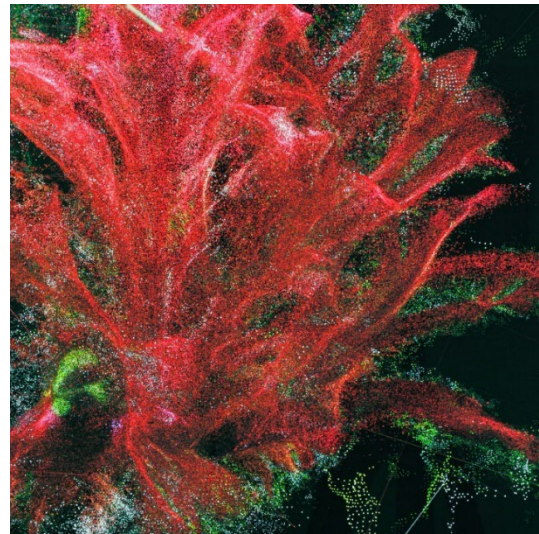


Figure 4. Phytosynthesis – Hibiscus Schizopetalus by Stefano Caimi (2021). Image credit: Stefano Caimi.

2.1. Defining key visual elements

Viewing point clouds beyond the usual technical and engineering lenses, reveals that they all carry a distinguishable aesthetic that strongly insinuates the existence of more elements, different from just mere precision. In an effort to distinguish what substantially creates this recognizable aesthetic, we propose the following four fundamental elements to explore the technology associated with the creation of point clouds: (i) subject matter, (ii) transparency, (iii) ambiguity, and (iv) algorithmic shaping.

2.1.1. From Matter as Subject, to Subject as Matter

Point clouds were always used to represent, reconstruct, and visualize certain data from the real world. They are generated through the process of scanning and registering real-world data where the scanner and its technical specifications play a crucial role in determining the quality of end results. Despite the rapid development of remote sensing technologies and their easier use through user-friendly hardware solutions, it is still necessary to have a certain level of expertise and familiarity with the scanning process to be able to get the desired results. In this case, matter from the real world is the key subject of the artwork for which representational concerns are paramount and based on accuracy, and fidelity. This can be observed in the case of

ScanLab's "The Falstone Country Show" work, which attempts to depict a real-world event and its participants (Figure 2).

As mentioned in the Introduction, as part of the natural progression of a new art medium, nowadays artists have a far greater choice over subject matter than previously. While often used by engineers and archaeologists to visualise heritage sites and buildings in construction, point clouds soon drew the attention of many tech-savvy artists, as they are the perfect medium to modify complex real-world data with creative and representational flexibility. As seen in the aforementioned work "In The Eyes of The Animal", now an expressive subject such as the lives of small forest animals is being materialised and freely interpreted through point clouds (Figure 3). This shows a progression which starts at a very technocentric and scientific side (Figure 2), where technology and "truthful" representation of the real-world subject take primacy, and then gradually transitions to the expressive side, where its other features such as ambiguity, and visual transparency constitute the focal point of the artwork (Ivšić *et al.*, 2021).

2.1.2. Transparency.

Visually recognisable as a dissolution of objects and environments into their fundamental representation (the point), transparency is the second key feature of point-cloud derived artworks and is directly conditioned by the density of the point cloud. The point density is largely dependent on the type of scanner, subject matter, and scanning methodology, and in spite of its ongoing technological refinement, the occurring variation in results represents a major issue for many Earth-science disciplines (Petras *et al.*, 2023). Therefore, after registration², a common step among spatial engineers is to convert the existing point cloud into a simplified version - a polygonal, or triangular mesh that will create a cohesive 3D model with a solid surface. However, point cloud derived artworks use this variation in point size and density as their aesthetic foundation. Similar to analogue photography and film "grain", the individual rendering of each point conveys the interaction of light and shadow through their various sizes and spatial density, resulting in visual 'uncertainties' and ambiguous viewer's perception. By doing so, this feature relies on the science of optics, similar to how it was done during the 19th century in pointillism (Lucas, 2017).

2.1.3. Ambiguity.

Technical artefacts or 'mistakes', such as 'glitches' or 'mixed measurements' generated by the scanning process itself are conventionally treated as errors in data among engineers (Tin, 2020). When interacting with the environment, if part of the laser beam hits only the edge of the object of interest while the second part meets the object behind it, a phenomenon called 'mixed pixels' occurs. The range sensor then receives a 'mixed return' which leads to an interpolation of two measurements from which the scanner creates a 'fictional' or a 'ghost' point between the first object's edge and the second object behind it (Pearce, 2015). And while it is undoubtedly clear why these mixed pixels represent a problem in fast and accurate three-dimensional (3-D) representation of vegetation (Tuley,

Vandapel and Hebert, 2005), as with the visual transparency feature, in the case of point-cloud derived artworks they can be considered as the scanner's input, and a machine's 'eye' view of the real world environment. As such, they act as another main constituent of this apparent dreamlike and ephemeral visual ambiance that features ambiguity and multiplicity (Figure 5).

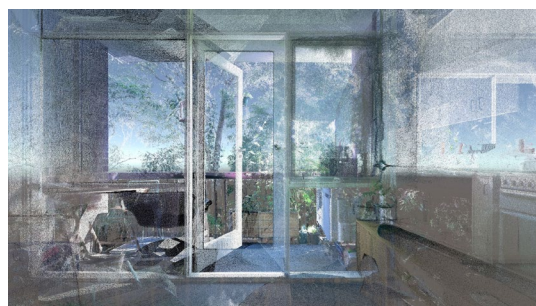


Figure 5. Still capture of the "What Homes are Made of: The Architecture of Displacement" by Lucija Ivšić. In this particular still image, it can be seen how balcony doors are opened and closed at the same time. Image credit: Lucija Ivšić.

2.1.4. Algorithmic shaping.

Existing in a digital format that is compatible with almost any computer software, the manipulation and rendering of point clouds nowadays is an incredibly versatile technology-driven process. Essentially limited only by the computer's CPU and GPU, and the digital post-processing know-how, it immediately appeals to artists whose practices lay at the intersection of art, science, and technology. As such, while this new medium often exhibits distinguishing characteristics of the 'purely digital' (Paul, 2002) through mapping and data visualisation artworks that focus on the aesthetic of this 'machine-eye' technology, it repeatedly illustrates its own hybrid nature evident through artworks that use a broad range of artistic practice: interactive installations, software art, and lately, virtual and mixed-reality (XR).

One such example is Refik Anadol's 'Latlong' (Figure 6), commissioned for the 350 Mission Building in the City of San Francisco, and created as a collaboration with Kilroy Realty Corporation. Here, Twitter activity is geo-mapped and used to produce a real-time visualisation of San Francisco. Rendered and transformed into millions of scattered particles, every individual tweet is visualized where it has been written, spotlighting the cityscape as a vibrant virtual social system. Created with sophisticated technology and extensive custom coding, 'Latlong' uses a point cloud aesthetic to display spatial data commonly perceived as tiresome, now enhanced with a form of 'social sculpture' and a 'swarm simulation' (Salimi, 2021) where the city's inhabitants are continuous sculptors of data.

² The point cloud registration is the process of storing digitally multiple point cloud datasets has been collected with remote sensing technology. The scanned physical object or area is represented through a collection of 3D points with highly accurate x,y, and z cartesian

coordinates, known as point cloud datasets which needed to be transformed into one coordinate system in order to be manipulated further.

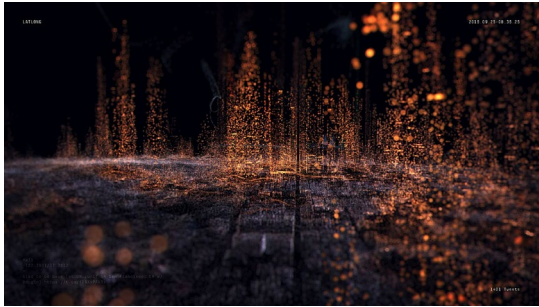


Figure 6. Still capture of the “Latlong” by Refik Anadol, publicly displayed in San Francisco. Image credit: Refik Anadol.

3. Point Clouds in Art Practice (A Review)

As this article establishes an artist-led exploration seeking to come to a deeper understanding of the medium (its properties, affordances and potential for artistic expression), the following review is not an art historical survey or curatorial critique but undertaken as part of practice-based research inquiry. We analyse three prominent artists and their finished works created with remote sensing technologies. The works discussed have been deliberately selected due to the strong, and distinctive visual presence of the “machine eye”, recognizable through the scanner’s role in the artwork’s compositional process. While differing from one another in their conceptual foundations, what they all have in common is the new way of “seeing” the subject matter from our immediate surroundings, exposing a posthuman outlook on the ways of working with this new art medium.

3.1. *Phytosynthesis by Stefano Caimi*

Over the past few years, we have observed a steady shift in the ways in which point clouds are represented and presented to the public. Instead of the usual use of large, public-scaled LED wall displays and swarm simulations, several artists have been creating still images printed in large formats, almost imitating the colossal paintings from the 19th century academic art³, found in large state galleries and museums.

Over 2018-2019, Caimi developed a series of works called *Phytosynthesis* that consisted of close-up images of flowers and leaves, created out of photogrammetry generated point clouds (Figure 7). Then, using bespoke post-processing software and algorithms, layers and depth inherent to the point cloud were enhanced to underline its transparency. In these works, a visual dialogue between natural and digital has been established through this particular ‘machine eye’ technology. Here, photogrammetry and its pertinent point cloud are crucial constituents and active agents in the compositional process and image creation (Pearce, 2015). Instead of just passively ‘representing’ the scanned object, the technology is actively engaged and provides us with a unique, almost transparent image of an object that exists in the real world. Additionally, recognizable characteristics of point clouds, such as multiplicity and ambiguity, make these still images come to life by blurring the edges, creating more space, and enhancing the ephemeral aura that usually surrounds nature. Through large-scale close-ups which clearly depict this meticulously complex structure “seen” by the scanner while retaining and even amplifying its

poetic and ephemeral components, perfectly showcases the expressive potential of this new digital art medium. Besides leaves, this project also contains a series of works reimagining flowers.



Figure 7. *Phytosynthesis* by Stefano Caimi. Image credit: Stefano Caimi.

3.2. *Remains by Quayola*

In 2016, using the latest LiDAR technology, Quayola⁴ developed his ‘Remains’ series, characterized by a meticulous digital rendering of very precise and data-rich scans, presented to the audience through room-scale prints in ultra-high resolution (Figure 8). Titled ‘Jardins d’été’ and containing prints and a video, the ongoing project focuses on nature and the tradition of landscape painting, establishing a strong interdependence between the artist and their technological means of realisation.



Figure 8. Excerpt from the ‘Remains’ series created by Quayola (2016). Image credit: Quayola Studio.

As with many paintings belonging to the pointillist era, ‘Remains’ resulted in hybridized sublime and immaterial forms, yet created from real-world, tangible data that successfully

³ Academic art, also known as academicism or academism is a style in painting and sculpture influenced by the European academies of art in the 19th century. After a very rigorous academic training, painters who practised the “academic style” often created colossal paintings.

⁴ Davide Quayola is a multimedia artist who uses computer software and cutting-edge technology to create artworks exploring tensions and equilibriums between real and artificial, old, and new.

‘tricks’ the viewer’s eye by offering a new way of ‘seeing’ landscapes. While these works celebrate the precision and complexity of detail in remote sensing technology—which is noticeably foregrounded through the use of large-scale prints—the sensibility that reveals itself through transparent and multifold point clouds (Figure 9) evokes further questioning if this is the work of an ‘objective’ and ‘passive’ scanner (Pearce, 2015). The inevitable timelessness of this body of work created by establishing and nurturing the strong linkage between the artist and this sophisticated technology, Quayola’s ‘Remains’ series manages to captivate and successfully transport the audience to those ephemeral moments in the forest, blurring the boundaries between the human and machine gaze.

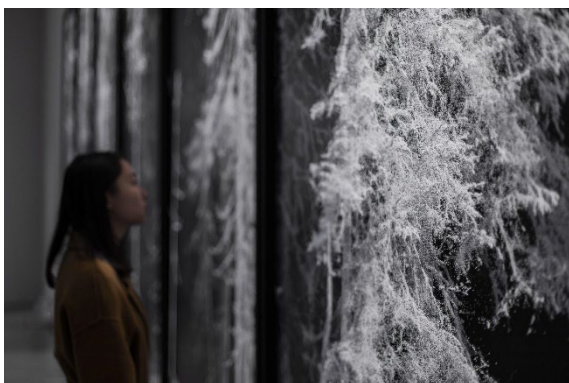


Figure 9. Close-up excerpt from the ‘Remains’ series created by Quayola (2016). Image credit: Quayola Studio.

3.3. *Continuous Topography by Dan Holdsworth*

Since 2012, the English artist Dan Holdsworth⁵ has been exploring the ‘extreme’ territories alongside geologists aiming to accurately register the contours of Alpine glaciers and rock formations. Using remote sensing technology, photography, and sophisticated software for post-processing, the resulting series called ‘Continuous Topography’ captures precise contours of a rapidly changing landscape. Brought to the viewer on large-scale displays (Figure 10(b)), the subject matter of these works is a set of complex and almost perfectly accurate maps of inaccessible and remote landscapes.

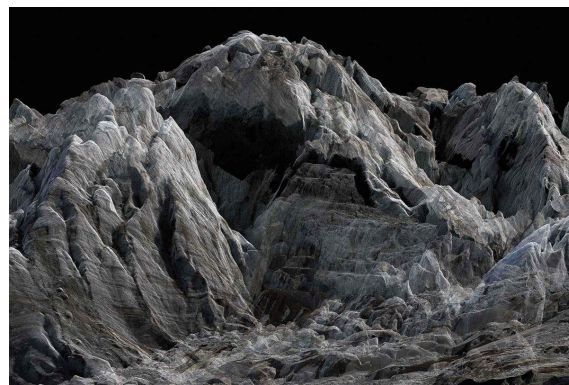


Figure 10(a). Excerpt from the ‘Continuous Topography’ series created by Dan Holdsworth. Image credit: Dan Holdsworth.



Figure 10(b). Excerpt from the ‘Continuous Topography’ series created by Dan Holdsworth. Image credit: Dan Holdsworth.

As is the case with the works by both Caimi and Quayola, here technology enhances the work by simultaneously introducing its own complex and multifold ‘machine eye’ perspective that is now revealed to the human eye. The scanner steps up from the usual role of the passive *camera obscura* and co-creates a new kind of landscape imagery rich with both high accuracy and ambiguity (Pearce, 2015). These works employ the visual ambiguity of point clouds to celebrate the landscape’s ephemeral nature while simultaneously ‘tricking’ the viewer into questioning if there is something immaterial and sublime involved as well (Ings, 2018). The astonishing amount of detail and rigorous data collected in perpetuity which now accounts for a historical record due to the constant landscape change marks it down as almost the ‘future archaeology’ as Holdsworth calls it.

4. Summary

As part of a practice-based research inquiry that seeks to investigate, explore and come to a deeper understanding of the medium (its properties, affordances, and potential for artistic expression), this article provides a selective, but representative review of exemplary artworks created with point clouds, to mark the natural progression of this new digital art medium by identifying and analysing common features found within existing works. Building upon Kemp’s *The Science of Art* and

⁵ Dan Holdsworth is a British photographer and a digital artist known for his geographical abstractions, and use of traditional techniques and long exposure times.

the importance of contextualizing a specific social structure and existing technological progress when discussing a new art medium, the natural progression of the way point clouds have found their place in art practice is mapped out through a selection of different works that have continued to evolve over recent years.

Born within the creative engineer's realm, as seen in works such as 'The Falcone Country Show', point clouds were initially celebrated because of their pure technocentric potential and truthful representation of real-world subject matter; these works were primarily created to intrigue the viewer with their representational power and cutting-edge ability to represent 'reality'. However, as artists discovered, there exists significant potential beyond scientific applications. In scientific applications sensing technology, with its meticulously collected rigorous data, is purely used as a mode of digital data visualisation, rather than as an active creative agent or a storytelling tool. However, this innate ambition to simply imitate reality wasn't accidental or undesirable; such ambitions have their origins in the Renaissance and then continued with the birth of camera obscura. It is necessary to first exhaust the existing technical and systemic features before the ability to experiment.

Moving forward, current artists such as Quayola, Stefano Caimi, and Dan Holdsworth are stepping away from the common notion of the human-technological relationship and placing the 'machine eye' view at the forefront of their large-scale works. By celebrating noise and 'mixed measurements'—non-existent points entirely created by the machine and commonly recognized as errors in engineering—features such as ambiguity and transparency are now the main visual constituents of the artwork. As such, these artists are exhibiting a point cloud representation of what the machine "sees". Furthermore, by slowly appearing in immersive technologies such as XR, and gaining increasing visibility within digital art communities, while facing many technical challenges that come with the richness of acquired visual data, point clouds have evolved into a multi-faceted digital art medium, whose potential is yet to be fully explored.

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Of Mentors, Teachers and Pioneers

Herstories of video and media art in Europe

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Abstract

In the 70s many women artists perceived video – that at the time was relatively new - as a tool free from the heavy patriarchal imprint of traditional artistic practices. Thanks to its technical specificities, it facilitated performance to camera and allowed working in intimate contexts. In several countries, the UK among them, many women artists who were experimenting with video were in Fine Art and Sculpture Departments. These environments were marked by a strong male culture and most of the teachers were still men. A few years later, women video pioneers would become teachers in the Art Schools and Universities in Europe, inspiring a new generation of artists – and, more importantly, women artists - to explore video and new media. Their relevance and influence as educators have, however, not been acknowledged in the histories of the medium and are yet to be properly investigated. An interesting and yet marginalised figure of artist and educator is for example that of the British artist Elsa Stansfield – who, as part of the duo Hooykaas/Stansfield, is not recognised as one of the most significant pioneers of video art in Europe. In 1980 Stansfield was invited to establish a Time Based Media Department at the postgraduate institute Jan van Eyck Academy in Maastricht, where she organised symposiums and exhibitions and invited some of the most important video artists and new media artists of the time including Bill Viola, Joan Jonas, Marina Abramović, Al Robins, and Toni Oursler. Stansfield's work as an educator and mentor influenced several artists who were students at the time at the Jan van Eyck Academy. For example, Swedish video and media artist Antonie Frank Grahmsdaughter recalled: "For me Elsa Stansfield was a great inspiration as a teacher. It was very important to meet female artists such as Joan Jonas and Marina Abramović, along with others who were invited to talk about their work at the Jan Van Eyck. It was also significant that they were female artists as we female students could identify with these female video artists in a film world dominated by men, which is still the case even today." This paper aims to question transmissions and teaching methods and approaches as well as discuss and reassess the legacy of a generation of women video and new media pioneers – including Stansfield, Nan Hoover, Tamara Krikorian, Catherine Elwes, and Elaine Shemilt - who became teachers and mentors in Art Schools and Academies in Europe and influenced deeply succeeding generations of media artists.

Keywords

Video Art, Art and Feminism, Media Archeology, Pedagogy.

1. Introduction

The commercial emergence of the portable video recorder in the late 1960s and early 1970s provided a key tool for many artists wishing to utilise a medium that was inherently more flexible and accessible than film. Many women artists, in particular, who were exploring intimacy, identity and the body, found in the Sony Rover Portapack the perfect ally.

It is interesting that Sony decided to use a woman model for one of their Sony Rover Portapack advertisements, presumably just to stress its light weight. The apparatus was portrayed as a fashionable shoulder bag to sport with a modern mini dress and a bob haircut.

The perfect accessory for the modern young woman. And yet, as can readily be experienced and as has been reported by many, the video tape recorder was although portable still hefty and relatively heavy (despite what the clever Sony advertisement might suggest).

However, borrowing an expression coined by the Italian video pioneer Luca Maria Patella, video was a "weightless" medium: a medium that was free from the cultural and conceptual burden of traditional art techniques. As a new medium most importantly, video eluded the established male-dominated art history canon, which had marginalised and excluded women artists and had been marked by a patriarchal gaze that had made women into models and objects. Therefore, video became particularly advantageous for those women artists who were exploring themes such as identity, the role of women in society and approaches to the gaze that had emerged during Second Wave feminism: it offered a unique platform and allowed immediacy and intimacy, thereby enabling women artists to incorporate elements such as nudity and the human body into their practice.

If teaching has always been the Cinderella of Academia and though very limited space has been devoted to, or attention paid to the history of how subjects were taught and art schools and departments developed, the knowledge to be had about women teachers and their key role in the teaching of video in the 1970s and 1980s (when it was a relatively new medium) is particularly limited.¹

In this paper I will focus on some germinal case studies of pioneering women artists who began teaching video and media

¹ No specific study has as yet been dedicated to the subject. Nonetheless, passages and brief mentions on the role of women artists teaching or directing video programmes can be found either in histories

of video art or in biographies dedicated to specific artists. An example of this can be found in Jennifer Steetskamp. 2017.

art in the 1970s and 1980s, their influence on their students – in particular on female students, and the enduring impact of their legacies. In addition, I will discuss some of the challenges and obstacles faced by young and early-career women artists as they approached video within the context of art schools, with limited support and few role models, challenges and obstacles which remain largely unexplored.

This paper aims to address these important issues by analysing case studies from the United Kingdom and the Netherlands – where the teaching of video art was particularly active – with some references to other European contexts. Through this survey, which is part of an ongoing research project, the intention is to lay the groundwork for other, more extensive studies.²

2.1. Context

In the UK in the 1970s, many women video pioneers were attending programmes in Fine Art and Sculpture Departments where the chairs and most of the teachers and students were men. Such Departments were deeply affected by a decidedly male attitude.³

At the time, many schools in the UK provided opportunities to access the video apparatus itself, but only some offered training on how to use it or assistance from technicians, depending on the facilities available. At the forefront of this movement, there was the Maidstone College of Art in Kent, England, where ‘godfather of video art’ David Hall established the audio-visual workshop in 1972 and in 1975 founded the first time-based media degree course in UK. In any case Art Schools were key to accessing the apparatus. As Cate Elwes has pointed out, you had to be attached to an Art School to lay your hands on to a video recorder either as a student or as a lecturer (Elwes 2015).

In any case, we could argue that crucial training on the video apparatus was in fact happening outside of the art schools. Many artists learnt how to use or expanded their practical knowledge of the ½ inch reel-to-reel EIAJ format, simply experimenting with it and relying on knowledge-sharing and peer-to-peer feedback. The medium was evolving quite fast (the ½ inch open reel format was soon replaced by the ¾ inch cassette-based U-MATIC format, which made editing possible, and the two systems ran in parallel for a few years) and knowledge exchange among artists, curators and gallerists was crucial. Organisations like the London Video Arts, for example, facilitated the creation of video communities, while various festivals and other events offered invaluable opportunities to discuss theoretical and practice-based approaches and the specificity of the medium.⁴

In some art schools in the UK, opportunities to receive training and feedback on video were likewise provided by guest lectures on speakers’ programmes.

In the 1970s and early 1980s, Art Schools in the UK – as in many countries and more in general in the art world – were

particularly male dominated. “All the studios were run by men”, observed the British feminist video artist and author Catherine Elwes, describing the situation at Farnham⁵ and later at the Slade School of Art where she was a student (Elwes 2014; for the quote: Elwes 2020). Drawing upon her own experience, Elwes recalls that at the time there were very few women among the part-time tutors at the Slade, and those that were employed there for the most part had only fractional, sessional or meagre part-time contracts. Lise Rhodes, for example, was teaching at the Slade but “very infrequently” (Elwes 2015). Nonetheless, some were able to offer Elwes important feedback in her first year. At the time she was still making objects, before her transition to performance and then video. None of her women tutors specialised in video or performance but Elwes was adamant about the importance of being able to share with them her autobiographical work in an intimate and respectful relationship, and she also emphasised the support that other women students were receiving from them (Elwes 2020).

Elwes also pointed out the importance of the women tutors being aware of current feminist discourse, participating sometimes in feminist collectives or groups and admitting the position of privilege that the patriarchy retained – something that she believed her male tutors at the time would have been unlikely to acknowledge (Elwes 1979; Elwes 2014).

The oppressive patriarchal culture at the Slade School of Art and the scarcity of women tutors drove Elwes to complain in 1979 (fig. 1). It was then that British performance artist Stuart Brisley allowed Elwes to spend as she saw fit the entire budget for the visiting lecture programme. She was thus able to create a programme that reflected much of the most avant-garde feminist experimentation with media of the time inviting pioneers such as Rose Garrard and Tina Keane – who were already working with film and video with a performative approach – and Rose Finn-Kelcey – who was using moving image in her practice – as guest lecturers. This innovative approach unfortunately would not be followed up and did not change the “balance” in the School but it is documented in an article by Elwes herself, that year, very poignantly entitled *The Feminist in Art School – a recent view*, which featured in the launch issue of *Feminist Art News*.⁶ (Elwes 1979).

² I conducted an initial reflection on some of the issues discussed in this paper in my research on the AHRC funded research project *EWVA European Women’s Video Art in the 70s and 80s*. See Laura Leuzzi, Elaine Shemilt, Stephen Partridge (eds.), *EWVA European Women’s Video Art*, John Libbey Publishing, New Barnet, 2019.

This paper develops from a paper published in Leuzzi 2023.

³ This can be observed for example in several interviews collected during the EWVA project available at www.ewva.ac.uk, accessed 30 November 2021, including Catherine Elwes and Elaine Shemilt.

⁴ I would like to thank for the insightful conversations with him, Prof. Stephen Partridge (September 2023).

⁵ Later Farnham School of Art and Guildford School of Art merged to form West Surrey College of Art & Design.



Fig. 1 Slade School of Art, 1979. Courtesy of Catherine Elwes.

In 1982, Tina Keane started lecturing in Film and Video at Central Saint Martins College of Arts & Design in London. On her influence and legacy and that of other women artists, Malcolm Le Grice has commented: "During the 1970s and '80s, the teaching of women artists – including Tina Keane, Anna Thew, Anne Tallentire, Joanna Greenhill and Pam Skelton – was one of Saint Martins' major contributions to art education. Their influence helped create a lasting shift in the gender profile in British art, and Central Saint Martins in general maintained a committed concern for gender, ethnicity and sexual politics throughout the Thatcher years (Le Grice 2011)."

In addition, British video pioneer Tamara Krikorian taught at Maidstone and Newcastle.

The gender imbalance marked art schools throughout the UK. For example, at the Winchester School of Art - Scottish artist and video pioneer Elaine Shemilt recalls the lack of female tutors and the predominance of male students in her programme. From 1974 to 1976, she was a student in the Sculpture Department – marked deeply by patriarchal culture - and began to experiment with video as an impermanent part of larger installations and performances, and in 1975 her work was selected for the famous *Video Show* at the Serpentine Gallery (Shemilt 2020).

In her memories of the time, Shemilt, although she praises the access the School provided to the apparatus at the same time remarks on the lack of actual training. The lecturers' programmes in her view were highly beneficial insofar as they exposed the students to different approaches. For instance, when subsequently she became a student at the Royal College of Art (1976-1979) and Susan Hiller contributed as a guest lecturer, Shemilt recalls being offered positive feedback by a prominent feminist artist for herself and her colleagues (Shemilt 2020).

This experience as a female student in a male-dominated department and her approach to media transformed Shemilt's approach when she herself started to teach printmaking. Analysing the nature of her practice back then - which involved among other things the incorporating of a multimedia approach to video and film in larger installations and performances - we can appreciate how deeply it influenced her own approach to teaching: "My approach was for students to abandon the idea that they were sculptors or painters or video artists/ whatever. The important issue was to think of themselves as artists first

and foremost. Technique is just technique at the end of the day (Shemilt 2020)." At the time, several artists who were experimenting with video informed by their own diverse experiences and expertise deployed video as part of a more complex and integrated artistic practice that might include several media, including film, photography, performance, printmaking, painting and sculpture. Similarly, Maria Gloria Bicocchi – who established the pioneering video centre art/tapes/22 in Florence in 1972/3 – has stated on several occasions that the approach that characterised the many conceptual Italian artists who came now and then to experiment with video at art/tapes/22, were often not interested in the specificity of the medium or any other technical aspect and considered video to be just another a tool to record a performance or to enhance their artistic research. They did not refer to themselves as video artists – and sometimes rejected that label as unduly "restrictive" - but simply as artists (Bicocchi 2015: 96-97).

2.2. Stansfield at the Jan Van Eyck Academie

Art School and Academies in different part of Europe started designing and offering courses or programmes that included or featured prominently video art only in the early 1980s and, interestingly, in a few - but very important – instances, women video pioneers were especially prominent in this context.

One of the most significant programmes was in the Netherlands, where, in 1980, the Scottish video pioneer Elsa Stansfield was invited – at the recommendation of Wiels Smals, the then director of The Appel - to create the Audio/Video Department for Time Based Media - soon renamed "Time Based Arts Studio" – which opened in September 1980 at the Jan Van Eyck Academie in Maastricht (Jennifer Steetskamp, 2017).

The Academie offered a postgraduate one-year programme structured as an "open workshop" for artists who had already received training and who were able to access the workshops at the Academie to develop their independent projects.⁶

The Audio/Video Department at the Academie was established thanks to Stansfield's international reputation as a European pioneer video and media artist. In the 1970s, Stansfield had pioneered video as part of the duo Hooykaas/Stansfield and had showed internationally. Her authority and experience were beyond dispute, and this enabled her to put at the service of the Academie her extensive international network. She was also familiar with advanced academic programmes in the field.

In 1978, for example, she had been awarded the first video bursary awarded by the Arts Council of Britain at the abovementioned Maidstone College of Art - a leader in the country in terms of the availability of technology and of expert technicians. The programme at Maidstone was attended by several artists who experimented with media at an international level, Stephen Partridge and David Cunningham among them. The Maidstone College programme could well have left a lasting impression on Stansfield at the time and may have provided a

⁶ A one-year extension could be granted.

model or in any case a source of inspiration for her setting up of the Audio/Video Department at the Jan Van Eyck.⁷

The postgraduate programme at the Jan Van Eyck Academie was conceived by Stansfield as an open platform that stimulated the participants “to develop autonomous and independent research”. The Audio/Video Department adopted an expanded notion of “Time-Based Media”, which encompassed a range of different moving image art forms as well as performance and installation, in order to pursue “their integration with Fine Arts”. As detailed in a leaflet from 1987, Time-Based Media included: “film/performances, video tapes and installations, audio works and installations using any of these media individually or combined with any other media” (*Time-Based Media* 1988).

Stansfield hoped that the Audio/Video Department would welcome artists who wanted to “work with these media, equally in the areas of research and production”. Stanfield was therefore framing the programme so as to open it up as a tool for both practising artists and media professionals, foreseeing a future in which these knowledges and skills would provide opportunities for both.⁸

Stanfield was also profoundly aware of the difficulty faced at the time by those wishing to sell and distribute video works – an issue that in the UK had been at the heart of London Video Art’s support for artists. Consequently, the Department encouraged the production and distribution of the participants’ works and, from 1980, Stanfield set about creating a video/audiotheque (*teek*) in which were collected works produced by the participants at the Academie as well as works by guest lecturers and artists, and also works purchased from other collections and archives, creating a pivotal resource for students and researchers numbering hundreds of different pieces.

At the same time, Stanfield persuaded those at the Academie to view and familiarise themselves with the most advanced and pioneering experimentation with the medium, and this at a time when access was quite limited, and video and media art were mostly still excluded from the major museum and exhibition circuits. The programme of screenings and seminars at the Video/Sound Departments – structured with a good gender balance – allowed the participants to view, discuss, and analyse pioneering work in the field and be exposed to a wide variety of approaches to the medium. The participants also had the opportunity to take part in trips to relevant exhibitions and museums in the Netherlands (the Stedelijk Museum in Amsterdam, for example), and in neighbouring countries, such as Germany and Belgium where video art had begun to flourish.

Possibly inspired by what she had seen at Maidstone School of Art, Stanfield ensured that technicians were available to offer support and assistance as well as to pass on skills to the participants, who were able to individually book studios in which to develop their own work and experiment with the medium.

Much as in the UK in the 1970s, the presence of invited guest lecturers at the Academie was of crucial importance. Thanks to Stansfield’s international network of artists and institutions, the

programme included some of the most prominent video and media artists of the time from mainland Europe and the USA, including Julius, Madelon Hooykaas, Ulrike Rosenbach (who in the 1970s and 1980s lectured internationally and in 1989 became Professor for Media Art at the Academy of Fine Arts Saar, Saarbrücken), Joan Jonas, John Latham, Marina Abramović, Nan Hoover (who from 1987 to 1997 taught at the Dusseldorf Art Academy), and many others.

Just six months after her appointment, Stansfield organised a major event, *Maart 1981 [March 1981]*, which combined video installations, single channel videos, performances, discussions, and lectures. Those participating contributed to the organisation of the event and had the opportunity to show their own works – produced in those early months at the Video Department – alongside some of the most pioneering video practitioners from the UK, Belgium, Germany, and the Netherlands. Artists invited included Dutch video artist Lydia Schouten, Belgian video artist Lili Dujourie, British video artists Mick Hartney, Ursula Wevers, and David Hall.

In the abovementioned context of the Netherlands, where it was rare to have the chance to view much video art – and in particular video installations – *Video Maart* acted as a catalyst for the contemporary debate on video art as well as a key resource for the students’ practice.

In her brief text for the event, Stansfield pinpointed how the video scene in the Netherlands was at its early stages in comparison to neighbouring countries, in part owing to the lack of specialised departments and programmes within the country and the sheer difficulty of gaining access to equipment. She explained that video was usually just perceived as “an extension of some other department and rarely as a fine art option” (*Maart 1981*): this statement, as we noted above, would apply to some art schools in the UK too in the 1970s and early 1980s.

Jan Van Eyck Academie in her view had shown great “foresight” in setting up the Video studio.

At *Video Maart*, lectures and discussions with invited guests were organised to discuss views on and approaches to video art. This provided a rare opportunity to share experiences at a time when such events were few and far between.

Later on, in 1984, Stansfield also organised a symposium at the Jan Van Eyck to accompany the famous exhibition *Het Lumineuze Beeld* (The Luminous Image) at the Stedelijk Museum in Amsterdam.

From interviews with Hooykaas and other available materials, it is plain that Elsa Stansfield saw her teaching activity and her role as head of department and educator as an integral part of her practice. In 1988, in her introduction to the exhibition *Het magnetische beeld* (The magnetic image), we can read “Over the past seven years, beside the production and presentation of my own art, which I have done in collaboration with Madelon Hooykaas; I have tried to give navigational directions to those artists at the Jan Van Eyck who have undertaken an uncharted journey across the magnetic field of the time-based media.” (*Het magnetische beeld* 1988).

publics: “via cable, local radio/television stations and also through presentations of interdisciplinary work to not exclusively art-oriented audiences.” *Time-Based Media* 1987.

⁷ I thank Madelon Hooykaas and Stephen Partridge for the exchange on the topic. See Madelon Hooykaas, private communication, 11 Oct 2023.

⁸ In Stansfield’s view, in the future these mediums would provide a wide range of opportunities for professionals and artists to reach new

Stansfield's words have a profound resonance today through the highly evocative use of two images in this brief excerpt: the navigational directions for her teaching style, hinting at a gentle pedagogical approach, whereby she indicated possible paths to students, but respected their freedom; and the 'uncharted journey', which could refer both to the complex career embarked upon by her students but also to the unexplored territories they were approaching through their experimentation in media. In my view, these metaphors capture conceptually Stansfield's pedagogical approach: her way of fostering students' autonomy, in line with the more general stance evident at Jan Van Eyck Academie.

On Stansfield's teaching style, Hooykaas commented: "Elsa Stansfield had an unusual way of tutoring the participants. She let them feel equal and often did not comment on the work but asked questions (Hooykaas 2020)." We can infer that Stansfield promoted a peer-to-peer horizontal approach that resonates with much of the feminist approach to teaching. Students were gently led to find their own solutions through a sort of Socratic process. Analysing Stansfield's own words and Hooykaas' testimony on her teaching style, what emerges overall is a profound respect for and consideration of students as professionals in training.

Stansfield left in 1991, and in 1992 the Academie was restructured into three departments - Fine Art, Design and Theory (Steetskamp 2017).

2.3. Legacy

Among the video artists who attended the Jan Van Eyck in the 1980s mention should be made of the Swedish video artist Antonie Frank Grahamsdaughter.

Frank Grahamsdaughter recalls the profound legacy and influence of Stansfield over that generation at the Academie, and praises more in general the good gender balance and the focus on women artists. In particular, she commented: "Elsa Stansfield was aware in a way I had not encountered before, of lifting and supporting female students". And continues "I felt that it was important as inspiration and identification to have a female teacher... It was absolutely crucial that I was assigned a place and was admitted to the Time-Based Art Program at Jan Van Eyck Academie... Elsa Stansfield had deliberately created a generous significant platform with a strong female influence. I think the new medium meant a lot to me and to be able to shape my stories but also the female identification and inspiration based on the fact that my teachers were women and worked with video art, the female language, the female narrative and the gaze. I felt that we started from the same experiences as women in our stories, in our portrayals' (Frank Grahamsdaughter 2020).

Stansfield evidently played a major role in young Grahamsdaughter's artistic development and training and in that of her peers. In fact Stansfield, at the same time, herself served as a deeply influential role model, being a highly accomplished, internationally renowned artist, continuing to work in the field, collaborating with Hooykaas in the 1980s but showing also a genuine ability to support and encourage her students and in particular young women artists, all the while adopting a feminist approach to pedagogy and promoting gender equality in the programme she devised at the Jan Van Eyck.

Stansfield/Hooykaas' own practice and their approach to space through video – referring to works such as the installation

Compass (1984) – exerted a particularly strong influence on Frank Grahamsdaughter's installation *Transit* (1986, fig. 2).

Commenting on the abovementioned lively programme of guest lecturers at the Jan Van Eyck, Grahamsdaughter paid tribute to the visiting lecturers, some of whom left a long-enduring impression on her and her colleagues: "I still carry with me many of these experiences such as the workshop with Elsa Stansfield & Madelon Hooykaas' workshop, and with Marina Abramović" (Frank Grahamsdaughter 2020).



Fig. 2 Antonie Frank Grahamsdaughter, *Transit*, 1986

Later on, Antonie Grahamsdaughter started herself to teach at the University of Arts, Crafts and Design in Stockholm, where she organised the first international screening of International Video Art. Following Stansfield's approach, Frank Grahamsdaughter found it important to expose her students to video artworks by women pioneers. While teaching Grahamsdaughter visited the Academie with her own students and had the chance to meet and be reunited with her teacher Elsa Stansfield.

In 2017, artist and researcher Hagen Verleger developed a feminist collaborative project at the Jan Van Eyck. He renamed the Jan Van Eyck Academie as the Margaret Van Eyck and all the studios (until April 2020), which are dedicated to men to women artists: Anne, Elsa, Luzia, Thérèse, and Wilhelmina. (Verleger 2018)

And although admittedly for a brief time only, this project flagged the institutional gender imbalance, giving visibility to those women artists who unfortunately today are still kept out of the limelight.

This paper demonstrates the importance of the under-researched, pioneering contribution that women video artists made to the development of video as an art form, in their role as students and in their teaching practice and their leading of educational programmes. Some themes seem to be recurrent in the testimonies and in the documents discussed: the importance of women mentoring women and providing role models; promoting a feminist perspective and approach to using video; an «expanded» approach to video art as an art form including single channel video, performance, and installation; the intimacy allowed by having a woman tutor/teacher to share personal stories that feed into feminist works; and a feminist pedagogical approach.

Several women pioneers were active as teachers at some point and this aspect of their activity is still neglected and too little researched. This applies, for example, to artists such as Lydia Schouten, who had participated in the *Maart 1981* programme and in 1988 also started teaching at the Artez University of the Arts in Arnhem (The Netherlands; Schouten 2020). Further research would therefore make it possible to trace these activities in the wider European context, thereby reassessing the influence and legacies of women artists in future histories of video art and pedagogy.

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Metaleptic Objects and Their Aesthetic Properties

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Abstract

The excretions, secretions, fluids and solids from the human body are in the western cultural context perceived ambiguously. They constitute useless waste, to be discarded, an excess that refuses to leave and disappear from the planetary ecosystem. Simultaneously, some of them are idealized as valuable, respected, untouchable, and considered to be carriers of life forces. As a resource, the human body and its biological surpluses are among the remaining taboos in the cycle of waste and the system of social values. This paper reflects upon contemporary biomedial art, which is finding a new purpose for human bodily solids and fluids. In artworks using living materials as media, these items are becoming a new resource for harvesting energy, repositioning humans in the same function as any other entity on this planet - objects for recycling. The bodily excretions and fluids are transgressive, migrating from being either sacrosanct (blood, mother's milk) or unusable, unimportant waste (sweat, urine, feces, adipose tissue) to the extraordinary, progressive, and dramatic entities we identify as metaleptic art objects.

Bearing specific aesthetic properties, metaleptic art objects are projective representations colliding with and exceeding norms thus shifting ontological borders and mixing the different levels of reality in which they operate. Due to the unusual and unexpected visual representation and conflicting connotations, they are phenomenologically eccentric. That makes them impossible to overlook because they keep magnetically and tenaciously hold of the participant's attention, triggering powerful and affectively intense experiences. These consist of discursively unarticulated sensations of disturbance as well as of repugnance caused by the disruption of regular functioning and the disclosure of the hidden meanings of metaleptic objects. Because of the ethically provocative status, they also activate socially normative reactions of unacceptability. To test the particularities of metaleptic art objects the paper analyses selected biomedial and performance artworks using resources like human milk, body fat, tissue, venous blood, menstrual blood and tissue, urine, and hair (Tajči Čekada, Dorotea Dolinšek, Antonio Kutleša, WhiteFeather Hunter, Theresa Schubert, Maja Smrekar, Hage Tapio, Zoran Todorović) to generate other forms of energy like food, fuel, and fertilizer.

Keywords

biomedial art; metaleptic objects; human body excretions and fluids; energy resources

1. Metalepsis and Object

Metalepsis as a rhetorical term was described by Roman rhetorician Marcus Fabius Quintilian as sort of intermediate step between the term transferred and the thing to which it is transferred: "a polyseme is replaced by a synonym that is equivalent to (one of) the polyseme's meaning(s) but which does not agree with the context" (Hanebeck 2017, 12). As a rhetorical figure, it is difficult to distinguish metalepsis from metonymy, and even metaphor in some cases, or synonym in others. The term, however, became clear when Gérard Genette appropriated and reinterpreted it in the narratological context. Metalepsis is commonly used in narratology, and it refers to narrative transgression, or deliberate deviation from conventional storytelling norms and expectation within literary work towards breaking traditional narrative structure to provoke thought. Metalepsis is applied to subvert audience expectations and engage them in a more complex, thought-provoking experience. Genette Explains the term metalepsis as: "any intrusion by the extradiegetic narrator or narratee into the diegetic universe (or by diegetic characters into a metadiegetic universe, etc.), or the inverse" (Genette 1980, 235).

In the context of visual art, we redefined the concept of the "diegetic universe" or "diegetic narrative" to adapt it to the nature of visual, auditive or any kind of sensation triggering works of art, which typically do not follow a traditional narrative structure. Instead of focusing on a storyline, the diegetic universe in the realm of visual art refers to the reality of the artwork itself, reality beyond the existential one. This diegetic universe portrays the internal reality presented by the artwork, where the audience encounters the imagery and artistic expressions that constitute the narrative of the work. Fundamental ideas, themes, messages, or intentions that drive the creation and interpretation of the artwork are the core conceptual framework or foundation upon which the entire artwork is built.

Object, a main agent in contemporary object-oriented ontology as conceptualized by philosopher Graham Harman, is not only a thing of matter and physicality, but anything that can't be reduced to its components or its effects (2019, 2). For the Harman objects have their own autonomy, they are a thing-in-itself as a *real objects* which "withdraw from our access to them"¹ (2009, 194). But they also present themselves in relational alliances as *sensual objects* experienced in encounters with other human or non-human entities. Objects as an accessible phenomenon, as things for-and-through the other. Thus,

¹ He continues: "The real cats continue to do their work even as I sleep. These cats are not equivalent to my conception of them, and not even equivalent to their own *self*-conceptions; nor are they exhausted by their various modifications and perturbations of the objects they handle or damage during

the night. The cats themselves exist at a level deeper than their effects on anything. Real objects are non-relational" (2009, 194–195).

“while there may be an infinity of objects in the cosmos, they come in only two kinds: the real object that withdraws from all experience, and the sensual object that exists *only* in experience. And along with these we also have two kinds of qualities: the sensual qualities found in experience, and the real ones Husserl says are accessible intellectually rather than through sensuous intuition.” (Harman 2011, 49)

We approach the notion of object in art as an entity governed by intentional aesthetic relation in connection to logic of representing ideas, concepts, affects, narratives, emotions, or the artist's intended meaning. Categories like visual representation, haptic, symbolic, conceptual, affectional, emotional, mimetic, or abstract signify the relational context and narrative around the object. An object in art is simultaneously *sensual* and *real*, meaning that the object's autonomous and non-autonomous forms are revealed along one another in a dynamic correlation. *Metaleptic objects* emphasize that in an extreme manner because their sensual qualities are intensively peculiar.

2. Metaleptic Objects in Biomedial Art and Performance Art

In creating theory of metaleptic object we are focusing on few selected contemporary biomedical and performance art. The alternative terms for biomedical art include "bioart," "bio art," "Bio Art," "biotechnological art" and the broader term "technoscientific art". The term "biomedical art", that was coined and conceptualized by Jens Hauser, we find to be the most precise, as it specifically refers to the biological media artists engage with.

“New art practices, increasingly more common since the 1990s, that operate beyond symbolism, simulation and representation and employ a broad spectrum method from the life sciences are suited, for a variety of reasons, to serve as epistemic indicators of a continually changing concept of mediality, not only in art. As such, I have described these strategies of organic media-art since 2003 as instances of biomediality (Hauser 2016), these include life enabling milieus (i.e. biological media that turn biological systems into something), technical means (i.e. biomedical through which biological systems make something) and instances of measurement (i.e. media of biology that do something with biological systems).” (Hauser 2016, 202–203)

Since the late 1990s, an increasingly prevalent trend in art involves the utilization of biomaterials and engagement with pressing environmental issues. Artists are interpreting, repurposing, and incorporating organic or bio-derived materials into their work, responding to the urgent global challenges of climate change, the survival of species, and sustainable practices. This form of art creation can be seen as a response to the environmental crisis we face, characterized by the abundance of biological resources and the necessity to reimagine our cohabitation with other life forms.

Biomedical artists manipulate biological elements as their media. The material they work with is no longer conventional; it's now biomatter, nature's own creations, already imbued with intricate processes and properties. They are working with the

fundamental building blocks of life, already in circulation within the ecosystem, and infusing them with new meaning in the context of art. They engage in the creation of novel forms not from scratch but by reinterpreting and harnessing the inherent potential of bio-based materials. This paradigm shift aligns with a broader movement that advocates for sustainable practices, conservation, and a re-evaluation of our relationship with the natural world. Urine, feces, saliva, blood and other excretions, secretions, fluids, and solids from the human body are in the western cultural context perceived in an ambivalent way. Some of them as useless waste, something to be discarded, an excess that refuses to leave and disappear from the planetary ecosystem. Simultaneously, some of them are idealized as valuable, respected, untouchable, and considered to be carriers of life forces. In both cases, as a resource, the human body and its biological surpluses are among the remaining taboos in the cycle of waste and the system of social values. Nicolas Bourriaud, in his theory outlined in the book “Exform,” develops the concept of “waste” encompassing everything that resists assimilation – everything unproductive, non-profitable, that does not work or is not in the process of becoming functional; what is discarded, unusable, and useless. Waste, in this context, refers not only to objects but also to other living beings, including humans. While Bourriaud is examining and emphasizing societal centrifuge and inevitable rejection and injustice, with philosophical and societal concepts and art projects that are dedicated to more just society, the emphasis of theory of metaleptic object is on the excessive and transgressive. The transgressive act of metalepsis challenges the established conventions of representation, allowing elements from one level of the diegesis to intrude or influence another. In the case of a metaleptic object, the paradigm of the representational logic of an object is intruded by fluids and solids from the human body.

3. Experimental Nature of Metaleptic Objects

To manifest their status, we will interpret metaleptic objects through their qualities. Characteristics of metaleptic objects include a) that the matter used by the artist has the position of taboo; 2) there is metaleptic transformation of taboo matter into art (aesthetic) object; 3) the object is at the same time seductive and terrifying. These qualities are tied to the performative activation of metaleptic object's nature including recontextualization of the existing narrative, collision with and exceeding of norms, shifting ontological borders, magnetic capture of participant attention, ethically provocative status, and phenomenological eccentricity.

3.1. Recontextualizing Narrative

Metaleptic objects revolve around human bodily excretions and secretions. Invoking art history both Manzoni's “Merde d'Artiste” (1961) – tin cans of excrement that caused an uproar, as well as Andres Serrano “Piss Christ” (1987) – infamous image of a plastic crucifix submerged in the artist's urine, are relevant examples of metaleptic objects. More recent approach to recontextualization in her project “Eco Eco Human Milk” (*Eko eko ljudsko mlijeko*, 2017) was done by the artist Tajči Čekada. She produced a series of products made from human milk, such as hazelnut spread, chocolate made from mother's milk, and similar items, and sold them at the farmers market, creating a perplexing discursive situation filled with discomfort (Figure 1). What interested her were the reactions of people who were repulsed by these products but otherwise consumed milk

and dairy products from animals. The majority of visitors hadn't deeply considered the subjects concerning the intake or avoidance of milk and dairy products, or pondered why human milk, despite being the only milk meant for humans, is often unappealing to us.



Figure 1: Tajči Čekada: "Eco Eco Human Milk," 2017

A few visitors genuinely left the stand with some new thoughts. In that artwork, a recontextualization of the narrative occurs when the boundaries between two theoretically distinct zones were blurred. The first zone pertains to the real, biological, and functional body, specifically the mother's body, which produces milk to nourish and sustain the baby for survival and growth. This biological function is a fundamental aspect, essentially a "fountain of life" for the infant. However, a recontextualization takes place when this functional, biological fountain of life is also perceived and utilized within another zone – the realm of art. Here, the same biological process, which is inherently tied to the sustenance and survival of a life, is repurposed and integrated into the creation of an artistic object. The boundary between the biological necessity and the artistic interpretation of this life-sustaining function is challenged, offering a new perspective on both the biological and artistic dimensions.

In the Čekada's artwork, the metaleptic dynamic carries a forceful undertone, involving a deconstructive construction and an element of aggression directed towards the spectator. These aspects align with the metaleptic qualities outlined in narratology, particularly emphasized by Debra Malina in her book *Breaking the Frame*, where she labels this phenomenon as "metaleptic violence" (2002).

3.2. Projective Representations Colliding with and Exceeding Norms

In metaleptic art objects one encounters projective representations that not only challenge but actively collide with and surpass established norms. These representations are not staying within the boundaries defined by conventional artistic norms; rather, they aim to rupture these boundaries, challenging the predictable and the ordinary. In 2016, during a three-month isolation period with dogs, Maja Smrekar, in her project "Hybrid Family," stimulated her mammary glands through systematic use of a milk pump to produce the hormone prolactin (Figure 2). She also altered her diet, consuming lactose-rich food to encourage lactation. The result of the project was a photo-performance in which Smrekar feeds a puppy named Ada with colostrum (Majcen Linn 2021, 200). If in Tajči Čekada's project

human milk was used and transformed into products for human consumption, in Smrekar's project human (her own) milk was employed to feed a different species traditionally seen as lesser. The essence of life is shifted into an alternate narrative line, one that is unfamiliar and unconventional, often viewed as a taboo.



Figure 2. Maja Smrekar: "Hybrid Family," 2016. Photo: Manuel Vason

Breastfeeding a dog by artificially stimulated lactation is one level of collision with social expectation. The multispecies kinship she is establishing is transgressing hierarchy between species by breaking the rules between humans and animals. The rules imply that a human baby is entitled to human milk from a breast, and a mother of a puppy can't be a human. Also, that humans, not dogs, are entitled to emotionally enjoy the female body.

In exploring metaleptic object's direct, thematic representation of mother's milk in a completely different transgressive narrative structure, there is a tendency of spectators to distance themselves from conceptual content of that kind of artwork in an attempt to avoid their own vulnerability. Being exposed to someone's empirical body within a changed sociopolitical context makes spectators either enjoy the open discourse of the piece, but most often they completely refuse it in order to protect their own traditional socially installed narrative.

3.3. Shifting Ontological Borders

Shifting ontological borders refers to the act of changing or moving the fundamental understanding or conceptual boundaries of what exists or what can be considered real within a particular framework of an art object. In the similar way as in quantum physics' concept of "superposition", where a particle can exist in multiple states simultaneously, with metaleptic objects we are experiencing recontextualization and challenging conventional beliefs about the nature of the boundaries between the self and the world. Metaleptic objects are thus producing transformation or re-evaluation of our foundational understanding of what exists, what is real, and how entities and concepts relate to each other in a given context.

WhiteFeather Hunter, through her project "Mooncalf," (2020) primarily focuses on creating a prototype of "unclean" meat or lab-grown meat using menstrual serum (Figure 3). This artistic endeavour is inspired by the overly glorified "clean meat" industry. The concept at the core of this artwork suggests that menstrual serum could potentially replace foetal bovine serum in the production of victimless meat. Foetal bovine serum (FBS) is commonly used in animal cell culture media and is

obtained from bovine fetuses from pregnant cows during slaughter. Utilizing menstrual blood and tissue instead could be seen as a more ethically sound substitute. However, the idea is intentionally provocative, as menstrual blood is traditionally viewed as unclean, impure, and even pollutant. This creates a repulsive quality associated with the concept.



Figure 3: WhiteFeather Hunter: "Mooncalf: Prototype I," 2020

A metaleptic shift occurs when something conventionally considered unclean transforms into a potentially safe or acceptable source of nourishment, challenging societal norms, perceptions, and taboos – illustrated by the notion of consuming menstrual blood.

WhiteFeather Hunter's project challenges and shifts ontological borders by redefining our understanding of life, ethics, and the boundaries of what is considered "natural" or "acceptable" in the context of creating lab-grown or victimless meat. The project questions traditional perceptions of life and ethics by proposing the use of menstrual serum as an alternative to fetal bovine serum and challenges societal notions of purity and pollution by utilizing menstrual blood. The project demonstrates how art can provoke important conversations about science, ethics, and societal norms, transcending traditional understandings of the arts and their relation to broader concepts of life and existence.

Another example of metaleptic objects is the work by Dorotea Dolinšek who experiments with the waste from the human body that becomes food for plants growing in outer space conditions, at the same time making the soil fertile. She is producing fertilizer from processed human urine, dried menstrual blood, and chopped hair. In other words, she is investing her body to make beneficial future connections between human waste and extraterrestrial food production. In her process the body becomes its own resource for survival (mediated) through a metaleptic device. The primary narrative of human waste is that it is perceived as undesirable and of little to no value, whereas the new level of narrative presented by Dolinšek's artwork portrays waste as a valuable resource essential for survival and sustainability. It challenges conventional beliefs about waste and encourages a paradigm shift towards viewing waste as a potential asset for future sustainable practices, especially in extraordinary environments like outer space. In comparison to WhiteFeather Hunter's project Dolinšek is not shifting ontological borders in an ethical sense but changing our understanding of the possibilities outside of the particular framework dealing with biowaste.

3.4. Magnetic Capturing of Attention

Metaleptic objects are not designed or structured to prompt social interaction, collaboration, or community building, but conflict and dispute. They trigger intense and ambiguous experiences. That makes them impossible to overlook because they magnetically keep and tenaciously hold the participant's attention, setting off powerful and affectively intense experiences. These consist of discursively unarticulated sensations of disturbance as well as of repugnance caused by the disruption of regular functioning and the disclosure of the hidden meanings of metaleptic objects.

An example of that is aestheticized experimental artwork "I – FOOD" (JA – HRANA, 2022) by Antonio Kutleša, where he is employing insects, a 3D printed labyrinth terrarium for insects and his auto portrait made of blood (Figure 4). He uses his own blood and starch to produce jelly and forms it into a mini hyperrealistic sculpture of himself offered to the insects as food. At the exhibition, dried insects who were feeding off the artist's blood, are served as food for the audience.



Figure 4: Antonio Kutleša: "I – FOOD," 2022, installation detail

The work explores the possibility of a human who is merely a consumer becoming food for their own sustenance. Individuals may be close to consuming their own blood indirectly by utilizing it as a substitute for insect food, which they then consume. The concept aims to reduce the demand for resources, which are already limited, by turning a human who typically consumes into a source of food. Metaleptic shift occurs in the use of blood in aesthetic and conceptually functional but unusual ways.

Reasons for magnetically capturing participant's attention are the shocking and unconventional nature of the work, but also the provocative concept of turning human blood into a source of food for food. The concept forces the audience to confront uncomfortable ideas about human overconsumption and the use of resources. Beautiful objects that are produced from clear plexiglass (labyrinth terrarium) and thickened red blood (hyperrealistic sculpture) are showing artistic skill and craftsmanship. Utilization of blood in aesthetic and conceptually functional but unusual ways represents a metaleptic shift making Kutleša's artwork into an emotional container for the discharge of various effects and feelings.

3.5. Ethically Provocative Status

Metaleptic objects hold a distinct position in the realm of art discourse, stirring ethical provocation by daring to challenge established boundaries and expectations. Metalepsis, as an

artistic technique, disrupts the barriers between varying levels of reality or interweaves one narrative within another. When employed in the context of objects, it generates a similar impact by defying traditional interpretations of an object's intended use, meaning, or cultural significance. This metamorphic narrative arises from the recontextualization of bodily secretions and extrusions, propelling the spectator into an alternative, ethically charged storyline.

In “mEat me” (2020) Theresa Schubert is pushing the borders of social contract by criticizing cruelty, environmental issues of the meat industry, existing lab-grown meat protocols and our own hypocrisy regarding meat consumption (Figure 5). By culturing meat from her own muscle cells, the result is a futuristic perspective of food production where we use our body to produce food from ourselves for ourselves. She suggests that we can become just another animal for food, a resource for self-sustainable nutrition, introducing a taboo of cannibalism into the project, thus inserting



Figure 5: Theresa Schubert: “mEat me,” 2020, performance at Kapelica Gallery. Photo: Hana Jošić / Kapelica Gallery archive

her muscle cells into metaleptic existence. Using the human body as a source of self-sustainable nutrition is ethically provocative for several reasons. The introduction of the taboo of cannibalism challenges deep-seated cultural, ethical, and moral norms. Cannibalism is universally viewed as morally reprehensible and socially unacceptable. By exploring this taboo, Schubert forces viewers to confront their discomfort and question why certain acts are considered a taboo. Also, the idea of using one's own body for food production raises ethical concerns about the appreciation for humans. It challenges the traditional understanding of the sanctity and inviolability of the human body, potentially causing discomfort and prompting discussions about where the line should be drawn regarding the use of human biological material.

Hage Tapio embarked on two distinct art projects that revolve around her own body fat tissue, which was deliberately grown for the purpose of creating these artworks. The first project, titled “Humanfuel,” (2016) involves the production of an alternative biofuel available in limited edition. This innovative biofuel concept aimed to challenge traditional energy sources. The second project, known as “Humanoil,” (2020) takes a different approach by crafting a cosmetic oil designed for use on the skin (Figure 6). It draws inspiration from historical approaches and references, delving into the unique qualities and significance of human oil in various contexts throughout history.



Figure 6: Hage Tapio: “Humanoil,” 2020

All three projects involve using the artist's own biological material (muscle cells in Schubert's case and body fat in Tapio's case) as a central element of the artwork. This usage raises ethical questions about the boundaries of utilizing one's own body for artistic purposes and food production. The projects challenge traditional views of humans as consumers or entities separate from the products they use or consume. Schubert envisions humans as a potential source of food production, akin to livestock, challenging established ethical boundaries. Similarly, Tapio portrays humans as a source of fuel and oil, prompting viewers to reevaluate their perspectives on resource utilization and consumption.

The artworks introduce taboos that are uncomfortable for many viewers. Schubert's “mEat me” explores the taboo of cannibalism, forcing viewers to confront their discomfort and question societal norms. Tapio's “Humanoil” challenges societal taboos related to the use of human fat tissue and prompts reflection on societal perceptions of beauty, leaving the viewer with a sense of unease. They indirectly critique environmental issues. Schubert's work questions the environmental impact of traditional meat production by proposing a self-sustainable alternative. Tapio's project challenges the ecological implications of the cosmetic industry by highlighting the use of human fat as a high-end product and suggesting an alternative use. Both artworks prompt reflection on the autonomy and dignity of the human body.

3.6. Phenomenological Eccentricity

Due to the unusual and unexpected visual representation and conflicting connotations, metaleptic objects are phenomenologically eccentric, where phenomenology refers to what is presented to our senses. From the unpleasant, revolting, shameful or valuable matter, artistic aesthetic output of metaleptic objects is strange and wondrous because it reuses and recontextualizes excretions, secretions, fluids, and solids from the human body in an unconventional and extravagant way.

Metaleptic objects are phenomenologically eccentric due to their ability to transcend and disrupt conventional perceptual and experiential boundaries.

The fetish object also made from the human fat tissue is the focus of a project “Agalma” (2003 – 2009) by Zoran Todorović (Figure 7). He made a soap from his own belly fat and skin, with details like visible pieces of skin in the translucent yellowish cube. It is an ultimate material that an artist can extract from himself – not his mental investment but a physical chunk of his body. The function of the soap-object is to transfer profound powerful affects and emotions from the artist to curators and further to the audience creating new relations and emotions: “*Agalma* is simultaneously an artwork, a gift and a love relationship. In order to create it, it is necessary to prepare the body (accumulate fat) and undergo a major medical procedure. The removed carnal object created through such a procedure becomes a part of a complex and unforeseen intimacy in an art event based on receiving and passing on a love message and corporeality in a circular exchange of an extreme form of gift giving” (Ostoić 2017, 97). This is achieved by curators washing the audience’s hands in the exhibition venue or washing their entire bodies in a more private setting. The artwork is variously perceived depending on the cultural context where it is exhibited, but it always produces powerful reactions – from emotional (tears) to ethical (discussions). Also it opens questions concerning legal issues, for example how the artist managed to produce the soap concerning the fact he had to undergo a surgery. On an affective level, his carnal metaleptic object provokes highly intense and visceral bodily sensations ranging from discomfort, disgust, nausea, being deeply moved to tears, gratefulness to joy.



Figure 7: Zoran Todorović: “Agalma,” 2003 – 2009, project detail

4. Conclusion

Metalepsis is a notion in literary theory and narratology that is referring to a peculiar phenomenon where narrative boundaries are bent, enabling a contradictory crossing between different narrative levels and rationally separate realms. Leap from one cognitive position to another, breaching into a new system. The metaleptic object refers to that paradoxical transgression of human waste or sacred fluids into the polar opposite “an aesthetic art object”. Metaleptic object in art is an entity of experimental nature. In artworks using living materials as media, the exform is becoming a new resource for harvesting energy and making other products. This repositions humans in the same function as any other entity on this planet – objects for

recycling. In that way, the bodily excretions and fluids are transgressive, migrating from being either sacrosanct (blood, mother’s milk) or unusable, unimportant waste (sweat, urine, feces, body fat tissue) to the extraordinary, progressive, dramatic, and ambiguous entities we identify as metaleptic art objects. Their position bears resemblance to Franz Kafka’s description from his *Diaries*, where he made himself into an object by describing the spectacular scene of his open head. The scene however is producing an intense impact on the reader giving him direct access to the image: “A segment has been cut out of the back of his head. The sun, and the whole world with it, peep in. It makes him nervous, it distracts him from his work, and moreover it irritates him that just he should be the one to be debarred from the spectacle” (Kafka 1968, 192–193).

Bearing specific aesthetic properties, metaleptic art objects are projectidrive representations colliding with and exceeding norms. They are mixing the different levels of reality in which they operate – shifting and recontextualizing narrative, changing the positions that excretions, secretions, fluids, and solids occupy in existential reality to a different one and shifting ontological borders. They are impossible to overlook because they magnetically capture the participant’s attention and trigger powerful and affectively intense experiences. By reason of their ethically provocative status, they activate socially normative reactions of unacceptability. Thus, metaleptic objects produce a sensation of disturbance at the same time encompassing attractiveness and repugnance. This is caused by the disruption of the usual position of the exform and the disclosure of the unforeseen meanings of metaleptic objects. Due to the unusual and unexpected visual representation and conflicting connotations, metaleptic objects are phenomenologically eccentric.

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Refocusing on the Medium: The example of Katsuhiro Yamaguchi 'Las Meninas' (1974-1975)

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Abstract

This paper explores early works of Katsuhiro Yamaguchi (1928-2018) as a lens to understand the intersection of video art, global art movements, and intellectual exchange in the realm of post-medium practice rising from East Asia. Yamaguchi's transformation of the Velázquez painting *Las Meninas* (1656) from a physical object to an information object in his CCTV installation 'Las Meninas' is analysed through the theoretical lens of Michelle Foucault evolution of perception, Clement Greenberg medium specificity and Rosalind Krauss post-medium condition. Keywords: video art, video installation, video sculpture, East Asia, contemporary art, post medium, medium specificity, global art, East Asian video art

A Culturally Non-Specific Medium

What makes the rise of video art in East Asia so compelling to reappraise is that artists globally were responding and experimenting with the same technological concept with little or no precedent in different cultural settings and geographies. With the arrival of the necessary equipment, artists across East Asia first apprehended the new medium in a relatively brief period, with access to the technology initially becoming available to artists in Japan from 1968, Korea 1978, Taiwan 1983, Hong Kong 1985 and mainland China from 1988. These seminal experiments with the non-culturally specific video technology were the foundations of not only a new artistic form, but also arguably the first global contemporary art medium synonymous with the turn from modernism's medium specificity to post-medium practice. The practical circumstances that coincided with access to the portable video recording technology, such as more accessible international travel and a global rather than a local outlook, saw the artists ambitiously participating in global dialogues with accelerated theoretical and philosophical exchange between Eastern and Western cultures. Artists from East Asia, like artists in the West, were testing the possibilities of this culturally non-specific medium. This paper explores the example of Katsuhiro Yamaguchi's as a lens to understand the intersection of technology, global art movements, and intellectual exchange in the realm of post-medium practice.

Analysis of a signature early work of East Asia video art demonstrates the nature of preoccupations experimenting with video medium specificity in the international context of post-medium practice. In Tokyo in May 1974, Katsuhiro Yamaguchi (1928-2018) presented a video version of Diego Velázquez's

seminal painting *Las Meninas* (1656) after accessing Michel Foucault's *The Order of Things: An Archaeology of the Human Sciences*.¹ The key argument in *The Order of Things* is that new ways to order and perceive the world are created over time. To prove this, Foucault nominates three central organising principles of human perception: language, living things and political economy. Foucault's extensive observations of the philosophical approaches to these 'human sciences' demonstrate underlying changes in the way the world was organised and functioned from the Renaissance to the end of the nineteenth century. Yamaguchi was interested in *The Order of Things* because it is fundamentally about perceptions that intersect with similar spatial investigations in his art, including the position and role of the viewer.

To establish the origin and motivations behind Yamaguchi's highly experimental interactive CCTV installation, it is worth contextualising his practice with a brief background of his preceding work. A significant figure in the highly experimental post-World War 2 cultural scene in Japan, Yamaguchi collaborated with artists using film, dance, theatre and fine arts in experimental practices.² He was a founding member of the Tokyo-based intermedia avant-garde art group Jikken Kôbô (Experimental Workshop) that ran from 1951 to 1958.³

Preceding his engagement with the video medium, Yamaguchi experimented with the concept of a 'moving painting' in his 1950s body of works known as the 'Vitrine' series.⁴ The principle followed in the series was that each abstract painting was mounted inside a box with a pane of rippled glass attached a few centimetres in front of the paintings' surface. As the viewer shifts position, their movement animates the painting seen through the undulating glass.⁵ In 1969, Yamaguchi extended this idea by placing a clear checkerboard textured pane of glass in front of a colour television monitor to abstract the television broadcasts, generating live geometric moving paintings (Fig. 1.).

The medium of video—television, in this instance—was appropriated and augmented further with a unifying electronic soundtrack to create a perpetually changing light-emitting sculpture.

¹ Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (London: Tavistock Publications, 1970; orig. pub. French, 1966).

² Christophe Charles, "Yamaguchi Katsuhiro: The Birth of Video Art in Japan (1971-1974)," *Leonardo* 7 Olats and Christophe Charles, October 2002, accessed January 21, 2018, <http://archive.olats.org/pionniers/pp/yamaguchi/yamaguchi.php>.
<http://archive.olats.org/pionniers/pp/yamaguchi/videoJaponYama.php>

³ Andrew Maerle and Natsuko Odate, "Katsuhiro Yamaguchi: Interview. Every Future Leads to Its Own Past," *Art IT* magazine, December 8, 2010, accessed January 21, 2018, www.art-it.asia/u/admin_ed_feature_e/K0pPomUHXDBJlvkgJT76/

⁴ Toshiharu Omuka, "The Early Career of Yamaguchi Katsuhiro: Vitrine Series in Historical Perspective," *Journal of Asia-Pacific Pop Culture* 3, no. 1 (2018): 90.

⁵ Maerle and Odate, "Katsuhiro Yamaguchi: Interview."



Fig. 1. Katsuhiro Yamaguchi, *Image modulator*, 1969, 6 television monitors covered with geometric segmented glass. (© courtesy the Estate Katsuhiro Yamaguchi).

With these experiments and new technologies such as the auto-slide projector that could program a series of still images with sound recordings, Yamaguchi investigated the relationship of the viewer to the artwork, with the goal and intention of implicating the audience into the artwork. Rather than being a passive spectator, the viewer becomes an active participant and an intrinsic element. Yamaguchi said, “The idea of integrating the audience was always part of my approach to art, even from the start.”⁶ This body of work was cultivated under the title of ‘The Imaginarium’, beginning with the 1972 performative video environment and performance *Eat* (1972) (Fig. 2 & 3).

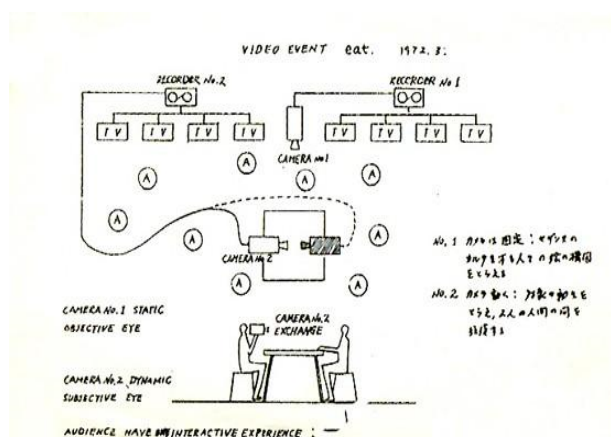


Fig. 2. Diagram for the video performance *Eat*, 1972 (© courtesy the Estate Katsuhiro Yamaguchi).

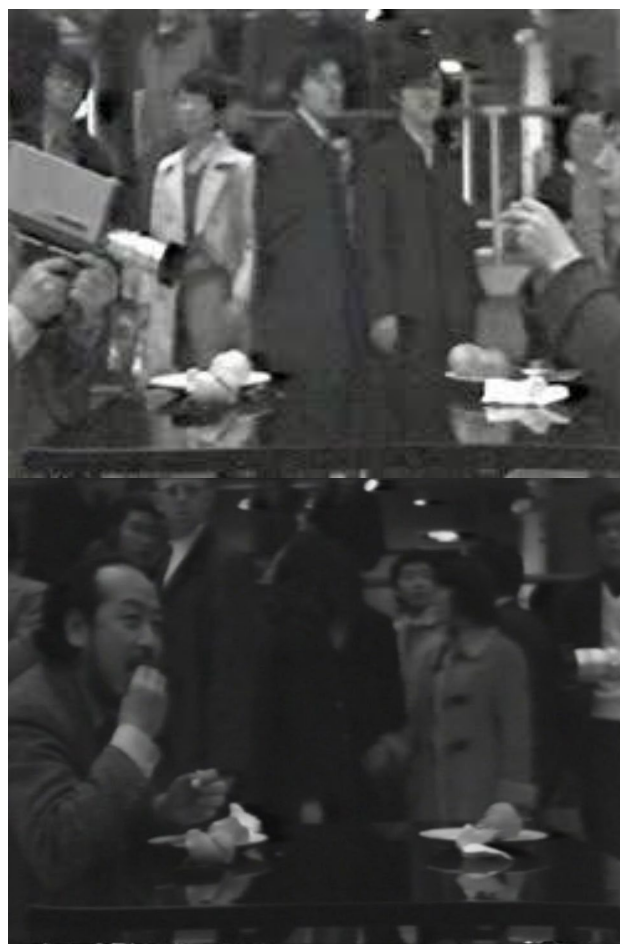


Fig. 3. Stills from the video performance *Eat*, 1972, conducted at the exhibition Video Communication: Do-It-Yourself Kit at the Sony Building, Tokyo, 1972. (© courtesy the Estate Katsuhiro Yamaguchi).

Yamaguchi’s description of the event reveals a deliberate and self-conscious approach to video as an artistic medium in dialogue with modern art. In this case, the work is based on Paul Cézanne’s *The Card Players* (ca. 1892–96).

Everyone who witnesses this video event will note that it is being presented not only by the two real-time people participating in it but also by video equipment. Our lives today are shaped by just this kind of real-time experience in a media format. Cézanne stood outside the images he painted, and we, too, have no choice but to experience his art from the outside. An electronic media event occurring in real time, however, draws onlookers—willingly or unwillingly—into the event.⁷

The artist considers and problematises the video medium to enfold and implicate the viewer through the mediated CCTV image feedback. Similarly, the early CCTV interactive video installations of Bruce Nauman (b. 1941) dating from 1969 and Dan Graham (b. 1942) from 1974 do not simply incorporate the image of the viewer but connect and entangle the viewer into the work.⁸ New York-based art historian Janet Kraynak affirms that Nauman produced video installations “that assertively engage

⁶ Maerkele and Odate, “Katsuhiro Yamaguchi: Interview.”

⁷ Yamaguchi commentary about *Eat* (1972). Reference from DVD documentation, Yamaguchi Katsuhiro Document Video, 1995 sourced from curator Ohsugi Hiroshi, Taro Okamoto Museum of Art, December 11, 2017.

⁸ Janet Kraynak, “Dependent Participation: Bruce Nauman’s Environments,” *Grey Room* 10 (2003): 22–45. This also directly relates to Michael Fried’s original text “Art and Objecthood” of 1966; see Michael Fried, *Art and Objecthood: Essays and Reviews* (Chicago: University of Chicago Press, 1998).

and operate upon the beholder's body, senses and mind".⁹ Chris Meigh-Andrews in his second edition of *Video Art History* and Barbara London's *Video Art: The First Fifty Years*¹⁰ claim a more global ambit, though opt to include only single-channel video art by East Asia artists, neglecting these early examples of video installation. Yamaguchi's internationally contemporaneous contributions in 1972 and 1974 snare the viewer as an active participant through the spatial attributes of the video medium. The viewer, once implicated in the video footage, is co-opted, or as Yamaguchi explains, the video camera "draws onlookers—willing or unwilling—into the event."¹¹ A dialectical approach to the medium is further demonstrated in Yamaguchi's drawings and diagrams constructed for *Eat* (1972) (Fig. 2.) and *Endless Image-Circulation* (1977) (Fig. 4). In both diagrams, the interconnectedness of the video camera and monitors with the live presence of the viewer demonstrates the perpetual self-reflexive image flow. The video camera and monitors operate in real time, making the viewer both an integral part of the artwork while simultaneously detached as an audience member.

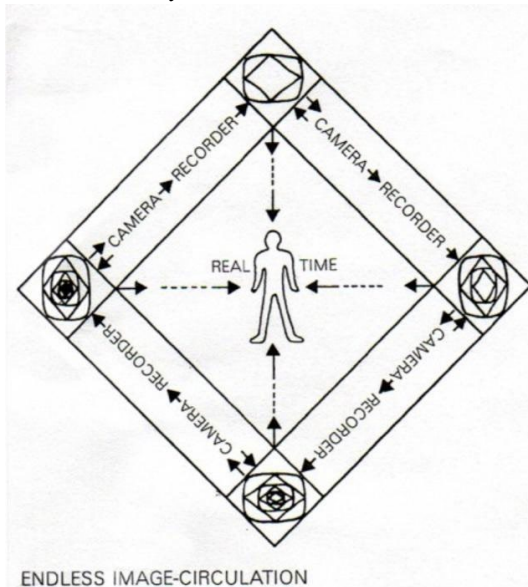


Fig. 4. Katsuhiro Yamaguchi, *Endless Image Circulation*, diagram for video installation *Experiment on the Imaginarium*, 1977. (© courtesy the Estate Katsuhiro Yamaguchi).

Yamaguchi's interest in international art practice outside of Japan and the immediate region is well documented in his travels, bringing him in direct contact with artists and art history references. Cézanne's *The Card Players* was formally appropriated into Yamaguchi's very early interactive video installation performance *Eat* (1972) in the *Do-It-Yourself Kit* exhibition held from February 24 to March 5, 1972, at the Sony Building in Ginza, Japan. This group exhibition made in collaboration with visiting Canadian artist Michael Goldberg

was another example of international exchange.¹² A decade earlier, Yamaguchi travelled to Italy, Spain and New York where he met Yoko Ono, who took him to meet Frederick Kiesler at Leo Castelli Gallery in 1961. The crossdisciplinarity and philosophical approach of Austrian-American architect, theatre designer, artist and sculptor Frederick Kiesler, was already known to Yamaguchi, who was deeply interested in similar ideas about the relationship of space and objects, art and life. Yamaguchi read authors such as Bertrand Russell, Edmund Husserl, had an interest in phenomenology and followed philosophical debates, which led him to consider Foucault's *The Order of Things*, mentioned above.¹³

Foucault devotes a chapter in this book to Velázquez's *Las Meninas*, in which he dissects the group portrait of the Spanish Royal Court in a process to consider perception, the gaze, the spectator, and the concept of representation itself. Foucault addresses the gaze and sightlines that reach out beyond the painting's surface to ultimately implicate the spectator into the composition, illuminating the tension between the representation of the visible and the invisible. Most importantly for Yamaguchi, the Velázquez painting and Foucault's text sets up dynamic theoretical questions about representation and the role of the spectator that could be expanded or perhaps collapsed by applying the new live image capability of the video recorder.

Las Meninas reconceptualized

Yamaguchi reconceptualises historic artworks to recalibrate Eastern and Western concepts and sensibilities within the ahistorical medium of video; in his words, he is "transforming the Velázquez painting from a physical object into an information object, and changes the people [represented] in it to living things" in video form.¹⁴ The interactive CCTV installation involves more than video technology; a photographic reproduction of the painting, sourced from a Japanese art history book (Fig. 5.), show how the sepia tones match the recorded video files used in the installation, suggesting that it is not a deterioration of the video tape, but an intentional modification and deliberate choice by the artist. This particular print brought into being by Yamaguchi in 1974, uses a now familiar postmodern strategy of appropriation, referencing the original painting, but modifying it and generating a facsimile that is clearly not attempting to deceive with the illusion that it is the original painting.¹⁵

Yamaguchi's approach to the medium empowers the viewer to read what is there, to look closely at the detail, and to discover a new way to think about the spatial relationships that the video medium activates. It is not the painting by Velázquez they are looking at; rather, it is a facsimile taken from an art history book that has been modified.¹⁶ It is thus an "information object".¹⁷ The colour reproductions were printed at the approximate size of the original (318 x 276cm), along with black-and-white versions that were sometimes smaller. In one version that features in the video documentation video, a studio television

⁹ Ibid., 23.

¹⁰ Chris Meigh-Andrews, *A History of Video Art*, 2nd ed (New York: Bloomsbury, 2014); Barbara London, *Video Art: The First Fifty Years* (London: Phaidon, 2020).

¹¹ Yamaguchi commentary about *Eat*, (1972). See fn7.

¹² Katsuhiro Yamaguchi met Goldberg on his first visit to Japan in 1971. See Goldberg interview with Chris Meigh-Andrews, www.meigh-andrews.com/writings/interviews/michael-goldberg accessed January 10, 2020.

¹³ Charles, "Yamaguchi Katsuhiro: The Birth of Video Art in Japan"; see also Toshiharo Omuka, "Vitrine Series in Historical Perspective," *Journal*

of Asia-Pacific Pop Culture 3, no. 1 (2018): 90; and Maerkele and Odate, "Katsuhiro Yamaguchi: Interview".

¹⁴ Reference from exhibition DVD documentation, Katsuhiro Yamaguchi - *The Document Video*, 1995 sourced from Ohsugi Hiroshi, Taro Okamoto Museum of Art, December 11, 2017.

¹⁵ Douglas Crimp, "Pictures," *October* 8 (1979): 75–88, doi:10.2307/778227.

¹⁶ Image files supplied by Yamaguchi archivist Christophe Charles show the original image taken from a Japanese history book, revealing page number and foot note on the print.

¹⁷ *Las Meninas*, in Katsuhiro Yamaguchi, *The Document Video*, 1995.

25 委拉斯开兹《宫娥》(1656年) 西班牙 普拉多博物馆藏

委拉斯开兹的这幅杰作，描绘了西班牙国王腓力四世和王后伊莎贝拉二世在画家工作室中的场景。画面中心是年幼的公主玛格丽特·特蕾莎，她坐在一张华丽的椅子上，周围环绕着宫女、侏儒和画家本人。前景中，一只大狗静静地躺着。背景中，国王和王后在镜中的倒影，暗示了他们正在观看这幅正在创作中的作品。画面构图复杂，充满了象征意义和精湛的技艺。

As previously mentioned, Foucault's analysis of *Las Meninas* uses the painting as an exemplar to introduce how the three organising principles of human perception—language, living things and political economy—may be stratified and networked with differing emphasis, while also demonstrating “a spatial mapping within which knowledge becomes knowledge rather than an accidental array of facts and objects”.¹⁹ Foucault's interest in a spatial organisation of knowledge is the common ground that Yamaguchi's exploration of video space intersects. Yamaguchi navigates pictorial and real space through his sculptural and interactive approach to the medium.

¹⁸ Ibid.

²⁰ Foucault, *The Order of Things*, 15.

Foucault's understanding of Classical representation is in the combination of three processes. The originating point is the gaze of the painter, which then transforms what is to be represented into an idea, which then is materially transmitted through some representing medium or device to become the object, which then becomes the subject of the gaze of the observer.²² Foucault contextualises this within the re-orientation of knowledge structures of the seventeenth and eighteenth centuries—the period where the emergence of scientific reason, individualism and scepticism characterised the intellectual movement known as the Age of the Enlightenment. Foucault's visual analysis of *Las Meninas* thus explains modernity's conceptualised approach to representation in contrast to the preceding sixteenth-century systems of Western civilisation, where representation was simply that an idea could represent the object of thought.²³

²¹ Ibid., 15–16.

²³ Gary Gutting and Johanna Oksala, "Michel Foucault", *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta, 2019, <https://plato.stanford.edu/archives/spr2019/entries/foucault/>.

artwork.²⁴ Yamaguchi stated that the video medium insinuated itself between filming and being filmed, between seeing and producing it: the relationship between the act of creating an image and the image that was born on the video monitor was now alive, because it was realized live.²⁵

The artist's selection of this particular work was by no means arbitrary, and he acknowledged that he imagined to make a new version of the work through the medium of video technology after reading Foucault's interpretation of *Las Meninas* in *The Order of Things*.²⁶ Additionally, Christophe Charles cites evidence that Yamaguchi was also aware of Picasso's series of paintings *Las Meninas*, further demonstrating his interest in international modern art and its critique of concepts of representation.²⁷

The Velázquez painting situates a cluster of people in the artist's studio where all figures are actively engaged in looking and being looked at. This includes the artist, who is working on a large painting gazing out toward us—the viewer of the painting. The painting is a 'snapshot' of the artist's studio utilising views from implied mirrors and points of view that call into question the perception of reality and illusion. In Yamaguchi's installation, he plays recordings on separate video monitors of close-up details of Velázquez's painting, positioned to the left and the right of the near full-size reproduction. In addition to these elements, CCTV was set up to capture the audience in front of the painting as they viewed the installation relaying it in real time to a central monitor while others displayed recorded framing sections of the painting. Yamaguchi's intention was to transform the Velázquez painting from a physical object in the museum in Spain to an information object that has dynamic living characteristics, able to be transported and duplicated, reanimated in real time with the viewer's integration and movement around the facsimile painting.²⁸

For the viewer, the medium of the video camera and monitors transforms the experience of contemplating the seventeenth-century painting into a performative contemporary moment. The mediated image is emphatically broadcast as 'now', the present moment. As already noted, Yamaguchi emphasised that "the image that was born on the video monitor was now alive, because it was realized live".²⁹ Through the CCTV technology, it was indeed live and the excitement this caused is evident in the video documentation of the installation showing a viewer interacting within the work, perhaps impressed with seeing their own image televised 'live'.³⁰

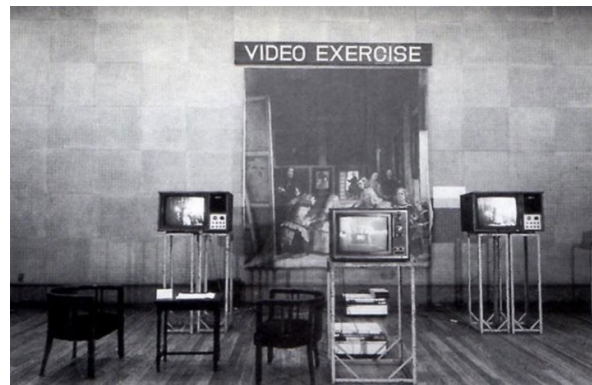


Fig. 7. Katsuhiro Yamaguchi *Las Meninas*, Video Exercise, 1974, Installation by, colour print, 3 monitors, CCTV, table, 2 chairs. (© and courtesy the Estate Katsuhiro Yamaguchi).

The first version, subtitled *Video Exercise*, included one near full-size colour reproduction of *Las Meninas* (1656) and a chair where a visiting viewer would be invited to sit and talk to camera about the Velázquez painting. At least three other versions were presented, evidenced in photographic documentation from Yamaguchi's archive.³¹



Fig. 6. Installation views of *Las Meninas*, 1974–75, taken from DVD documentation, *Yamaguchi Katsuhiro Document Video*, 1995. (© courtesy the Estate Katsuhiro Yamaguchi).

The second version was presented at the São Paulo Biennale in 1975, where the deconstruction of the original painting

²⁴ Reference from exhibition DVD documentation, Yamaguchi Katsuhiro Document Video, 1995 at Taro Okomoto Museum 11 December 2017 acquired from Ohsugi Hiroshi.

²⁵ Charles, Yamaguchi Katsuhiro: The Birth of Video Art in Japan (1971–1974).

²⁶ Ibid.

²⁷ Ibid.

²⁸ Reference from exhibition DVD documentation, Yamaguchi Katsuhiro Document Video, 1995 sourced from Ohsugi Hiroshi, Taro Art Museum.

²⁹ Charles, "Yamaguchi Katsuhiro: The Birth of Video Art in Japan."

³⁰ Ibid.

³¹ Access to files by Christophe Charles, linked by email July 5, 2019.

commences with two near full-size facsimiles of the Velázquez painting—one colour print, another black and white—mounted on opposing walls. In the same way that Velázquez suggests and plays with an implied mirror in the construction of his composition, so Yamaguchi used the live video feed to create a mirrored reality in the monitors that urges the viewer to turn to observe themselves and thereby incorporates the viewer both physically by their presence and virtually through their image captured in the monitors as part of the artwork. Yamaguchi ensconced the CCTV camera behind the supporting wall, positioned to peep through a cut-out section of the black-and-white Velázquez reproduction, removing the painted representation of the King and Queen. With prescient insight, Yamaguchi replaced the scrutiny and power of the monarch with the eye of CCTV surveillance.

Foucault's reading of the Velázquez painting describes a similar position of the artist in the process of observing and of painting himself into the composition, noting that occupying these two positions were contradictory; Foucault comments that "He [Velázquez] rules at the threshold of those two incompatible visibilities".³² Through the medium of video, Katsuhiko Yamaguchi addresses multiple 'incompatible visibilities' to successfully actualise and further complexity for the viewers within the installation. The viewer is implicated within the artwork, no longer a bystander, but drawn into the tensions of the multiple 'incompatible visibilities' through a further complication of sightlines and the spatial arrangements.

A Reorganisation of Representation from Painting to Video

The meeting of classical baroque painting genre and electronic media in this 1974 work embodies a revolutionary reorganisation of representation through the medium of video. By physically moving around Yamaguchi's *Las Meninas* installation, we experience multiple thresholds between the act of observing and being observed, being part of the work and separate from it. By shifting our gaze to specific details within the work, we change through multiple roles, positions, and realities. Our role is a dynamic changing element, where we can sequentially or simultaneously consider being a passive spectator, an active participant, a central or decentralised subject of, or an object in, the artwork. In addition, the reproduction of the seventeenth-century painting and the CCTV live representation of our own image come together to meet in a virtual expression, but also as an actual contemporary spatial moment.

By introducing Eastern philosophies of perception into Foucault's discussion, Yamaguchi was advancing a truly global form. Yamaguchi has said that the Japanese cultural awareness of body movement in relation to eye movement is significant in his work and is a quality strongly evident in Kabuki Theatre.³³ The spatial arrangement of the prints, monitors and video camera invite constant recalibration of our body and eye positions within the space to explore new sightlines that expose new perspectives both internal and external to the work. The narcissistic impulse to watch, glimpse or gaze at our captured portrait 'inside' the monitor as part of the installation compels

continued adjustment of our position, which is also mediated with other elements, such as the CCTV camera embedded within the painting that replaces the framed portrait of the King and Queen. However, because the camera is positioned facing the colour reproduction of the painting, and the monitor holding that live CCTV image is in front of the painting and facing the camera, the viewer can only see the back of their image. As the viewer cannot see their face, they are diminished as the subject of representation, but amplified as an object within the video. The viewer—the live imported subject—is simultaneously objectified and elided to exist in the same way that Foucault describes the void created by Velázquez's multiple viewpoints of the representation of the subject, to be a pure form of representation:

This very subject—which is the same—has been elided. And representation, freed finally from the relation that was impeding it, can offer itself as representation in its pure form.³⁴

Yamaguchi has merged the subject and object as a liminal quality to be explored and realised within the medium-specific elements of the installation. A reorganisation of space and time is achieved through the deconstruction and reinterpretation of the experience of looking, enabled by the technology of photography, recorded and live video, and is not complete without a viewer in real time.

Yamaguchi's choice of medium and his awareness of radical new spatial relationships between the audience, painting and video are evidenced in the artwork's assembly of both colour and black and white photography, recorded video close ups of the *Las Meninas* facsimile painting, live CCTV, and indeed the medium of seventeenth-century portraiture as a genre. Each is purposely selected for the meaning, history and inherent properties of representation. Further, the multiple roles of the viewer offer a new dimension, where the viewer is not only a witness, but is essential as a participant to interact within the installation for the work to be fully realised.

Demonstrating the international nature of the experiments with the video medium, this prescient work by Yamaguchi can be counted to be among the first wave of interactive video installations globally. In the same year, seminal New York conceptual artist Dan Graham made his first relational video installation *Time Delay Room* (1974) in a purpose-built room with an entry and passage into a second identical room, each installed with CCTVs and a monitor. The viewer sees their real time screen presence in the first room, while the screen content in the second room is delivered with an eight second delay. Yamaguchi's video installations also dealt with a heightened sense of the viewer's role as a participant, perception of the present, and a disruption of time created through experiencing live broadcast combined with previously recorded footage.

Yamaguchi's video installation was relevant and in dialogue with post-medium practice internationally. *Las Meninas* was presented at São Paulo Art Biennial in 1975, where it was awarded the Premio Industria Villares, a prestigious award. In the same year, the artist exhibited in the 4th International Open Encounter on Video at the Centro de Arte y Comunicación (CAyC) in Buenos Aires. In 1976, his art was included in the 5th

³² Foucault, *The Order of Things*, 4.

³³ Charles, "Yamaguchi Katsuhiko: The Birth of Video Art in Japan."

³⁴ Foucault, *The Order of Things*, 16.

International Open Encounter on Video at the ICC, in Antwerp. Other international exhibitions in 1978 include the 1st Sao Paulo International Video Art Exhibition, at the Museu de Imagem e do Som, São Paulo and *Yamaguchi Katsuhiro, Environmental Video Art*, at the Anthology Film Archives, New York. The key point here is that Yamaguchi and other artists in East Asia such as Shigeko Kubota (1937–2015), Takahiko Iimura (b. 1937), Park Hyunki (1942–2000), and Soun-Gui Kim (b. 1946), were experimenting with new technology from the same starting point as artists in Europe and North America and were pursuing direct participation in an international contemporary art dialogue.

This analysis of Yamaguchi's artwork supports my contention that the rise of East Asia video develops as a hybrid global medium characterised by conditions of medium specificity in a context of post-medium practice.³⁵ Rosalind Krauss' concept of post-medium and the rise of contemporary art has been generalised as a rejection of medium-specificity. While Krauss claimed that Greenberg's theory was too restrictive, her publishing from the late 1960s on continues to critique artworks with an emphasis on the medium. For instance, in her analysis of unconventional sculptural approaches by Robert Morris such as *Columns* (1961), Bruce Nauman's *Video Corridor* (1968–70), or Richard Serra's film *Hand Catching Lead* (1968), Krauss applies close attention to each artist's approach to the medium, albeit with expanded consideration of new materials, unconventional contexts, performative and time-based expressions. Krauss maneuvered discussion using her terms 'post-medium' and the 'post-medium condition' to unshackle the understanding of medium from the positivism that Greenberg's 'medium specificity' had left behind. Favouring artists committed to non-traditional mediums such as video, photography and installation, Krauss opened dialogue around contemporary approaches to art making, but consistently and meticulously examined the artworks through a discussion of the medium.³⁶ Krauss, on the one hand, is credited as being a decisive leader in the escape from high modernism, commonly associated with the end of medium specificity and the diminishing importance of the medium; but, on the other, she in fact recalibrated and expanded the interpretation and conditions of medium specificity that is associated with the limitations of Clement Greenberg's term whereas the preoccupation experimenting with the medium specific qualities of video is evident in the approach by the artists in the post-medium practice, including video art, heralded through international art events since the early 1970s, such as the São Paulo Art Biennial, Tokyo Biennial, the Sydney Biennale and it now needs an international revision to include the approach to the medium from an East Asia perspective.

While some international attention has been given to early East Asia single-channel video artworks, most museum exhibitions have overlooked the medium's spatial installation approaches as video has most commonly been presented sequentially in screening programs. For instance, in 1979 at the Museum of Modern Art in New York, Barbara London curated an exhibition titled *Video from Tokyo to Fukui and Kyoto* that included sixteen single-channel video artworks by Japanese

artists. All works except one dual monitor work were sequentially screened on single monitors in seven scheduled programs excluding sculptural or installation approaches. London references the international nature of video art and ascribes the Japanese approach to the medium as having an "Eastern sensibility: a particular kind of concentration, a flowing sense of time and lyrical use of colour", also noting the indirect influence of Shintoism on the works.³⁷ Additionally, London makes known in her most recent book that she had already seen experimental activity by Japanese artists in alternative venues in New York in the 1970s, reinforcing the fact that these artists were actively seeking to place their work in an international context outside of East Asia.³⁸

From the 1970s, an increasing number of artists from East Asia were part of the global traffic helping to stimulate a more global art. Artists from Europe, the United States, Canada and elsewhere were also actively travelling internationally, influencing, and being influenced by others in a dynamic movement of people through the post-war era. Artists including Katsuhiro Yamaguchi, Shigeko Kubota, Yoko Ono, Kim Soun-Gui, Park Hyunki, Wang Gongxin, Zhang Peili, and others, were seeking connection and exposure outside of their region and were keen to exhibit internationally where their work could be in dialogue with peers who were also challenging the medium. The main point here is that artists from East Asia made significant contributions to an emerging global post-medium practice through the medium of video art. Yamaguchi's CCTV installation, *'Las Meninas'*, not only demonstrates the artist's profound exploration of the video medium but also reflects his keen awareness and active participation in the global discourse surrounding emerging experimental art practice relating to contemporary Western and traditional Eastern philosophies. The example of Yamaguchi's investigations into the medium specific qualities of video provides a methodology that can be applied across continents to better understand cultural differences and similarities implicit in the emergence of what can be considered the first genuinely global artistic medium—video art.

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³⁵ Alessio Chierico, *Medium Specificity in Post-Media Practice* Vol.1 no.12, 2016. *VIRUS 12 Radical Moderns*. While this essay has a different argument emphasis, it concurrently affirms medium specificity in post-medium practice in new media art.

³⁶ Rosalind E. Krauss, *A Voyage on the North Sea: Art in the Age of the Post-Medium Condition* (London: Thames & Hudson London, 2000)

³⁷ Museum of Modern Art, Press release, no. 20, April 1979. *Museum Exhibition Surveys Video Art from Japan*. This press release details the seven screening programs with dates and times.

³⁸ London, *Video Art: The First Fifty Years*.

Rebellion in 16mm: Expanding Cinema through Animation in 1950s America

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Abstract

Gene Youngblood's seminal book *Expanded Cinema* (1970) reflects both the technological and socio-cultural transformations of the late 1960s, when computers helped place a man on the moon and the opposition to the Vietnam war and the fight for social justice amalgamated the youth movement into a dissenting counterculture. Youngblood's paleocybernetic filmmakers benefitted from the film culture and infrastructure created in the late 1940s and 1950s. After World War II, the wide availability and dissemination of 16mm cameras and, especially, portable projectors, supported the development of a non-commercial alternative cinema that rebuffed the theatrical conditions of film-viewing associated with the entertainment industry's circuit of distribution and programming.

In the context of the apparently limitless abundance of the capitalist economy that furthered the consolidation of corporate America, the growing gentrification of cities and the suburban lifestyle in the Eisenhower era, the 16mm was a token of communal engagement. Massively produced and widely distributed this small gauge supported improvised and inventive modes of presentation that prompted discussion, debate, and social connection. As Haidee Wasson has demonstrated, the 16mm projector could be a dynamic media machine that allowed to stop, reverse, and repeat parts of the film and to change the speed of the projection and the size and brightness of the image. More importantly, the radical growth of portable film technology offered a previously unimagined capacity for programming in all kinds of scenarios as these apparatuses invited "a controlled, creative kind of technocultural performance" [1].

The animations created by Harry Smith, Larry Jordan, and Stan VanDerBeek in the late 1940s and the 1950s were manifestations of the alternative cinema that, bolstered by the small gauge, confronted the film industry and the nascent television culture. Their intuitive, self-taught approach to the animation-making process was made possible by the surfeit and wide availability of 35mm film stock and 16mm cameras and projectors. Moreover, their works were conceived as parts of screening events where the films were either integrated into jazz performances or shown at public places where the filmmaker as projectionist had the ability to improvisationally and creatively alter the projected image. These animations were conceived for screening and distribution through the artists' run non-profit associations and/or cooperatives for the dissemination of independent and experimental 16mm film created at this time: *Art in Cinema*, *Cinema 16* and their offspring, *Canyon Cinema* in San Francisco, and the *Filmmakers' Cooperative* in New York.

Examining the early works and careers of these animators within the context of the alternative cinema developed in the 1940s and 1950s by filmmakers who rebelled against the

oppressive Cold War culture of the Eisenhower years, this essay argues that the 16mm provided the necessary technological conditions for the development of the platforms (both temporary structures and systems for the creation, exchange or sharing of content) that supported the expanded cinema of the revolutionary 1960s.

Keywords

Experimental animation, 16mm, Harry Smith, VanDerBeek, alternative cinemas, amateurism.

1. Introduction

In January 2023, director Steven Spielberg thanked actor Tom Cruise for saving the theatrical movie business with *Top Gun: Maverick* [2]. Critic Su Fang Tham noted that, by providing a unique and "singular cinematic experience," the film demonstrated that "an exclusive theatrical run still seems the most effective way to make a big splash for mass audiences" [3], that is, to pry the public away from their home and portable screens and lure them back to the theatres. It must be noted that this is not the first time that the film industry is threatened by competition from ubiquitous small screens.

Back in the 1950s, rattled by diminishing audience numbers and theatres closings, Hollywood put into practice new projection processes: Cinerama and CinemaScope. These widescreen film formats offered a sumptuous, sensuous involvement and participation in terms of bodily sensation. Scholarship in this period has interpreted the emergence of these processes as the studios' reaction to television and overlooked the popularity of other competing formats. Film scholar Haidee Wasson has recently argued that the post-war availability and wide distribution of small-gauge projectors and the abundance of films in 16mm also threatened the ascendancy of mainstream cinema [4]. Hollywood's present predicament, reflected in the exchange between Spielberg and Cruise, may well be helping scholars to better understand the history of cinema in the 1950s.

The invention of film technology at the turn of the 20th century was the result of experiments conducted by amateurs and entrepreneurs. The displacement of the amateur non- or semi-professional filmmakers from the film business was part and parcel with the creation of a film industry centred around influential production studios that monopolized the tools of production, promotion, and distribution of film in the 1920s. Theatrical cinema was the epitome of this system. The process was accelerated by the creation of patented technology (sound and colour) that made the creation of movies contingent to the availability of substantial funds in the 1930s. Since its inception, theatrical cinema had to compete with other systems (cinemas) vying for hegemony. The darkened movie-theatre that promoted the spectators' absorption into the film's narrative and fantastic world by hiding the technological equipment that made the projection possible, was only the most financially successful of a variety of competing models. Nevertheless, supported by mainstream scholarship on the history of film, this became the paradigm associated with the term "cinema."

The historiographical bias that conceives of theatrical cinema as synonymous with the media and its institutions forgets first, that portable technology stimulated the development of screening environments that preserved the characteristics of earlier forms of cinema (cinema of attractions) characterized by audience participation (comments, laughter, interruptions) and an awareness of the space, the film, and projection technology (clickety sounds, celluloid odour, the light beam from the projector to the screen, accidents); and second, that small-gauge cameras encouraged experimentation and innovation in filmmaking while portable projectors allowed projectionists—or event organizers—to creatively transform the films' reception. These cinemas were not derivative expressions of theatrical cinema but alternative instantiations of the form with their own showing protocols, circuits of distribution, and filming practices that were influenced by, but autonomous from, the hegemonic one [5,6].

The demise of film as a medium at the end of the 20th century brought to the centre of attention discourses that had until then been considered peripheral or supplemental, and highlighted their histories, specific techniques, and supporting technologies: among them was animation. In 2001, Lev Manovich, noting how digital- simulation technology had displaced live-action footage as the material base for the creation of films, argued that cinema could well become a particular case in the history of animation [7]. As an inherently cross-disciplinary field of practice that intersects with film and the plastic arts, this form allows visual artists to explore time-based media. As animation was not a hegemonic—or popular—moving image form until the turn of the 20th century, non-professional animators had to rely on equipment created for other practices (film and photography) and adapt it to their needs. Animators are in total control and are responsible for the creation of each frame to produce the illusion of movement, which makes them highly aware of the technology they use. Moreover, they are especially mindful of the materiality of the film medium rather than of its capacity for representation.

The 1950s were characterized by the oppressive Cold War culture, segregation, the growing gentrification of cities, the development of suburbia, and the consolidation of corporate America. Taking advantage of the cheap and well disseminated abundance of small-gauge equipment and filmic material, a wide range of rebellious, dissatisfied artist converged around the technology and culture of the moving image, despite having

no cinematic training or any desire to see themselves as filmmakers. Animation—as a practice open to all forms of experimentation and interdisciplinary approaches to art creation that lacked recognition among both film critics and art writers and scholars—provided artists working with amateur technology in the Post-war period with an entry point into the artworld. These creators remained closer to the amateur spirit in a field that was neither professional filmmaking nor recognized as an avant-garde, experimental art practice.

Scholarship on the art trends that emerged in the period 1945- 1960 had, until recently, considered these artists as precedents of the explosion of the youth and revolutionary counterculture of the 1960s. In contrast, this essay studies a selection of experimental films created thanks to the articulation of the amateur cinema fostered and supported by portable, small-gauge technology and animation in the 1950s. Concentrating on this technology allows to discover the continuities in amateur practices that supported the efflorescence of art film and the creation of alternative distribution and dissemination networks in this period. These, in turn, laid the groundwork for the radical changes brought about in the next decade by the underground avant-garde and the emergence of computer art.

This essay concentrates on post-World War II artists' use of 16mm technology by analysing the work of animators working in the 1950s. It argues that this small-gauge format provided the necessary technological conditions for the development of a platform (both a temporary structure and a system for the creation, exchange or sharing of content) that supported and shaped a non- commercial, alternative cinema that rebuffed the theatrical conditions of film-viewing associated with the entertainment industry's circuit of distribution and programming. In this way, this format helped to establish the foundations for the rebellious avant- garde art manifestations of the 1960s, when the institutionalization of art cinema sought to delimit the ways in which film was understood within the domain of modern art.

Exactly one century before the *Re:Source* conference in Venice (2023), Kodak made amateur motion pictures possible and practical with the introduction of 16mm reversal film on cellulose acetate (safety) base. This became the first small-gauge format to create an alternative to the industry-standard 35mm gauge, which was based on the easily flammable cellulose nitrate until the mid-1950s. As all small-gauge formats, 16mm equipment (camera and projectors) and film were designed to minimize cost (for example, film development) and to be portable thanks to their reduced weight and size. Aimed to non-professionals amateurs, they were to be easy to operate, adaptable, multifunctional, and affordable. During the Depression, American companies strove to make amateur filmmaking—previously restricted to the leisured wealthy class— more popular. The concentration of the production of 16mm equipment in a small number of manufacturers—film (Kodak); cameras (Bell & Howell), etc.—helped to standardize the technology and reduce costs. By the end of the 30s, the small gauge was a common, familiar, accessible everyday technology used for amateur filmmaking and education, that is, it had established protocols for practice and projection. During World War II, there was unprecedented progress and innovation in the production of small-gauge technology due to its value for the war effort.

2. The Little Format that Could: 16mm During and After World War II

At the war's outbreak, 16mm amateur film equipment was requisitioned for military and government use. While Hollywood studios provided free reductions of their films for troop entertainment, the format was favoured for the creation of training, information, documentary, and propaganda films that were distributed both domestically and on the war front. The goal of these films was not to absorb spectators into a well-curated narration or its fictional world (Hollywood) or to entertain family or friends (amateur film as a hobby), but to move the audience into action by offering a kind of vicarious participation in the represented experience; in the words of scholar Patricia Zimmerman, they provided "a more intimate and more sensory spectator experience" [8]. 16 mm cameras were showcased as heroes that directly experienced and participated in war action. The use of hand-held, simple, low-grade cameras by inexperienced operators capturing footage under strenuous circumstances contributed to the creation of a new form of realism. This style's effect depended on the acknowledgment of the camera operator as a serviceman using precarious technology, that is, on making the apparatus—that in traditional cinema remains transparent—opaque and a contributor to the film experience. Precariousness and inexperience then, became indices of authenticity. Technology more than aesthetics or form was now at the centre of the filmmaking activity [9].

16mm projectors—in many cases purchased from or donated by the civilian population—gained a still broader set of new functions and uses than cameras. As they had been already adopted for education and community engagement activities, there were well-established protocols to use them as visual aids that enhanced attention, interest, and information retention. In some cases, these projectors were part of interactive experiences as in the case of the Waller Gunnery Trainer simulator, where dozens of 16mm projectors were used to improve aerial gunners aim. The instructor had the capacity to manipulate and change the position of the enemy target [10]. This "experience machine" was one of the precursors of the wide screen Cinerama process.

The drive for amateur tinkering and jerry making was well alive as rationing forced amateurs to fend for themselves and be creative with whatever technology and material they had. Amateurs also invented gadgets to optimize cameras used on the front for documentation or gathering and analysis of intelligence. The section "Home Movie's Experimental Cine Workshop: Ideas for Cine Gadgets, Tricks and Shortcuts Contributed by Readers" in the magazine *Home Movies*, *Hollywood Magazine for Amateurs Home*

Movies brimmed with such suggestions.¹ Victor Animatograph Corporation's ad in the back cover of the April 1945 issue—"Victor Projectors 'can take the beating'"—shows an armed GI disembarking with a box on his shoulder (presumably a Victor projector). The copy asserts that, like the servicemen, these machines had "guts" and could withstand adverse situations (*Home Movies* April 1945). The back cover for the February 1944 issue presented Bell & Howell's ad "Today... a Camera is a WEAPON" that shows civilian spectators looking at a film—screened by a projector situated in the text section below the illustration—displaying American GIs advancing towards the enemy. The text informs that the reason why civilians cannot buy new B&H equipment is that cameras and projectors are being used to win the war but that, when the conflagration is over, the company will be able to offer products "improved by the war experience" (*Home Movies* February 1944). Finally, in March 1944, the back of the magazine's front cover published Victor's "Death pauses for Mickey Mouse" (Fig. 1) The ad shows a group of American soldiers relaxing at night while watching a Mickey Mouse cartoon. There is comradeship among the soldiers as they laugh and comment the film. The scene suggests a vivid soundscape: to the convivial atmosphere must be added the music and dialogue of the cartoon as well as the noise of the airplanes in the background leaving the campground for their night missions. The projectionist seems to be one of the soldiers and is also enjoying the film.



Figure 1. "Death Pauses for Mickey Mouse." *Home Movies*, *Hollywood Magazine for Amateurs Home Movies*. March 1944, back of front cover.

¹ The study of articles and ads by equipment manufacturers published in specialized magazines such as *Home Movies* to track down changes is a well-established strategy among scholars working on this topic (Cramer Brownell, Zimmermann, and Wasson)

In the last years of the war, the Treasury Department organized movie events to incentivize participation in the last war bond drives. To instigate community activism, patriotism and public participation, officials enticed community leaders to serve as “victory volunteers” [11] and trained them as event organizers and film projectionists. By the end of the war, thousands of skilled cameraman and projectionists and tons of discarded 16mm equipment were reintegrated into civil society.

Throughout the war, this small-gauge format gained legitimacy as a utilitarian technology and developed into a semi-professional industry. In the immediate post-war years, 16mm equipment—already associated with the technologies that had secured US victory—was promoted as a symbol of the new American way of life. Writer Ben Williams noted in an article published in *House and Garden* in 1954 that “[m]any families now consider a good projector, preferably 16mm sound, a standard part of their recreation equipment, like the charcoal grill, scrabble set, or ping pong table” [12]. In the context of what Lisabeth Cohen has characterized as the “consumers’ republic” [13] goods’ consumption amounted to participation in the fight against communism, free choice and patriotic commitment to home and family [14].

The expansion and colonization of leisure time by market practices instigated the professionalization of leisure: amateur film became a hobby. The purchasing power of those devoted to it determined the kind of cameras and projectors they could acquire: simpler, automatic machines were available at the mall while the semi-professional ones that required dexterity and sophistication in dealing with the film were found in dedicated stores [15]. Specialized, consumer and lifestyle magazines provided comments, how-tos, and technical information about films and filmmaking while the prodigious surfeit of films available in 16mm—the film reduction prints the studios had given to the army were offered in jackrabbit, i.e. unlicensed, shows [16]—favoured the creation of personal and public libraries, and a network for exchanges.

Portable projectors were key for this new media ecology, as their adaptability allowed for different configurations and a great variety of viewing scenarios. The ubiquitous 16mm projectors encouraged event organizers and/or projectionists to set the time and conditions of spectatorship as they were able to shape the program and establish the rhythm of the event. They determined the image size, the speed, stops, and parts to be repeated, and even the sections of the films to be watched. They could even alter the original soundtrack or create a new one as the 16mm film was issued with a magnetic sound band and projectors had audio recording capacities. Moreover, as the industry’s goal was to maximize adaptability and multi-purposefulness, many projectors were conceived as multimedia environments that could be connected to slide projectors, microphones, record players, radios, etc. As Wasson notes, “[e]xperts, specialists, partisans, and the simply curious gained access to an apparatus that invited a

controlled, creative kind of techno-cultural performance” [17]. Both amateurs and avant-garde artists took advantage of the potential offered by the semi-professional 16mm technology.²

However, as Patricia Zimmerman has noted, there was a growing gap between amateurs and creators. The non-professional filmmakers’ free time and creativity was being suffocated by the transformation of portable film equipment into a leisure time commodity for family and community entertainment, thereby stifling the desire for exploring the technology’s capabilities and its potential for social and political action [18]. Concurrently, the experimental use of this technology came to be perceived as the preserve of artists, especially those reacting against the cultural, social, and economic realities of the Cold War during the McCarthy years.

The creation of new films was supported and stimulated by the development of dynamic networks of exchange and use that operated outside of the movie theatres and the studio-dominated system. Film scholar P. Adam Sitney noted that “[t]he visionary film-maker in America [in the 1940s and 1950s] does not go on quietly doing his work indifferent to considerations of exhibition, distribution, and response, even though that may be his goal” [19]. Post-war American experimental filmmakers took advantage of the 16mm gauge for both revolutionizing film and the creation of networks for the distribution and projection of art films at a time when they were forging their professional identity as different from that of the amateur and when film art had not yet been bestowed recognition as a manifestation of modern art. In the USA, a huge step in this direction was the creation of the *New York Film Festival* in 1963, which legitimized film as an artistic medium. The progressive institutionalization of art film forced experimental practitioners into the underground.

3. 16mm Made it Possible: Experimental Animators in Post-war America

The study of 16mm technology in the Post-war period offers a new perspective to examine the work of experimental animators. Len Lye (1901-1980), the New Zealander animator who had attained fame with his 35mm direct/scratch abstract colour animations in the Interwar period could experience how the use of 16mm changed his style and technique: while in New York in the 1950s, he used this small gauge for the creation of *Free Radicals* (1958). He averred that the “spastic look” of the film derived from the fact that the small size of each frame did not allow him to see what his hands were doing. He had to crouch over it: “I wriggled my whole body to get a compressed feeling into my shoulders [and] a pent-up feeling of precision into the fingers” [20]. The series of energetic lines that resulted from Lye’s corporeal exertion provokes a very physical sense of movement that resounds in the spectators’ bodies. The 16mm allowed a younger American artist, Robert Breer (1926-2011), to pursue the avant-garde dream of adding movement to his art and, more importantly, to screen loops of his collage

² Most of the information in this paragraph was drawn from Wasson’s ground-breaking study on the 16mm.

animations in the gallery space. The immense portability and mobility of the 16mm projector is illustrated by the anecdote where Breer recounted how Amos Vogel the director of *Cinema 16*, a film society devoted to the circulation and screening of art films, had shown Breer's 1961 *Blazes* on "a screen propped up on a pillow in his bedroom" [21]. Both Lye and Breer, having discovered the power of movement in art thanks to animation, moved on to become kinetic sculptors in the 1960s.

The availability of 16mm film and equipment shaped the work and careers of four animators active in the 1950s. What follows is a short description of how this amateur technology helped these artists ease into their artistic careers through the creation of experimental animations. None of the creators selected had any training in animation and most of them did not use this visual form for the extension of their professional lives. Amateur portable technology allowed them to intuitively invent their own techniques by engaging with the materiality of the film and of the machines they were using and tinkering with.

John Whitney (1917-1995) was an American artist whose career exemplified how amateur tinkering was creatively applied for the transformation of war surplus hardware into one of the first computer graphic engines [22]. While working at the Lockheed Aircraft Factory during the war, he began harnessing the potential of military technology for artistic endeavours and built an instrument based on calibrated pendulums that was able to write sounds onto the soundtrack of 16mm film strips. In 1958, Whitney collaborated with graphic designer Saul Bass in the creation of the title sequence for *Vertigo* (Hitchcock), which is considered the first use of computer animation in a film. In the late 1950s, he created, together with his brother James, an analogue computer using parts of the decommissioned anti-aircraft targeting computer called "the M5 gun director." Only in the 1960s was he able to apply his computerized set-up to produce what today is known as "useful films," consisting of designs and metamorphosis of typography lines that were a commercial success. In 1966, he became IBM's first artist-in-residence and devoted the rest of his career to work on experimental digital computer animation. He would later say that his "work with the digital computer is the culmination of all my interests since the 1940s because I found myself forced into the techniques and mechanisms of cinema" [22].

Harry Smith (1923-1991) was a musicologist, experimental filmmaker, anthropologist, painter, linguist, and occultist. His work exemplifies how the adaptability of portable projectors helped to set up creative configurations and viewing scenarios as he used them to instigate performances that—at a time of segregation— conjugated abstract animation and jazz improvisation. Having moved to San Francisco in the last years of the war, Smith practiced direct animation: scratching or painting directly on the film. He called his technique "batik" [23]. He would take a multi-speed projector modified by another animator, Hy Hirsh, to the jam sessions taking place in the city's jazz clubs (Fig. 2). The machine allowed Smith to adjust the images so that they followed the musicians' improvisations [24]. In a letter to the director of the future Guggenheim Museum, Smith boasted that jazz players Dizzy

Gillespie and Charlie Parker had improvised from his animations and noted that:

the musicians who gather nightly in the back room of a cafe near here, to play for their own amusement after they have their regular jobs, have asked me to bring my projector to their "Jam Session" several times, because now everyone wants to try playing while looking at the film [25].



Figure 2. Harry Smith in front of the mural at Jimbo's Bop City, California. 1950. Photographer: Hy Hirsh. Harry Smith Archives.

Conversely, the program of the 1950s instalment of *Art in Cinema*, a ground-breaking series of experimental cinema that took place at the San Francisco Museum of Art, informs that Smith's *Five Instruments with Optical Solo* was a performance in which "the optical images [were] tried, not as visualization of the music, but as a basis for its departure" [26]. This means that the jazz players based their improvisations on the visuals provided by his hand-painted abstract animation. Jonas Mekas informs that Smith had built a "contraption" that consisted of a screen surrounded by ornaments and that the artist projected "around the film itself other images and designs" while also using coloured filters [27]. In this way, each screening was a different, original event.

Stan VanDerBeek (1927-1984) was introduced to the Bauhaus multidisciplinary approach to experimental art and design when he attended the famous Black Mountain College. This was in 1949- 1950 and Summer 1951, that is, precisely at the time when avant- garde musician John Cage and dancer Merce Cunningham were actively involved in the school's activities. VanDerBeek's work exemplifies how artists benefited from portable projectors' capabilities to become part of multimedia environments.

In the late 1950s, VanDerBeek self-taught himself how to create socially critical animations by mixing collage and direct animation techniques. These collages, or photomontages, consisted of both thematically related and disparate groupings of media imagery. Starting in 1963, the artist, who was acutely conscious of the dangers associated with the cultural legitimization of film and of the

need to create alternative manners of spectatorship, created the Movie-Drome, a grain silo dome that he turned into his “infinite projection screen.” 16 mm projectors were part of a wide array of machines that projected images—including his animations—on the dome’s concave surface. This same concept was at the basis of the *Movie-Mural* he devised as backstage for Cage-Cunningham *Variations V*—a collaborative, interactive multi-media performance that integrated dance, multiple film projections, and live-electronic music that interacted with the dancers’ movements—that premiered at the Lincoln Center on occasion of the 1965 *New York Film Festival*. In this setting, 16mm projectors were hooked to a fifty-channel mixer created specifically for this event [28]. In the performance filmed by German TV (which was directed by Arne Arnbom and filmed at Studio Hamburg, West Germany, 1966) 16mm projectors were incorporated into the choreography as dancers circled around them. VanDerBeek later worked at Bell Labs and became a pioneer in computer animation.

Larry Jordan (1934-), is the perfect example of the independent film-creator conscious of the need to create networks of distribution and promotion of art films to secure filmmakers’ autonomy from the studio-controlled cinema. In the 1950s, while mastering the use of the film camera in San Francisco, Jordan wrote poetry, painted, and performed in plays written by his friends. In 1958, he joined assemblage artist Bruce Conner to create a short-lived film society called *Camera Obscura* and built a “16-millimeter experimental film theater” [29]. In the early 1960s, he became one of the founders of *Canyon Cinema*, a non-profit distribution cooperative for experimental film that was and still is key for the preservation and dissemination of experimental art film.

Inspired by Max Ernst’s collage novels, Jordan created stop-motion animations using cut-outs of Victorian engravings as profilmic material. He later recalled how he had “found” the soundtrack for one of this cut-out animation while screening it at a coffee house: “I was improvising with the radio for sound while I was showing the film in a café in San Francisco, and on came this sonata...” [30]. A fierce defender of the 16mm format, his studio equipment was modified to serve his creative needs [31]. Until recently, he offered performances where he manipulated a 16mm projector to attune his animations to the sound of live electronic music.

4. 3 There Could be more 16mm, but... (Conclusion)

Gene Youngblood’s 1970 *Expanded Cinema*— the first survey that explored the avant-garde rejection of modernism and mainstream cinema in the 1960s—analyses Whitney’s and VanDerBeek’s early creations. This influential book misconstrued the cultural context from where their work emerged and, by presenting them as experimental filmmakers, disallowed animation as a distinctive cinematic form. Even though Youngblood studies how television, videotape and cable television revolutionized normalized approaches to film and cinema, the book reinforces the historiographic bias that positions them as the paradigmatic forms

of this field of theory and practice skipping altogether a crucial chapter of this evolution.

In the 1950s, 16mm technology helped to establish a zone of indetermination where amateurism as a place for creativeness and refuge from commercialism was still tangled with the practices of creators looking to develop artistic careers and alternative nonconformist manners of expression. Thanks to its exceptional growth and dissemination during World War II, 16mm technology allowed the development of an alternative cinema that established the foundations for the emergence of the underground cinema of the next decade. In the mid 1960s, as art film began to be institutionalized as an artistic expression, filmmakers used this platform for the creation of their own oppositional forms.

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Low Fi + Hi Tech: On Fluxus's ambivalent embrace of technology

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The Fluxus (non-)movement in art featured many pathbreaking figures in the history of early media arts. This paper seeks to trace some of the differences, tensions, and contradictions existing among a loose affiliation of artists who sought to disrupt both quotidian life and gallery art, but had varying attitudes towards technological innovation. This also manifested itself in texts, events, works, exhibitions, and differences in the later historiography of Fluxus. This is the contradictory feast that is offered up to the Fluxus scholar in the current moment.

Despite all the technological innovations that may be attributed to certain Fluxus artworks and artists, its members often tended towards low fi, rapidly executed, easily reproduced cultural production. In their earliest performance events, they retained a classic avant-garde notion of shocking the bourgeoisie yet simultaneously a much more stripped down, grass roots rather than elitist notion of what an artwork could be, as scores tended towards outlining an action that could be replicated by anyone: pouring water, tearing paper, shaving a head, preparing food, shouting, or destroying a musical instrument.

These tensions and contradictions I would argue regarding low tech / high tech are not merely circumstantial but core to the very contradictory nature of Fluxus itself. In my reading, this is in line with a lot of other contradictions running through Fluxus' artists' self-evaluation and historical assessments: whether Fluxus artworks are artworks or not; should be spectacular or not; should be political or not; should contest prior notions of art; should be collaborative or singular in attribution.

But a theme running through many Fluxus artists' practices could be summed up as an ongoing subversion or undercutting of technological sophistication in favour of the rough, blunt, direct, and intentionally rudimentary structures as an analogue to quotidian, often mundane rather than spectacular experiences.

Fluxus has many definitions but some of the characteristics most associated with the artworks and events created by Fluxus artists (since 1962) include the following points, according to a formulation originally posited by the late artist and independent publisher Dick Higgins, and later revised by artist Ken Friedman: "internationalism, experimentalism and iconoclasm, intermedia, minimalism or concentration, an attempted resolution of the art/life dichotomy, implicativeness, play or gags, ephemerality, specificity, presence in time, and musicality."¹ How such aspects might be realised becomes another issue.

In Fluxus scores an intentionally rudimentary DIY aesthetic often prevails raising—*What if?* style—speculative questions.

With everyday objects frequently acting as symbolic and actual prompts and props representing subversive phenomena, i.e. tools taking apart a piano = dismantling bourgeois classical sensibility. And in terms of working with food, fluids, other edible or consumable materials, Fluxus seems to want to eat the world whole, to fully ingest, imbibe or otherwise take into account that which surrounds it, outside transformed into inside, exterior into interior experience made manifest in a literal fashion.

But along with the tendency to challenge authority, often by either reworking existing Modernist tropes, or attempting to do away with them entirely, neo-avantgarde artists of the 1960s became increasingly fascinated with emergent technologies in the world and how to respond to them within the context of art. The late Fluxus scholar Owen F. Smith has written that:

Although the production of the variety and forms of Fluxus publications, films, and multiples is of general significance, it is two other aspects of this work that have a particular relevance for a prehistory of the Internet: first, the exploration of new and combined forms of media, or more specifically, intermedia; and second, the attempt to develop a new global distribution network for the works themselves.²

And as early as 1966, happenings innovator and Fluxus frenemy and sometime ally Allan Kaprow commented that:

Contemporary art, which tends to "think" in multimedia, intermedia, overlays, fusions, and hybridizations, more closely parallels modern mental life than we have realized. Its judgments, therefore, may be accurate. Art may soon become a meaningless word. In its place "communications programming" would be a more imaginative label, attesting to our new jargon, our technological and managerial fantasies, and our pervasive electronic contact with one another.³

Predating our actual "pervasive electronic contact with one another" in this century, Kaprow in prescient fashion takes the temperature of our increasingly rapt attention to technological interfaces. Such interfaces become a major factor in Fluxus whether actually realised or in the form of reciprocal give and take in performative scenarios, which seemed to be never-

¹ Dick Higgins, *Intermedia, Fluxus and The Something Else Press*, Steve Clay and Ken Friedman, eds. Catskill: Siglio Press, 2018, 98.

² Owen F. Smith, "Fluxus Praxis," in *At a Distance: Precursors to Art and Activism on the Internet*

Annmarie Chandler and Norie Neumark, eds. Cambridge: MIT Press, 2005, 125-26.

³ Allan Kaprow, *Essays on the Blurring of Art and Life*, Jeff Kelley, ed. Berkeley: University of California Press, 2003, 86.

endingly generative, especially over the course of “early” Fluxus.

But as Smith noted, both the emphasis upon intermedial experimentation and the global networks created via Fluxus become key innovations of its radical and ongoing programme of activities for decades. Some of this was done on a modest scale, along the lines of mixing multiple forms within one work, and acting “in between” media (Higgins’ original notion of intermedia), or posting multiples, objects, printed matter across the globe, as Smith wrote (from a 2005 perspective):

In Fluxus one can see a glimmer of an information economy: not what our economy of information has become, in the commodification and sale of information, but a desire to create a network for interactions between constituents. What Fluxus models is a system, however flawed, that seeks a judicious use or management of the intellectual resources of its community. Further, this process of information exchange within this economy was projected as shifting; all could, or at least would eventually, participate as both producers and consumers.⁴

This is a view that could be called that of Fluxus as internet precursor, and I have sympathy with it being a cogent argument, but nonetheless yet again a contradictory one, in that the first hand, face to face, and materially present is also a central attribute of Fluxus.

It’s revealing to examine what might be called the technological foci of Fluxus during the 1960s-70s, and among those efforts one finds Nam June Paik’s video broadcasts and television sculptures and installations; Alison Knowles’ excursions into computer poetry; Yoko Ono’s recordings and films; Robert Filliou’s video works featuring humorous monologues and dialogues.

It’s generally Nam June Paik who is considered a “technologist” or “technological visionary” whereas along one reading of Higgins’ “intermedia” idea, it’s not so much that artists were working “across” or “trans” media as much as in-between genres and media, such that the choices of how to realise each conceptual idea and with which tools seems the most relevant here. As Dick Higgins wrote in 1987, “Virtually all Fluxus works are intermedial by their very nature: visual poetry, poetic visions, action music and musical actions, Happenings and events that are bounded, conceptually, by music, literature, and visual art, and whose heart lies in the midground among these.”⁵

These artists were unafraid to take on different tools, but as in the example of Robert Filliou, he was completely unconcerned with how “well” i.e., smoothly his works translated technologically. Rather the media he used were a means to communicate, to document, and to a large degree to experiment and play around the discursive formations and formats that he oriented his practice toward: poetry, prose, plays, children’s books, games, performance, monologues, discussions, interviews.

⁴ Smith, “Fluxus Praxis”, 133-34.

⁵ Higgins, *Intermedia*, 97.

⁶ Robert Filliou, *Telepathic Music No. 7, the Principle of Equivalence Carried to a Series of 5* (1977) [videotape]

As Filliou commented within the context of one of his idiosyncratic video efforts:

In video what I would do is to make a tape involving an action in which I could be involved, and this initial action might last 10 minutes. This first tape would be to the best of my ability well made. Then I would do the same action but this time badly made. Perhaps by overcharging the information or not erasing errors as they come in – but at any rate there is no normative value judgment implied between well-made and badly made – it is just the contrast added to which is the not made. That is to say [...] I would make another tape explaining the concept [...] and actually this is what I am doing now. You have seen an action and so on and so on. Three times it was a well-made badly made – now it is a not made.⁶

And so Filliou uses video as an extension of performance but also a mechanism unto itself to explore the medium, even if now in seemingly (and largely) rudimentary a manner.

A key aspect of artist Alison Knowles’ works is their iterative, ongoing uses of certain materials and themes, such as food and consumption, sound and poetry, prints and multiples. Her 1967 iteration of the work entitled *House of Dust* (which continued to have many further versionings) consisted of a computerised poem, working in collaboration with composer James Tenney. This is both adapted from a Fluxus score entitled *Proposition No. 2 for Emmett Williams* but also a technological shift in Knowles’ working process.

However, it is not as if this experiment led to many more computer based works, it simply became a novel method for a specific project, and in relation to this notion of hi tech / low tech I have raised, the very same year Knowles created another longstanding work *The Identical Lunch* simply based on creating a score from her most frequent meal: “A tuna fish sandwich on wheat toast with lettuce and butter, no mayo, and a large glass of buttermilk or a cup of fresh soup was and is eaten many days of each week at the same place at about the same time.”⁷

In a different but related vein, artist Yoko Ono used the much more widely distributed pop album as a method of concretising radical event performance and sonic experimentation. While her associations with rock n roll musicians owing largely to her partnership to John Lennon “professionalise” the sound quality of the records, they still encompass a loudness, dissonance, eclecticism that breaks the stylistic sonority characteristic of many records of the time, primarily through long form compositions, unusual timings, and Ono’s vocals, which range from classic musical voicings to abrasive and affecting shrieks and shouts.

And starting towards the end of the 1960s, Lennon and Ono used media campaigns as an activist tool, billboards, advertising, posters, television chat shows, events such as their renowned *Bed-Ins* such that the primary technology involved was the technological apparatus of the media industrial complex, chasing sensations that are as much or more “celebrity” coverage as art and cultural happenings.

⁷ By Alison Knowles: *A Retrospective (1960-2022)*, eds. Karen Moss with Lucia Fabio, Berkeley: University of California, 2022, 116.

In a 2013 interview, Ono intriguingly stated that:

John would have been totally excited about the computer age, because that's the kind of thing that John and I were dreaming of. Like the Smile Project [where Ono set out to make a film capturing a smile face of everyone in the world] – we were almost having that kind of format of, like, communication in our heads ... It's very interesting to think about, that John was a person in a rock group, and what they were doing was totally different from what I was doing, but he just jumped in. He was totally open.⁸

But one could say that Ono jumped in as well, and in her continuing sound works and music has had as much of an enduring, and even potentially longer and more influential career in her sonic experiments and productions as in her visual art practice per se.

In an intriguing critical comparison of the works of Nam June Paik and writings of Dadaist Raoul Hausmann, scholar Ina Blom notes, with reference to Paik's representations of the moon and its phases, that in the actual television transmissions of the Apollo moon missions and landings, the accepted standard quality of televisual imagery allowed by the FCC agency had to be lowered, writing that:

It essentially meant that the analog or photographic truth-standard of television images would have to be relinquished. Television coverage could no longer hide or cover up the essentially unstable and indeterminate character of electronic images. The moon transmission was in other words paradigmatic in that its extremely low-fi image transmission made visible the slippage in official TV's representational strategies.⁹

This is particularly relevant to the ethos of Paik's practice which often calls attention to glitches and the largely untranslatable vs the easily mediated, the seen and unseen, the mimetic representation and its material analogue. Paik in his installations and projections frequently refers to the static, diagrammatic, and iconic—whether the moon, the Buddha, the Sistine Chapel, the Altarpiece, or the United States map—and populates it with ever-shifting, often distorted imagery. Determinate and indeterminate entities are always being juxtaposed, overlapped, merged into one another, but form an uneasy visual coexistence.

For Paik technology was an aid to sabotaging and subverting its very characteristics, often taken as transparent. In a later interview, he noted that

film director Nicholas Ray who catapulted the unknown James Dean into stardom in *Rebel Without a Cause*, dreamed of making a frameless film using 8mm, 16mm, and videotape simultaneously and compositely, but he died without realising his dream. Perhaps it's everyone's dream to make a frameless film. As for me, I would like to destroy the TV frame.¹⁰

And arguably Paik's experiments with altered televisions such as the 12 manipulated televisions he presented at his 1963 *Exposition of Music – Electronic Television* in Wuppertal, Germany at the very least radically transformed the accepted attributes and properties of the TV frame.

As scholar David Joselit writes:

In contrast to the standard structure of the network as a centralized source of information that is uniformly broadcast to a multitude of individual receivers, Paik customized a microcosmic network in which each TV receiver would decode the signal in its own way. The resulting plurality of data streams effectively mapped Raymond Williams's famous formulation of television as 'flow'.¹¹

I tend to subscribe to the notion that Fluxus involved experiences as much or more so than things. That the many objects, images, prints, moving images, sounds are prompts for actions, whether at the time of their making or their reenactment, reviewing, rereading, relistening; prompts for new realizations on the part of the participant. As Hannah Higgins has phrased it, "Fluxus materials ... provide contexts (the Fluxkit and the Event) for primary experiences".¹²

That an eclectic range of technologies became central to Fluxus' identity was largely a means to an end, making paths to foster interchange, whether inter-actions or intra-actions, both within and exterior to the artist community itself. Their historic push in this direction now might seem slightly less innovative than it once was, but simply because we live in a world that, for many modes of artmaking, Fluxus brought into existence, and if it leaves less of an imprint at times that might be owing to its not to its obscurity or contentiousness, or tools used or subverted, but its comparative lightness of touch.

⁸ Patrick Doyle, "Q&A with Yoko Ono: 'John Would've Loved the Computer Age'" *Rolling Stone*, Sept 17 2013 <https://www.rollingstone.com/music/music-news/qa-with-yoko-ono-john-wouldve-loved-the-computer-age-195111/> Accessed Sept 7 2023.

⁹ Ina Blom, "The Touch through Time: Raoul Hausmann, Nam June Paik and the Transmission Technologies of the Avant-Garde," *Leonardo*, 34: 3 (2001), 214.

¹⁰ Stooss, Toni and Thomas Kellein, eds. *Nam June Paik: Video Time – Video Space*, New York: Harry N. Abrams, 1993, 128.

¹¹ David Joselit, *Feedback: Television Against Democracy*, Cambridge: MIT Press, 2007, 11-13.

¹² Hannah Higgins, *Fluxus Experience*, Berkeley: University of California Press, 2002, 58.

Vera Frenkel's String Games: Improvisations for Inter-City Video

Mikhel Proulx

Abstract

In the autumn of 1974, the Canadian artist Vera Frenkel staged *String Games: Improvisations for Inter-City Video*. Two groups of participants—five each in Toronto and Montreal—engaged in a remote version of the classic string game *cat's cradle*.

String Games is the first piece of telematic art. However, art historical attention to the artwork has been insufficient. *String Games* emerged from a watershed moment for network technologies, specifically within a context of telecommunications development in the Canadian nation state. Telecommunications-based art has a long legacy in Canada, the country that exactly a century before Frenkel's artwork saw Alexander Graham Bell's patent for the telephone in 1874. His namesake company launched the Bell Canada Conference TV System in the early 1970s. In its day, the System was one of only four organizations worldwide that provided conferencing technology that engaged video, audio, and computer networks. Decades before studies alerted us to the cognitive overload of Zoom fatigue, the effects of 'continuous partial attention,' and to the importance of non-verbal, bodily signals in digital media, Frenkel and her collaborators used telematics to consider new ways of being together with and through embodying new communications tools. This paper provides a historical analysis of *String Games*, situates its role within the history of networked art, and explores the artwork's co-operative realisation of live connection and a feeling of co-presence in the context of technological development in the Canadian nation-state. Within the context of early interactive video work, *String Games* was a notable innovator

Body text

Fifty years ago, in the autumn of 1974, the Canadian artist Vera Frenkel (b. 1938) staged the artwork *String Games: Improvisations for Inter-City Video*. Two groups of participants—five each in Toronto and Montreal—engaged in a teleconference version of the classic string game *cat's cradle*. As if each the fingers of two hands, the ten participants played the synchronous string game on an early telematic network. In three live, closed-circuit transmissions, the group improvised a nine-hour performance together.



Figure 1 Vera Frenkel. Documentation of *String Games* inside the Toronto Bell Canada Conference TV studio, 1974. Vera Frenkel fonds, Queen's University Archives (Kingston Ontario).

Frenkel is a pioneering media artist and a leading Canadian artist, and before her celebrated involvement in documenta, the Venice Biennial, and her honorary doctorates and governmental awards, she created *String Games*.¹ It was the first artwork to be accomplished within a telematic network, although it remains largely underacknowledged within studies of telematic art.

In two cities on the morning of October 30, 1974, two groups of people arrived for the first of three telematic transmissions at the newly built Toronto and Montreal Bell Canada Conference TV Studios. Each person would play the role of a designated finger in a remote game of *cat's cradle*, resulting in what Frenkel called "an electronic re-enactment of the familiar eight figures" of the game (Frenkel 1974: 4). Frenkel described the event's choreography: "each player would learn the movements of a particular finger in all the figures, and could contribute to the improvisation in the same order as that finger would manipulate the string" (Frenkel 1978: 13). Corresponding to how fingers would move to achieve the eight stages that form the *cat's cradle*, each participant embodied the role of a specified digit. But instead of plucking strings from fingers, this telematic version had each player perform from a set of components they each chose beforehand: one each for nine categories set by Frenkel: a number, a letter, a word, a name, a sentence, a fragment of a poem, a visual image, a gesture, and a sound. Entering the exchange primed with these components, the ten participants brought the elements to be used for the eight *cat's cradle* movements, for a vast range of possible combinations. It was a formalized co-operative structure, as Frenkel described, "somewhere between a square-dance, sound poetry and prayer" (Frenkel 1978: 13).



Figure 2 Vera Frenkel. Documentation of *String Games* inside the Montreal Bell Canada Conference TV studio, 1974. Vera Frenkel fonds, Queen's University Archives (Kingston Ontario).

Through live black and white video transmissions and with a playful demeanour, the players charted a handful of the thousands of possible permutations of these elements. Orchestrating the event, Frenkel called out each move before the players would perform their act, as she also shared a diagram of the choreography on one of the telematic screens. During the play, each participant could see both their own group's image, and the image of the participants in the connected city. The transmissions were recorded, and displayed for the month at the Montreal art gallery *Espace 5*.

Attempts to define the artwork have proven tricky. Writers have variously categorized *String Games* as a "video work,"² a "performance piece,"³ a "video-performance project,"⁴ a "performance-installation,"⁵ an "interactive performance video,"⁶ a "videographed performance,"⁷ a "video teleconferencing performance,"⁸ a "teleconferenced interactive performance,"⁹ and as an "interactive performance-based work."¹⁰ Although the evident consensus is that *performance* is central to the artwork, this range of reaching descriptors demonstrates the difficulty of locating what *type* of artwork *String Games* is. And while performance is a common thread, these descriptions qualify the performance as mediatised; *String Games* was performance-like, but was also mediated by technology and thus somehow also unlike a straight performance.

The struggle that scholars have had with categorizing *String Games* indicates how the innovative artwork confounds what performance theorist Philip Auslander has called the "traditional view of live theatrical performance" (Auslander 2008: 107). This conventional notion that documentation betrays the aura and authenticity of a live performance has been shifted by evolving technological conditions, highlighting the changing conceptions of the nature of passive spectatorship of live, active performance. The presence of new communications technologies had led to a situation in which clear-cut distinctions between a live artwork and its reproduction are no longer possible. "What counts culturally as live experience," Auslander notes, has changed "over time in relation to technological change" (Auslander 2012: 3).

String Games openly brings this fact to light. The performance has no privileged audience, and had no discrete, unmediated, original event that might be undermined by technology. That is, the video imagery was itself integral to the

artwork's realization. Each group of performers looked at the live video transmission and were cued telematically by the other group to generate their next move. For the players of *String Games*, the telematic screens were constitutive of the social activity produced in real time; they interacted both with the media and with each other at the same time.

String Games anticipated forms of co-presence that have become commonplace in the Internet age. Now, nearly fifty years after Frenkel and her collaborators realized the performance, it is clear to see the artwork's grasp on the changing ideas of liveness and participation in relation to technological paradigms. *String Games* prefigured the "new forms of public sociality" afforded by digital communications networks that stretch our sense of live participation by fostering a real-time, remote co-presence (Couldry 2004: 359). Removed from the restrictive sense of theatrical liveness in which an artist and audience share a physical time-space, *String Games* heralded these new forms of liveness by several decades, engaging co-operative communication across distance and across borders.

Exactly a century before *String Games*, Alexander Graham Bell famously patented the telephone in 1874 from his parent's homestead in Ontario, Canada. His namesake company would reach an apex of Canadian telecommunications infrastructure development with the Bell Canada Conference TV system, erected in the early 1970s, which Frenkel's *String Games* was an early participant.¹¹ At the time of *String Games*, the Bell Canada Conference TV System was one of only four organizations worldwide that provided remote conferencing technology that utilized computer integrated telecommunications networks.¹² The project proved to be tremendously expensive, and with little demand for its services, it would not last the decade. Within that time, however, the system supported technical research, scientific studies, and, with Frenkel's *String Games*, at least one artwork. Routing audio and video separately, the system used both the Trans-Canada Skyway microwave link, and a designated long distance broadband coaxial telephone switch. In other words, both a microwave radio relay and a set of copper wires carried simultaneous, live picture and sound between two or more of the Bell Canada facilities. This was an enormous volume of digital information to transmit in the early 1970s—well before optical-fibres and broadband computer networks were in wide use. Moreover, by feeding communications on a designated channel, Bell Canada's videoconferences had a very minor network delay. That is, the lag between someone speaking on one end of the line and someone receiving this at the other end was negligible—even in comparison to teleconferencing today.



Figure 3 Vera Frenkel. Documentation of *String Games* inside the Montreal Bell Canada Conference TV studio, 1974. Vera Frenkel fonds, Queen's University Archives (Kingston Ontario).

Participants of the TV System sessions sat in a horseshoe-configured row of seats, 12 feet in front of two 23-inch monitors. This setup reminded Frenkel of two hands, hence her idea of playing string games. Screens displayed for the participants both the transmitted image of themselves in the room, and the incoming video from the joining city or cities. The facilities were outfitted with four cameras and five directed microphones, built with a sophisticated voice-switch relay that automatically displayed the video of whoever spoke loudest (Hough and Panko 1977: 6). As well, a table-mounted camera was stationed to transmit images of documents to either group, and the rooms were further networked with fax and telex machines.

The art historian Griselda Pollock has recently praised as “enormously influential and important” the “inventive beauty” of Frenkel’s artworks, arguing for her better recognition as “one of the most important multidisciplinary, intermedial, and...conceptual artists of the late twentieth and... twenty-first centuries” (Higgie 2020). And yet, *String Games* is largely absent from international discussions of media art history. *String Games* was the first artwork to use live, video-based telematics. Although, the artwork predates the very term *telematic* by four years,¹³ and this was six years before the first of Roy Ascott’s many artworks in the medium, and his coining of the term *telematic art* (Shanken 2003, 63). Although the artwork is known and appreciated internationally, *String Games* itself has received scant scholarly attention outside of Canada. It is also neglected in the specialized literature about telematic art history altogether, such as in Oliver Grau’s influential research of virtual art, Kris Paulsen’s history of telepresence art, Tilman Baumgärtel’s overview of digital telecommunications art, and in Roy Ascott’s canonical literature of the field (Grau 2003; Paulsen 2017; Baumgärtel 2005; Ascott and Shanken 2003). Even within Canada, the artwork has often been neglected in histories of networked art, such as in Hank Bull’s “Canadian Perspective on the History of Telematic Art” (Bull 2016). Art historians have elected other artworks as ‘firsts’ in the field—all of which took place after *String Games* in 1974. Robert Adrian X’s overview of the “pioneer years” begins in 1979 (Adrian 2001). Tatiana Bazzichelli gives an account of artists working with digital networks in the mid-1970s—all after *String Games* (Bazzichelli 2008: 96). Domenico Quaranta highlights Elvis

Presley’s live broadcast 1973 concert in Hawaii, but the first artwork in his overview to utilize telecommunications is from 1976 (Quaranta 2013: 59). And Dieter Daniels neglects to mention any artwork before 1980 in his history of networked art (Daniels 2010). Edward Shanken does include a passing sentence on *String Games* in his 2009 tome *Art and Electronic Media*, though the brief description is marginal next to entries on artists better-recognized in the field (Shanken 2009). Shanken’s research that more expressly concentrates on telematic art neglects *String Games* altogether, with an overview of the field beginning in 1977 (Shanken 2003: 60).

String Games is well-acknowledged by leading scholars of media art in Canada, notably by Dot Tuer and Caroline Seck Langill, both of whom have given considerable attention to Frenkel’s practice and likewise have noted that the 1974 artwork has been underappreciated.¹⁴ “Despite its prescient nature,” Tuer notes of the artwork’s emergence in the 1970s, “*String Games* did not achieve critical recognition as a seminal new media artwork until decades later” (Tuer 2013: 42–43). As Langill observes, “the lack of critical and curatorial insight into the work’s pioneering nature, as well as its very limited exposure in 1974, led to its absence from discourses surrounding new media art” (Langill 2009).

Art historical accounts of early telematic art usually—and erroneously—indicate the beginnings of the field in the years following *String Games*, a period that indeed saw the advance of telematic art practice. *String Games* stands apart as the progenitor in the field, and is in dialogue with those artworks better documented within media art canons, which focus predominantly on artwork in the 1980s, tend to canonize Americans, and are nearly exclusively the domain of men.



Figure 4 Vera Frenkel. Documentation of *String Games* rehearsal, 1974 Toronto. Vera Frenkel fonds, Queen's University Archives (Kingston Ontario).

String Games emerged at a key moment in the cultural history of network technology to offer a co-operative, social practice that critically examined this new technology. It came from a context in which attempts to democratize televisual media cast ‘viewers’ not as passive consumers, but as content producers in their own right. New media technologies of the 1970s saw the genesis of video and access to cable networks, as well as the birth of art practices like Frenkel’s—employing such networks in the service of community-making. As the cultural critic Gene Youngblood has expressed, such networked media activity was concerned with “creating alternative possibilities

for conversation,” and ultimately, “the goal is to have an alternative social world” (Huhtamo: 1990). Ascott was unambiguous in his hopes for telematic art, claiming that it “provides the very infrastructure for spiritual interchange that could lead to the harmonization and creative development of the whole planet” (Ascott 1990: 247). Here, individuals became a part of a greater system: as in a string game, two hands work together as a self-regulating system that extends and multiplies human perception to stimulate collaboration and copresence within this temporary, virtual community.

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Notes

- ¹ Frenkel has received the Governor General's Award in Visual and Media Arts (2006), and honorary doctorates from the Nova Scotia College of Art and Design (1994) and the Emily Carr Institute (2004).
- ² Joyce Zemans, "Vera Frenkel," in *The Canadian Encyclopedia*, ed. James H. Marsh (Edmonton: Hurtig Publishers Ltd., 1985); Sarah Hampson, "Sick of Bureaucrats," *The Globe and Mail*, January 1, 2005, <https://www.theglobeandmail.com/arts/sick-of-bureaucrats/article973858>.
- ³ Simon Lewsen, "String Games," *Canadian Art*, Winter 2017, 82.
- ⁴ Amy Marshall Furness, "Vera Frenkel: Archive Fevers," Canadian Art Online, December 2, 2010, 156.
- ⁵ Lorna Collins, *Making Sense: Art Practice and Transformative Therapeutics* (London; New York: Bloomsbury Academic, 2014), 153.
- ⁶ Marie-Josée Lafortune, "Vera Frenkel | Archi-Féministes!: The Virtual Exhibition," Optica Centre d'art contemporain, 2011.
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- ⁸ Sylvie Lacerte and Vera Frenkel, "Vera Frenkel: Cartographie d'une Pratique / Mapping a Practice" (Public Conversation, SBC Gallery of Contemporary Art, Montreal, October 2, 2010).
- ⁹ Cheryl Simon, "Vera Frenkel, Ed. Sigrid Schade, Ostfildern: Hatje Cantz, 2013, 310 Pp.," *Ciel Variable*, no. 98 (Fall 2014): 98.
- ¹⁰ Caroline Langill, "Shifting Polarities: Canadian Electronic Media Art and Institutional Space, 1970–1990" (PhD diss., Peterborough, ON, Trent University, 2009), 5.
- ¹¹ Information on Bell Canada's teleconferencing studios is scarce. I am grateful for the support of Bell Canada Historical Collection archivist Janie Théorêt. Anthony J. Patterson, "Bell Experiments with 'Teleconferencing,'" *The Calgary Herald*, January 19, 1974.
- ¹² The others were: Institute for Defense Analyses, Washington, DC; Johns Hopkins University, Baltimore, Maryland; and Stanford Research Institute, Menlo Park, California.
- ¹³ *Télématique*, in the French original, is a neologism that combines "telecommunications and informatics." The term was coined in an influential 1978 report for the French government by economic advisors Simon Nora and Alain Minc to refer specifically to the linking of computers and telecommunications networks. "Telematics, n.," in *OED Online* (Oxford University Press), accessed June 28, 2020; Simon Nora and Alain Minc, *L'Informatisation de La Société: Rapport à M. Le Président de La République* (Paris: La Documentation française, 1978).
- ¹⁴ Dot Tuer, "Vera Frenkel: The Secret Life of a Performance Artist," in *Caught in the Act: An Anthology of Performance Art by Canadian Women*, ed. Tanya Mars and Johanna Householder (Toronto: YYZ, 2006), 232–39. Also see Lacerte and Frenkel, *Vera Frenkel: Mapping a Practice / Cartographie d'une Pratique*; Jan Allen, Earl Miller, and Vera Frenkel, *Vera Frenkel's String Games* (Kingston: Agnes Etherington Art Centre, 2011).

Urban Screens in Hong Kong

A balancing act between artistic and commercial application

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Two decades ago, large video billboards illuminating a metropolis at night were still understood as an important element from science fiction movies. Whereas today, their presence is ubiquitous in larger cities. But not only famous intersections or major shopping districts feature screens in all sizes, even the corner shop in some sleepy side street carries a display bigger than the store itself. What started as a sophisticated play-out for prime content has degenerated into inferior advertisement hoardings with flickering pictures.

Tracing the genealogy of current video art in the public realm of the east Asian metropolis requires an understanding of the place-particular and scaled practices of the urban screen. As art and advertising are intertwined with shifting matters of governmentality and (extra)territoriality, artists and curators have responded to the advent of large video screens and surfaces by exploring video art's refusal to remain indoors.

Ellen Pau's 2022 site-specific moving image artwork, *The Shape of Light*, which was created for the M+ Facade, a massive urban screen in the West Kowloon Cultural District in Hong Kong is a shining example for a current engagement with the scale of the new medium. With this piece of work, the fundamental challenges of the form can be illustrated, reflecting on the possibilities, problems, and histories of urban screens and public media art for Hong Kong and beyond, as Pau's work demonstrates a deep understanding of the image, and the materiality and site-specificity of the screen façade.

One of the most interesting aspects of these huge screen formats is the fact that they can become part of the architecture, no longer just a window into the world of commercial interests, but a membrane that connects the inside with the outside and expands the perception of a building. The current state of urban screens in Hong Kong, its cultural and educational potential and the warped/convoluted context in this city is the overarching theme of our debate.

Keywords

urban screens, public media art, Hong Kong

1. Introduction

In this paper, we will introduce different views on urban screens, their presence, and application. Two decades ago, large video billboards illuminating a metropolis at night were still understood as an important element from science fiction movies. Whereas today, their presence is ubiquitous in larger cities as on London's Piccadilly Circus or Hong Kong's Nathan Road. But not only famous intersections or major shopping districts feature screens in all sizes, even the corner shop in some sleepy side street carries a display bigger than the store itself. What started as a sophisticated play-out for prime content has degenerated into inferior advertisement hoardings with flickering pictures. One of the most interesting aspects of these huge screen formats

is their transformation from a flickering advertising billboard to a display of art in public space.

With our different backgrounds and connections to urban screens we will hereafter discuss a range of projects, working with this unique medium.

The current state of urban screens, their cultural and educational potential and the tracing of their histories is the overarching theme of discussion among these three contributors.

2. Situated Screens: Ellen Pau's *The Shape of Light* in Hong Kong

Ellen Pau's 2022 site-specific moving image artwork, *The Shape of Light* (Figure 1), which was created for the M+ Facade, a massive urban screen in the West Kowloon Cultural District in Hong Kong is a shining example for a current engagement with the scale of the new medium. With this piece of work, the fundamental challenges of the form can be illustrated, reflecting on the possibilities and problems of urban screens and public media art for Hong Kong and beyond, as Pau's work demonstrates a deep understanding of the image, and the materiality and site-specificity of the screen façade.

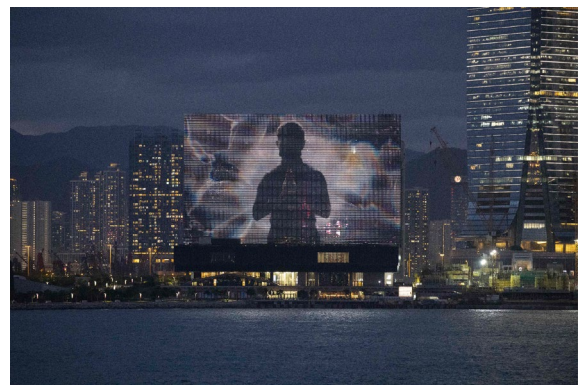


Figure 1: *The Shape of Light* on the M+ Facade, 2022. Courtesy of Ellen Pau and M+, Hong Kong. Photo: Lok Cheng. M+, Hong Kong.

This paper is a reflection and framing of a public dialogue on urban screens and public media art inspired by Ellen Pau's 2022 *The Shape of Light*, a site-specific moving image artwork created for the M+ Museum façade in Hong Kong. The dialogue was the first in a series of online webinars on urban screens and public media art curated and produced by faculty Kristy H. A. Kang at Arizona State University and Stephanie DeBoer at Indiana University. These "Emergent Visions Provocations" are a series of curated discussions that reflect on the distinct and diverse situations and scales of urban screens and public media art, gathering an assembly of places, practices, and people, for thoughtful and communally-inspired dialogue on the

possibilities and problematics of urban screens and public media art from global and local registers.

The first of these public discussions took place in January 2023 and featured veteran Hong Kong video artist Ellen Pau in dialogue with M+ lead curator of the moving image Silke Schmickl and film and media scholar Chris Berry from King's College London. The second discussion was held in April 2023 with Los Angeles based media artists Jennifer West and Nancy Baker Cahill, who discussed their public media work for New York's Times Square and engaged in dialogue with Holly Willis, critic, scholar and chair of the Media Arts + Practice division in the School of Cinematic Arts at the University of Southern California. This series of provocations grew out of an international symposium Emergent Visions (www.emergentvisions.net) in 2018 hosted in Singapore at Nanyang Technological University's School of Art, Design and Media. Co-organized by Kristy H. A. Kang, Stephanie DeBoer, and Anne Balsamo, Emergent Visions gathered a group of international artists, curators, and scholars for dialogue and critique concerning the diverse frames and practices through which we might recognize the emergent and evocative visions, affects, and practices potentiated in and around urban screens. Growing from the contributions and conversations that took place at the symposium, the organizers are co-editing a special issue for a journal called "Emergent Visions: Situated and Adjacent Practices of Urban Screens, Media Facades and Media Architecture". The special issue will present and perform an assembly of practices – artistic, scholarly/critical and curatorial and is constituted in two parts. The first is a series of scholarly essays. The second part is the accompanying series of Emergent Visions Provocations.

The subject of this paper is a reflection of the first dialogue engaging with Ellen Pau's *The Shape of Light*, a site-specific moving image artwork created for the M+ Museum façade and commissioned by M+ and Art Basel in 2022. The M+ Museum is a museum of visual culture designed by the Swiss architects Herzog and de Meuron. It opened on 12 November 2021 and is situated in the West Kowloon cultural district across from the famous Hong Kong Island harbour and skyline. But at night, it lights up and becomes a highlight in the Hong Kong skyline. The museum is unusual in that it not only displays its collection of visual art, architecture and design, and the moving image within its walls, but it also commissions and displays works for its unique urban screen façade. Examples include an interactive work *Touch for Luck* by Moniker (2022) where viewers can interactively populate and play with animated koi on the M+ screen. Other works displayed on the façade include Nalini Malani's *In Search of Vanished Blood* (2022) and a series of moving image works that highlight the museum collection. All of these are part of the curatorial programming for M+.

Because of the pandemic there was no official opening in November 2021 with guests and visitors. As a result, the screen became an important platform from which the museum could communicate its launch to the public. The unique LED façade was designed specifically to fit the building's T-shaped architectural design so that during the day, the screen is not visible but rather, looks transparent. There is a sophisticated technological system for the screen which the architects engaged Swiss company I-Art to design for them. It involves having the

LEDs hidden inside a louver system so that during the day they are not visible and integrated into the architecture. As a unique system, the museum works on site with technologists from the company Meta Objects who help develop the artists' work for the screen. The resulting massive urban screen of the M+ Museum of contemporary visual culture radiates out over Victoria Harbour and the Hong Kong skyline.

Pau's *The Shape of Light* is situated in Hong Kong and specific to this particular screen. Recently acquired as part of the museum's collection, it can only be screened exclusively on this façade. Specificities refer to the site itself but also the specificities of the technology and to scale. There are distinct differences using an LED façade versus projection, for example, and each has specific material constraints that the artist works with. Moreover, the scale of this urban screen has its own set of challenges and constraints. Among these challenges and constraints is that the façade broke down and was out of commission for several weeks during the opening period in 2021. Curator Silke Schmickl recounts that in the weeks during its repair, the public voiced their appreciation of the new façade. Schmickl learned that the public appreciated both the absence of programming but also expressed what artworks they enjoyed or found disturbing.

In this work a silhouetted figure slowly emerges from an abstract and meditative expanse of rippling light and shadow and silently performs the Heart Sutra in sign language. Pau recounts potential responses to her work during its production, sharing her realization that the social unrest in 2019 could be evoked through the figure who was clothed in a black bodysuit and face mask (a common outfit during the protests). Upon recognizing this herself, during preparations for recording the performance for the work, she wondered whether the public would see this performing figure and be reminded of the protesters on the streets of Hong Kong during that period. She reflected on this dilemma and decided that whether the audience was reminded of the protest or not, they could still enjoy the message of the Heart Sutra and her invitation to audiences to perceive the world with harmony rather than threat or fear. Though it was a risk on her part, she decided to keep this dark figure and invite the audience to interpret its presence and performance in their own way.

In Pau's rendering and words, the M+ Facade is a futuristic lighthouse "standing on the shores of West Kowloon like a guardian that shines a light to all travellers and home comers." The video is offered as a gesture of guidance and hope for audiences in Hong Kong as "clusters of cells and pixels merge with the building's architecture, forming a new cultural observatory to the place artists call home." Using digitally animated special effects, the video explores the possibilities of the immaterial and the material, transforming light into digital objects. Featuring a popular sutra in Mahayana Buddhism, *The Heart Sutra*, here expressed through sign language, the ritualistic video both meditates and meditates on the concept "form is emptiness, emptiness is form."

In his reflection, Chris Berry proposes that the urban screen that displays artwork of this kind is a third kind of screen, beyond the commercial and informational. By far the dominant uses of public screens in Hong Kong and elsewhere are advertising and public messages. The THIRD screen (as Berry

proposes) is that of public screens for art. The intervention of art on these screens is rare and exciting. The M+ screen is in itself a provocation that challenges us to see the potentials of urban screens in a different light, beyond its ubiquitous presence in advertising capital and authority of the state.

3. Public Video Art for Commercial CWB Screens

Tracing a recent genealogy of video art for outdoor spaces and surfaces in Hong Kong requires attention to not only the site-specificity but also the scale of urban screen practices. Scale in this context is not a fixed resolution but rather a continual process of (trans)formation that troubles screen practices in Hong Kong, an arena in which art and advertising have long been entwined with shifting matters of governmentality and (extra)territoriality.

The intensely screened commercial centre of Causeway Bay (CWB) is widely described as a site where, as Isaac Leung phrased in his curatorial efforts to intervene into this arena of the city, a place where “overdimensional screens” and “dazzling displays of advertisement and moving images mean that building facades are,” by and large, “sheathed” in commercial and informational content. In October 2017, the Outdoor Mega LED CVision Screen, then claimed to be the Asia Pacific’s largest LED outdoor screen, was inaugurated on the entire exterior façade of the SOGO flagship department store in Causeway Bay.

SOGO’s CVision screen is not the only screen to be promoted as such in Hong Kong. Indeed, the logic of screen scale – of the landmark and the largest – is not limited to the recent emergence of massive LED screens in public urban space. It refracts a longstanding logic of large-scaled urban illumination and signage, which can be illustrated in Hong Kong’s ubiquitous neon signscapes and the installation of a host of large neon signs in the 1980s to 1990s – for example, the construction of the Motorola neon sign atop Star House in Tsim Sha Tsui. Upon its installation, the local press made much of Hong Kong’s then “largest” rooftop sign, as it was lauded as fixing our gaze on the city’s “prosperity” and confidence in the world. In its more contemporary context, the massive CVision LED screen has further announced SOGO’s central place in the development of Hong Kong’s digital economy, and by extension Hong Kong’s place within the hierarchical and classed structures of global cities.

Against this spectre of neon signs is also a history of outdoor television in Hong Kong. By the mid aughts, cultural critics in Hong Kong were reflecting on an everyday life within which screens were experienced as seemingly everywhere in the city – on its streets and in its shopping malls, transit stations and routes, department stores, cafes, and so on. This seeming ubiquity was to have exceeded the limits of the public shopping square that surrounded the Times Square screen, which had held a central place in Causeway Bay and Hong Kong from the 1990s onward. The Times Square mall’s seven meters by nine meters sized outdoor television screen maintained its status of Hong Kong’s “largest” into the early 2000s. In its scaled landmark function, the screen featured commercial content for high end consumer products. It was also a locus for viewing a host of screening events – political, cultural, tourist, sports, and New Year’s

oriented – over time also simulcast with other outdoor screens or so-called television walls installed elsewhere in Hong Kong.

In 1998-1999, Videotage – Hong Kong’s collaborative and centre for video and media art – curated a series of public video exhibitions and actions for public screens. The programmers for the ’99 City Festival pontificated on how: “Giant video screens and TV walls are everywhere feeding the city with images ... Why should video art stay indoors? Videotage and 13 artists will show their works in public outdoor spaces.” For “The City’s Floating Anchor,” Videotage’s curated program for the festival, one-minute video works were displayed in various locations across central Hong Kong. As its “participating artists aim[ed] to make confessions, declare statements, release emotions, give warnings, and start dialogues with the public. In short, to let their work trespass into the public domain.”

A similar set of one-minute videos had earlier been displayed for Hong Kong’s ’98 Microwave media art festival; their “Site and Sight” programming had been touted as an “experiment” in video art’s encounter with “the public realm.” Its outdoor screen platforms included the Panasonic SOGOVision screen on the exterior surface of the SOGO department store – a precursor, large for its time, to the 2017 CVision screen – which had been installed for pedestrians to glance up at from their walking routines through Causeway Bay. The ’98 curation of video art here displayed one of its one-minute videos after every six-to-seven-minute cycle of commercial content. As they inserted themselves into urban screen temporalities, the personal and interpersonal poetics and politics of their video voices were distinct from the largely commercial, statist, or tourist content of the SOGOVision screen. This video art was thus to have trespassed – with its voicing of everyday inhabitant or citizen interests on the street – into Hong Kong’s dominant domains.

The perceived, or at least promoted, intervention of these one-minute videos was their small-scale form as well as address against an urban arena of increasingly “giant video screens and TV walls.” Their fragmentary length was on the one hand an experiment with the limitations and possibilities of urban technologies. Their production and curation, while certainly influenced by global video practices, were also inspired by video and performance artists of the time in Hong Kong and their engagement with video as a medium as well as with an urban space in technological, artistic, and political flux.

Flash forward to the 2019 *Artificial Landscape* video art project, curated for the massive CVision screen on the SOGO department store’s exterior in Causeway Bay. *Artificial Landscape* was co-produced in collaboration between Videotage and the Arts and Culture division of the Hong Kong flagship department store. The project displayed the work of four emerging video artists on the CVision screen extending the span of the SOGO building. The exhibition spanned the month of March 2019 with three minutes of video art projected at the top of every hour from 6am to 10pm.



Figure 2: Howard Cheng's *O* on the CWB screen, Sogo department store, Causeway Bay, 2019.

For its curator, Isaac Leung, *Artificial Landscape* was a site-specific “intervention” into Hong Kong’s “dazzling” screened urban space; it was effective as such through its very use and practice of large scale. As he argued, “Because of its scale, the SOGO [screen] plays a role in constructing the landscape of Causeway Bay. Every day, tens of thousands of pedestrians are disrupted by it.” Here, the intersection of scaled urban screens and video and media art potentially shifts the ambience and thus experience of the street. Shi Zheng’s *Embers*’ vibrant red and orange display reflected upon and poetically transformed surrounding architectural surfaces. Yet the poetics – and thereby politics – of scale are not only a matter of design or material size. Scale can also be a geographic term of analysis, and thus indication of a different kind of poetic practice – one that works to enable urban inhabitants to recognize the relations that form the screened city. Howard Cheng’s *O* filmed the busy pedestrian road crossing in front of the SOGO department store with a drone before feeding it through a computer tracking program that allowed perceptual connections to be generated with the pedestrians crossing the street (Figure 2). As it appeared that these connections were generated in real time, the edited footage was to engender a self-consciousness among the people who saw it. Here was an opportunity to consider relationships between the screen and our street-level subjectivities and embodied identities. It also put the issue of surveillance in Hong Kong on glaring display.

Such competing accounts of the purpose, aims, and effects of public video and media art projects speak to a range of approaches to the performance, poetics, and politics of scale for different moments and urban screen contexts. They also underscore the further contingencies between dominant (often commercial) articulations of urban screens and the media artists and curators who work to negotiate and sometimes repurpose their use, expression, or experience.

4. Public Screens as an Artistic Challenge

The concept of cities illuminated by large animated or even interactive billboards seemed to be a significant metaphor for a future yet to come. Artistically, they were an essential component for visualizing the future in science fiction comics, movies or descriptions in novels. By now, these large displays are well incorporated in cityscapes with advertisements still being their major application.

As introduced in the first part of this paper, the cityscape of Hong Kong features some major displays, dedicated to the arts or featuring artistic content on special occasions. Currently, the M+ display is one of the ten largest in the world with 110 by 66 meters, the display on the Sogo department store still has impressive dimensions, spanning 72 by 19 meters, 1400 sqm, with an 8K resolution, and the entire façade of Hong Kong’s tallest tower, the ICC, lights up at night with 1-bit images and text, while more and more building fronts are being equipped with large LED displays. This section of the paper addresses some of the opportunities and challenges that artists might face in working for these screens.

While international standards are widely recognized for video recording and playback, urban screens need to adapt to the architecture and their surroundings. This can be regarded as an advantage for specially produced visualizations, but also a challenge to adjust to these requirements in existing projects. Drawing on Elke Reinhuber’s experience as an artist, the perspective is informed by work with screens and projections in private and public space, some of which will be introduced hereafter.

In 2010, an open call was launched for Grid Gallery in Sydney’s commercial district centre. The gallery itself was a newly inaugurated screen in a prominent location at the intersection of Sussex and Erskine Street, on EnergyAustralia’s substation, powered by renewable energy and curated by Deborah Turnbull.

The invitation to propose artwork for the 15-meter-long screen came with the challenging requirement, that “the resolution of the graphic/animation must be set to 512 x 32 pixels ...”, meaning that each tiny pixel will increase in size to 3 centimetre in width and height in an aspect ratio of 16:1. Not only was the technical background of the screen innovative at this time, also the dedication to artistic content in public space outside of a museum context was quite unique. A monthly open call should have encouraged artists to respond to specific themes and make their work widely accessible for a broad audience of passers-by. The online art magazine *artrush* announced the inauguration of the panoramic display with the headline “Digital art finds a permanent home on Sydney’s streets”. Despite the promising headline, it was not expected that the lights would go out so quickly. While the second project of Elke Reinhuber was still being screened, the display was ‘currently closed for maintenance’, as stated on the according website. Technical issues are a recurring challenge many urban screens are facing, because most of the devices are custom-made and hence very delicate. The extreme panorama format exists for public screens in different aspect ratios and artwork needs to be correspondingly adjusted or specifically produced. Following open calls for public screens always come with the requirement for artists to work for the size and shape. While the horizontal panorama is a well-established form, working for vertical screens is even more demanding.



Figure 3: *Fly High: Time Flies* on the ICC building during ISEA 2016. Copyright: Christa Sommerer and Laurent Mignonneau.

In 2013, a non-commercial lightshow was commissioned for the ICC, the 484-meter landmark in Kowloon that is well recognizable during daytimes and even more by night with its huge façade of monochrome LEDs. This sparked at the same time concerns on light pollution, since Hong Kong's night sky is one of the brightest in the world with the large number of public screens contributing to it significantly. Another concern which is important to address is the enormous energy consumption. In Hong Kong, many neon lights had to be removed and were replaced by led tubes while at the same time, the number of gigantic billboards increased notably.

As part of ISEA 2016, Maurice Benayoun organized the Open Sky Project for the ICC, inviting Christa Sommerer & Laurent Mignonneau to participate. They responded to the unusual format with their project “Fly High – Time Flies”, a further development of their interactive work “Portrait on the Fly” in which illustrations of flies assemble to create portraits of the observer in front of the screen. Comparatively small flies populated the skyscraper and could form swarms in different shapes and sizes, shaping up to word messages connected to the theme of flies and fleeting time and also gathering together to represent huge flies. With the movement of the insects, their different sizes and configurations, the whole display could be covered comprehensively and turned into an engaging object. (Figure 3).

Another work to mention is “Big Moon Hong Kong”. Instead of working with tiny objects, Clea T. Waite covered all four sides of the ICC with the starry night sky and intermittently a large animated image of the moon, which was barely recognizable in its full shape, wrapped around the building. By using detailed photographs, the tower was covered by a well-recognizable pattern and appeared almost like a tall mirror to reflect a part of Hong Kong's night sky.

Although the display on the SOGO department store on Hong Kong Island follows a standard aspect ratio of 16:9, the fine 8K resolution was extremely high at its time of inauguration in 2017. Only a small range of professional cameras were able to capture real-life content for the gigantic display and produce the required facets. However, for animations and computer-generated content, it was already an ideal platform. Even when providing the finest details to the widest possible viewing angle with specially designed louvers, the resulting images were still on a single plane, flush with the façade.

To counter the missing spatiality and to boost engagement in the everlasting fight for attention, 3D screens are the latest sophistication. Installed at the corner of highly frequented intersections, they merge with the architecture to complete the illusion. Because their contents seem to protrude from the building and simulate depth, they require specific designs to make full use of their potential. No longer the screen functions as a window to another reality, but as a constitutive element of the structure itself.

In Hong Kong, the first ones appeared in Causeway Bay mid-2022 and since then they have spread throughout the city, presenting mainly commercial 3D content. The new format is also being adopted in the well-frequented areas of other megalopolises, such as Shanghai or Tokyo. There, non-promotional clips which appear only once in a while attract pedestrians, tourists and even dedicated fans to come by. The Calico cat at Shinjuku station changes its behaviour and actions during the day to the delight of onlookers, so that a view on the famous intersection is streamed live. In Shibuya, an Akita-Inu dog shows up every hour and interacts between eight screens, jumping around them and playing tricks. Through this non-commercial content, viewers are attracted to visit the screens repeatedly or to stay and wait for their favourite clip.

In summary, it can be said that large screens have become an indispensable part of the cityscape. Even if their energy consumption and contribution to light pollution cannot be ignored, they offer unique platforms for art and encourage the rushing passers-by to stop, reflect and enjoy the artistic content. This is all the more true when the content is specially commissioned and created for the screen and location.

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From “Re-source” to Pre-source

Computer Graphics by Frieder Nake, the Forgotten Flow Chart and Some Thoughts on Digital Image and Programming

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Abstract

This paper deals with the conceptualisations of „programming“ and „the digital image“ using the example of 1960’s computer graphics by Frieder Nake. With the help of a reconstruction of the historical production process – in the sense of aesthetics of production – will be demonstrated (1) the decisive role of the flow chart and its practices in the context of programming as well as (2) that the notion of programming also includes computerless work. On the basis of that case study, it will be argued that (1) the (historical) condition of the digital image needs to be thought instead of a binary relation of code and image as a trinary relation together with the diagram. (2) For a better analysis and understanding of computer graphics it is necessary to integrate also the work before the computer(-coding) or – to seize on Wendy Chuns’ concept “re-source” – to do a (methodical) shift from re-source to pre-source. This paper not only contributes to the history of media art, but also to theories of the digital image, programming and draft as well as artistic processes.

Keywords

computer art, computer graphics, diagram, flow chart, digital image, code, programming, Frieder Nake, re-source, pre-source, 1960s

1. Introduction: Computer Graphics around 1960

In 1965, September 13th, the computer graphics *Hommage à Paul Klee* (fig. 1) developed. Frieder Nake, who is well known as a pioneer of computer art, was working at that time as a mathematician at Technical University Stuttgart (Southern Germany) and had used the local mainframe ER 56 of Standard Elektronik Lorenz company for it. Finally, the graphics had been printed – and that is all public history (Klüttsch, 2007) – with the drawing table Graphomat Z 64 of Konrad Zuse company.

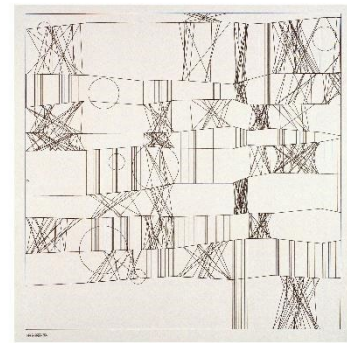


Figure 1: Frieder Nake, 3/9/65 Nr. 2, „Hommage à Paul Klee“, 1965, computer graphics, Zuse Z 64 Graphomat, black ink on paper, 40 × 40 cm. Courtesy the artist.

Today we speak about (early) „computer art“, a term which primarily refers back to that time around the mid 1960s when aesthetic production with digital computers began. Pioneers like Georg Nees at Siemens Erlangen, Frieder Nake at University Stuttgart and many others used mainframes to create computer graphics and/or computer film like Béla Julesz and Michael Noll at Bell Labs (Patterson 2015; Rottmann, 2008); artists like Robert Mallery and Charles Csuri used computers to realize computer sculpture as well (Rottmann, 2023). But, this is not the place to spread out the history of computer art, which could be read elsewhere, for instance in (Taylor, 2016) or with a view to activities in Eastern Europe (Rosen, 2011).

The term „computer art“ is a kind of suggestive as it highlights the computer – once as a new artistic means – and could make us think that the artworks are a mere result of a machine. In the 1960s the belief of the autonomy of the machine was in the air – and such a belief still affects the current debate about Artificial Intelligence (AI). Once a „push button“-rhetorics circulated in the context of a predominating automation-debate, which was in particular related to economy and science. There was the promise of new possibilities and solutions, especially in research and industry, which could give legitimization and funding in sciences and engineering, and the promise of simplification, especially in the household, which can be identified in device-advertisement and its marketing rhetorics, in which the older Kodak-slogan „You press the button, we do the rest“ (1889) found entrance to the collective memory probably in the most enduring manner.

But all these beliefs in no way correspond to the reality of computer work in the 1960s. In contrast: The production of computer graphics was an elaborate, multi-level, also non-linear, partly recursive process, which appeared, depending on the computer system and pursued computer graphics, more or less complex. In most cases – like at TU Stuttgart – it was necessary to program, although *Sketchpad* as a graphical user interface (GUI) was already developed in 1963; but this GUI was at first

not well known and not available on market. When German art criticism used in 1966 with a view to Nake's computer graphics the „push button“-rhetorics, it was at least qualified by a description of necessary preparatory work by a – at that time of course supposed to be a male – programmer (Vogt, 1966). To indicate the human's role is one reason – and we will understand that later better – why Nake preferred to speak about „algorithmic art“ (Nake, 2012: 65).

Seizing on this historical situation, this paper deals with the question: „How do (so-called) digital objects like digital images actually come into being?“ We could answer with reference to media studies, which are informed by media archaeology, and cultural studies, which have integrated Actor-Network-Theory (Bruno Latour), on a very general and theoretical level: digital objects are to be determined by technological conditions, as well as material, instrumental, social, institutional and economical ones, and all this is related to certain practices. To put it simply: Digital objects are made, shared and received or used in a certain time, under certain circumstances, with certain means, technologies, practices, and intentions, in certain social milieus.

In any case, computer graphics, understood for the moment as a computer-based image, is determined by its specific technical conditions and thus a historical phenomenon. Hence, and for a better understanding, a reconstruction of the historical production process is required, which needs to be as precise as necessary, namely complete, but without aiming to do technofetishism. At the same time we must be aware of a fundamental problem of historiography: It is impossible to fully reconstruct a past process, there is always a missing link; this becomes the more clear as we are interested not only in technical processes, for example machine operations, but also in human actions in the manner of a praxeological approach.

2. Computer Graphics as a Programmed Image

Asking for explanations of a digital object's being, its appearance and behaviour, there is still in art history – as well as in media studies – a strong linking of the digital object and its code. Nake himself offered with a special view to images the binary conceptualisation of „surface“ and „subface“ (namely the „screen“ and the „display buffer“), in which both elements are entangled and bearing the „algorithmic sign“ (Nake, 2008: 105). His meanwhile established model allows (him) to grasp the kind of doubled existence of an image as a digital object and as a code. The latter could mean here the data of a digital image like in a JPG-file or the source code, which represents following Nake in turn the program that generates the image. It was Wendy Chun who made a good point, when she argued in the context of software studies, that focusing on code (alone) would be not sufficient to explain a digital object's being, because code as a performative entity, firstly needs to be executed and for it activated, interpreted and transformed – in particular into machine-instructions. There is a „gap between source and execution“ (Chun, 2008: 321), she explains, because, for instance, only those parts will be compiled, which are necessary in a certain system configuration. Following Chun, code must be understood in a relationship with „interface, action and result“

and that relationship would be „always contingent“ (Chun, 2008: 300). „So, source code,“ Chun concludes, „thus only becomes source after the fact. Source code is more accurately a *re-source*, rather than a source“ (Chun, 2008: 307). Accordingly, her term „re-source“ stands for a back reference and a belatedness of source code and lets the latter become a medium for considerations of the Foucauldian dispositif: the code refers to (its) „history and context“ and to a „network of machines and humans“ (Chun, 2008: 299f.; 307; 322), or – as we also could describe it – human and non-human actors in the sense of Actor-Network-Theory. Since the code and so the digital object could be understood adequately only against this broader background, the binary concept of code and object has been opened.

Taking up these considerations, this case study of 1960's computer graphics using the example of Frieder Nake will focus on programming in the way of a historical practice – as programmability is a key feature of digital objects (Manovich, 2001) and thus programming an important determinant. So computer graphics will be approached neither by iconography, nor by an in-depth analysis of the code's functionality, but on the level of aesthetics of production, which argues that knowledge of an artwork's ‚making of‘ is a requirement for understanding it as particularly the technicality of production and aesthetics of the artwork are entangled.

In our case we deal with a plotted computer graphics, which is materialised outside the computer system, as such fixed, static and no more refreshable – I speak about a „non-updatable, external digital image“ (Rottmann, 2021: 4). Indeed, there is a controversial discussion, if a computer-based, but external materialized image is to be seen as a digital image. For some authors a digital image – which shall be here understood for a start as a computer-based image¹ – must be an internal one (Broeckmann, 2010: 196), whereas other authors argue that also external images should be included as they are also in a certain relation to the computer and the code, their specificity results from a digital-technological origin, and they would be excluded from the discourse on digital cultures otherwise (Kwastek, 2015: 1). Anyway, the following considerations are valid also for ‚prototypical‘ digital images on the screen, which are still operated by the computer system and thus processible, transformable as well as ‚liquid‘ to use a common description – I speak about „updatable, internal digital images“ (Rottmann, 2021: 4).

The aim of this paper is not only to extend history of media art with the example of one of its pioneers, but also to show that the notion of programming is broader than coding in front of a computer, which includes even computerless work (on paper). Surprisingly, Wendy Chun, although she is aware of the historical change of programming from „direct programming“ to „automatic programming“ (Chun, 2004: 28ff.), in her discussion of the source code didn't go back to processes, before the machine comes into play. Thus she did not take into account the code's full ‚making of‘, on which her concept „re-source“ in the end refers. It is a central aim to demonstrate hereinafter the decisive role of the flow chart in the context of programming (in the 1960s) and therefore to argue that the flow chart is a further

¹ Following the thoughts on an artwork's digital being by Meredith Hoy, who brings the production and phenomenology of an image in a tense relationship, the issue of the digital image becomes even more complex. To put it simplified: The problem is that analog images could have a digital look and vice versa. Hoy offers a notion of digitality, which is based on a digital appearance of a picture and a „digital method“ in the making of the picture – both could be the case even without computer technology (Hoy, 2017). Similar thoughts can be found in

(Rottmann, 2002) and (Rottmann, 2007), where I indicated that images which are on a syntactic level digital, could be effective on a semantic level in an analog manner and vice versa and thus suggested to speak about for example „analog-digital images“ and „digital-digital images“ to distinguish the digital and analog state with a view to the levels.

element in the production network for reconsidering the binary relation of code and image.

While the flow chart has been discussed in computer science since the 1940s, it has been mentioned just sometimes in media art history – the issue is all in all a blind spot of research. There are descriptions, even about its benefits (Nake, 1974: 216; Soon/Cox, 2020: 215ff.), but media-historical or -theoretical considerations are missing. Furthermore, I assume that the analysis and reflection of the historical case study will lead, in the manner of a corrective, to some important conclusions with regard to the theory of digital objects.

Let's get first a deeper understanding of the whole historical production process of *Hommage à Paul Klee* as a basis for the further argumentation.

3. The Historical Production Process

The production of the computer graphics happened in a network of actors in an interplay of programmer, computer, programs, data carriers and peripheral devices, especially a plotter, as well as paper, pencils, pens and coloured crayons. It was a central task to develop the program to be executed on the computer. The results were output to a punched tape, which in turn could be read in by the plotter and finally printed (fig 2).

Basically, the ER 56 computer could be programmed using an operating panel with buttons and control dials as input units as well as control lamps – the panel could be extended by a keyboard. Frieder Nake could input the instructions after he had written the program in machine language – with a pencil on pre-printed paper. Such a notation on paper is a „program“ as well, as it is formulated in a formal programming language and is executable by a computersystem (Laplante, 2001: 386).

But, that mode of programming was very laborious: The input was tedious as the computer does not own a monitor, operated in batch mode and programming tools like editor, compiler, or debugger did not yet exist. So Nake earlier produced by hand – and that was a usual procedure at that time – a punched tape, which represents the program, if applicable with the help of a card perforator. In both cases programming happened without the computer and before it came into play.

With the help of a punched-tape reader the program was fed afterwards in the main memory of the machine, where it became an electronic program and could be executed. On the basis of the program the computer calculates the appearance of the image, especially the positions of the elements like lines and circles, particularly with the use of sophisticated theory of chance (conditional probability). After transferring the results with a data carrier to the Graphomat Z 64, Nake could operate the plotter, to start the ‚automatic‘ printing of the image.

The graphics *Hommage à Paul Klee* developed in several phases of print; the circles for example were printed in a second run. All in all, it was a ‚blind process‘ as there were no intermediate steps with a graphical user interface, which would allow to get a visual impression of the ongoing processing of the final picture. When GUIs came up, the process of producing images changed significantly, because the latter became especially an interactive process on screen (Rottmann, 2018a).

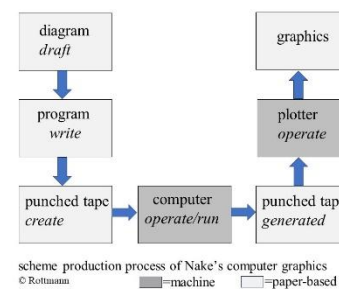


Figure 2: Scheme of the Production Process, © Michael Rottmann

On site, in Stuttgart, the printing process must be ‚monitored‘ and if necessary influenced: the China ink in the pencils could have been caked, if they had not been used for a longer time and this could effect the coloration. The paper – Nake did not use standard-paper – could become wet in places and wave itself and must be flattened by hand and pressed onto the underground (Nake, 1967: 29). Beside such corrective interventions Nake – whose *modus operandi* was not always the same – sometimes manually interrupted the printing due to aesthetic reasons, especially to keep the (artistic) control; that is why his graphics *16.3.65* (ink on paper, 22 × 22 centimetre, 1965) shows the total time of printing (17 minutes) and the time of interruption (7:30 minutes).

The intense interplay of man and machine indicates that the theorisation of generative art – as it exists in research literature like in (Galanter, 2006) – in the way of ‚an artist creates a linguistic, logical or machinic system that in turn generates an artwork‘ is not a wrong description in principle, but an abstract and unduly simplified one, since the machine-related ways of production in a network of objects with specific agencies are manifold. In the case of Nake it is exactly not a ‚pure machine art‘ (Vogt, 1966: 20; translation by the author), how art criticism once described it, to emphasise the central role of the computer. Obviously Nake had to accompany the whole production process, but first of all he had to develop the program. This proves, for a reconstruction of the process it is important to take into account not only the technological aspects, but also human practices and procedures.

Let's now have a closer look at the process and practice of programming, which is revealing.

4. Programming: Flow Chart and Diagrammatic Work

As a central, if not ‚the‘ central medium of Nake's programming in the 1960s must be mentioned: the flow chart. Actually, Nake developed his programs, especially the more complex ones, by using it. He explained: „I never seriously programmed without having begun with a flow chart.“ (Rottmann, 2021: 13; translation by the author).

What is a flow chart in the context of programming? It is a graphical medium, which is used (1) to represent, (2) to communicate, and last, but not least, (3) to develop the functional logic of a related program. The latter was a reason for Herman Goldstine and John von Neumann to introduce in the 1940s the flow chart – they called it „flow diagram“ what is still today a synonym (Laplante, 2001: 190) – as a method in the design process of computer programs: The linear sequence of operations can be organised with blocks representing the operations, which are connected by lines or arrows (Hartree, 1949: 112). Program steps can be represented, depending on the

specific function, by certain graphical elements and enclosed written commands – for example a rectangle for a single action, a rhomb for a conditional branch or a parallelogram for an input or output (according to DIN 66001). Stencils out of plastics were available in the 1960s, for example as accessory for mainframes like the SEL ER 56. Still in the 1970s educational books for data processing were delivered with stencils out of paper and its use bespoke.

In the flow chart recorded is foremost a kind of a ‚pure‘ functionality, whose basis is the repertoire of logical functions, detached from programming languages. In this regard the flow chart – although it can represent a program as well – is closer to the representation of an algorithm understood as a „systematic and precise, step-by-step procedure [...] for solving certain kinds of problems“ (Laplante, 2001: 13). An algorithm can be realized in ordinary language as well as in machine language or in a programming language (Laplante, 2001: 13). It could be executed by a machine, if it is sufficient precise and realized in a program, which is – the other way round – „a specification of an algorithm to be executed by a computer“ (Laplante, 2001: 386). Thus an algorithm, which can be realized even in different programming languages, is an abstraction of all related programs. In that sense the algorithm could be described as more abstract and general, whereas the program could be understood as a description of an algorithm and its data fields in a formal language in a strict manner and closer to the machine.

As a medium of communication flow charts served especially in work-sharing and team-based programming processes, how it was described in a representative way in the Universal Automatic Computer's (UNIVAC) manual *Programming for the UNIVAC-FAC TRONIC System* (1953): The programmer works out the flow chart, after analysing the problem to be solved and prearranges a relevant method. The coder translates the flow chart into specific instructions with a view to the machine (Remington Rand, 1953: 12-14). We see, „programming“ in the historical use of language in the USA around 1960 could also mean to create a flow chart, which represents the algorithm, whereas „coding“ meant to develop what we would call the computer program. In that way programming happened in the 1960's industry: with pencil and paper in ‚dust-free‘ rooms for programmers at computerless desks (Rottmann, 2021: 13). (Obviously, programming has undergone changes since that time.)

In this spirit Frieder Nake understood figuring out the algorithm – let's say the general idea – as the more important task of developing a program, because it goes along with problem solving and creativity; coding, as he explained, could be done afterwards by an assistant (Rottmann, 2021: 13). So Nake used the flow chart less as a medium of communication (as he did everything by himself), but more as a medium of creativity, in the sense of a centre of drafting and developing – beside thought-sketches. He draws his flow charts by hand on paper, without using a stencil – like in the case of the program ZEIPRO, which was part of the package COMPART ER 56 for computer graphics, and which operated all drawing instructions for the Graphomat Z 64 (fig. 3).

One can also find printed flow charts of Nake's *Hommage à Paul Klee* in his publications (Nake, 1974: 216). The appearance – texts are typeset and lines are straightened to improve the ‚readability‘ – reminds us that such edited flow charts, which are used for communication-, documentation- and publication purposes, were made also afterwards: Here it happens on the basis of antecedent handmade diagrams, but sometimes – and

that differs from the primal idea – on the basis of already existing source code, for instance for documentation purposes.

It should be noted that the use of diagrams in creative processes has an interesting parallel in contemporaneous Minimal, Serial and Conceptual Art, in which protagonists like Sol LeWitt and Mel Bochner were expanding the boundaries of traditional drawing by (experiments with) diagramming (Rottmann, 2020). With such a diagrammatic art in different occurrences the artists contributed to an ongoing discourse of visibility and image, questioned artistic processes and media in the context of an instrumental discourse of creativity (Mareis/Rottmann, 2020; Rottmann, 2018b), and to criticise digital culture against the background of a growing digital technology – that's why I speak about „co-digital art“ (Rottmann, 2023).

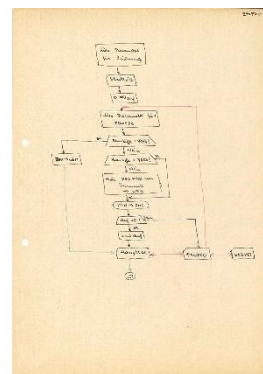


Figure 3: Frieder Nake, flow chart, program ZeiPro, circa 1964. Courtesy the artist. Image: © Michael Rottmann

We can suppose, according to Friedrich Kittler, that programming by using a flow chart must be specific and determines the thinking and results. Kittler claimed with reference to Nietzsche that the use of certain (technical) media influences our thinking and cultural development (Kittler 1999). With the flow chart a diagram as medium is in play. Its early naming as „flow diagram“ is in correspondence with a today's definition of a diagram in a narrower sense: a graphical notation, which uses a combination of drawing, text and lines to represent a structure.

In the course of the diagram-work the future program flow could be developed, tried out, and tested with the use of the graphical repertoire. It was a beneficial aspect, that the flow chart forces to separate the whole production process in a finite number of single steps. But the diagrammatic work on paper was more than using predefined graphical elements and a straightforward procedure.

In an alliance of media practices writing and drawing supplements could be made easily: For example, connections could be established by lines or sub-programs could be added and referred, corrections could be done or certain parts could be canceled; and Nake used especially own symbols, different colours and annotations. He liked the quick and easy modification and possibilities on the plain of the paper or as he described it: „Where one can also branch off to the left or to the right and return to above places“ (Rottmann 2021:14).

The flow chart offers, despite its standardisation, a specific freedom of design, other than working directly at the computer, in particular with programming languages (on a screen). It has been shown in diagrammatics that different types of diagrams, like a tree- or a circle-diagram, offer specific ways of

representation (Lüthy/Smets, 2009). So we can assume that the space of possibilities in programming corresponds with the type of flow chart in use. Indeed, the following example shows: While flow charts allow to draw a connection from each position in the process to any other and hence where criticised to enable unacknowledged ‚spaghetti code‘, the Nassi-Shneiderman diagram as an advancement precludes exactly that. Like the decision to work with a flow chart or not changes the process of programming, thinking and the result, it does also the type of the involved diagram.

In a finished diagram Nake could use the ‚road network‘ – an oriented graph(ism) – to retrace the process flow and ‚liquefy‘ mentally the operations addressed to the machine. In the same sense diagrams are not only visual ‚static graphical forms‘, but have to be understood as procedural ‚media of thinking‘, both in their production and reception (Bogen/Thürlemann, 2003: 10; translation by the author). Diagrams could even be understood as ‚(auto-)interfaces‘ (Rottmann, 2018a: 102f.) as I showed in my paper *Before Ink Starts to Blink*. In the course of production issues can be packed in diagrams, in the course of reception they can be unfolded. So the diagram was not only essential in the design phase, but also useful for a desk test (*Schreibtischtest*): Nake conducts test runs on the paper using pre-calculated intermediate data, not until then he continued with programming (in front of) the machine. The ‚art of programming‘, as he said it to me in a neat manner, would be: ‚To force oneself, to think in that way, the machine would think, if it could do that‘ (Rottmann, 2021: 16; translation by the author). That mode of thinking – Nake speaks of ‚algorithmic thinking‘ (Nake, 2012: 65) – a trained mathematician is not unfamiliar with.

5. Conclusions and Consequences

Let’s sum up key aspects and consequences of the historical case study:

- (1) The making of computer graphics needs a mass of media transformations, in particular with an interplay of so-called analog and digital media and the work of human(s) and machine(s).
- (2) This goes especially for (historical) programming: it is not just to be understood as writing of code in front of a computer. Actually, programming included computerless parts, in particular drafting, drawing and developing a diagram – the flow chart – and writing code on paper.
- (3) Nake once diagnosed for computer graphics a shift from ‚drawing by hand,‘ like in traditional drawing, to ‚drawing by brain‘ (Nake, 2012: 73). We can add now: This shift was accompanied by a graphical practice – diagramming by hand, which included – resonating with our notion of diagramming – even drawing.
- (4) The possibility space of programming is determined by the (type of involved) flow chart.
- (5) Computer graphics is determined also by the diagram and its dispositif. Thus, the binary conceptualisation of code and digital image has to be relativised and expanded to a trinary relationship of diagram, code and image. The digital image has to be understood as a computer-related, not as computer-based image.
- (6) The whole production process of the (so-called) digital object begun before working with the computer and the electronic program. Thus, for an adequate understanding of the process, we have to take into account not only the aspects linked to the computer’s source code in the sense of Wendy Chun’s concept ‚re-source‘, but also the pre-computer procedures (on paper), ‚pre-source‘ as I want to call it. To put it simply: we have to move (methodically) from re-source to pre-source.

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Transformation of Media in Emerging Forms: Heritage Art Practices in Mexico

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This short article does not claim to be an exhaustive compendium of electronic and media art in Mexico -with all its actors linked in the fascinating world of art, science, and technology in this country, but rather a sample of those artistic interactions and biographical details which stand out in this complex history, and which have demonstrably opened new doors in artistic experiments and consciousness through the projects. Our purpose is to give an overview of the digital creations which broadened the artistic experience and cast light where there was darkness. This darkness was projected by a dictatorial political party - the *Partido Revolucionario Institucional* (Revolutionary Institutional Party) or PRI in short - that continued to govern and exploit for almost seven unrelenting decades in the twentieth century before its fall. We present renegade and innovative artists from this process in a more or less chronological manner, starting with the pioneers who made use of new technological, kinetic, optical, and cybernetic devices to express their radical ideas; although in recent years it has been difficult, sometimes futile, to keep track of what artists produce at a specific time due to an overwhelming increase in production of art works and exhibitions across a plethora of locations. We recognize the importance, of historical studies on the subject, on the temporary or intangible appearances of specific works, with which we are not dealing with on this occasion, but on the contrary with an important historical overview with reference to relevant exhibitions such as have been carried out in the research recently. Examples are: *[Ready] Media. Towards an archeology of the media and invention in Mexico*, or more recent research published in the form of a book titled *Machines to decompose the gaze. Studies on the history of electronic and digital arts in Mexico*.

There are three discernible stages in the history of technology mediated art in Mexico: from (a) conventional technology to (b) digital technology, and finally (c) artificial systems, in that historical sequence. The last phase of electronic works is most interesting and comes into its own as a phase of artistic productions that are delving into the future with a vision and momentum of its own. This momentum is built on a whole concept of the independence and intelligence of the machine. Artists are writing algorithms for strange and eerie installations, such as may not have been made possible with the subjective and linear imagination of the first phase of automation mentioned above -- namely conventional technological art and the subjective innovations of digital technology. Prosthesis and neural extensions now produce striking art works. Artists like Gilberto Esparza, Fernando Palma and Marcela Armas have been creating art in this frontier or third phase space.

1. The Radical Origins

Electronic arts started to gain global popularity in the sixties and seventies, with the advent of computers and programming Mexico, and other countries in the Global South were not exempt from the evolving technological changes that tested the limits of creativity and possibilities with a new media. We can trace the brief history of electronic and digital arts that flourished in Mexico since the mid-sixties, starting with works of artists like Loraine Pinto whose electromechanical installation titled *The Fifth Dimension* was exhibited at the Olympic Games of 1968 in Mexico City. The following decade was further witness to the use of computers in artistic installations. Manuel Felguerez's radical project called *The Aesthetic Machine* (1975) was another significant milestone in the run up to the new media arts culture. Its radical character comes from the fact that it could offer an alternative to decades of Mexican Muralism (1920-1952), which dominated the visual arts scenario since the twenties and which as such tended to valorise a socialist subtext through the broad, public dimensions and political themes. Felguerez was one of the first artists to rebel against the forms and conventions of Muralist practices and asserted his artistic creed as part of a group of artists that later came to be recognized as the *Generación de la Ruptura* (The Breakup Generation). For subsequent decades many fresh artists contributed to the technological niche of machine and electronically mediated art with which Felguerez so painstakingly experimented.

Keywords

New media, art, history, Mexico



Figure 1: Manuel Felguerez in his studio in Mexico City. Photographed by Reynaldo Thompson on June, 2016.

The important proponents of this niche art world are now legendary names today, like Andrea Di Castro, Pola Weiss or Humberto Jardon who created very innovative, personal, and culturally off-beat art from elements in their personal experience yet with a message of innovation for a better future in which technology could be used for aesthetic transformations. During this epoch of transformation in real and near -total aesthetics in the seventies and eighties, there was an explosion of creative ideas, not only in the use of devices and techniques, but also in the vision of a simulacrum that anticipates the future even further down the lane in the behavioural diversity of robotics and digital AI. Gilberto Esparza's *Nomadic Plants* (2008-2014) or the Latin American collective of artists called Interspecifics created the algorithmic artwork *Codex Virtualis* in 2021, completely reconfigured musical composition and architectures for a posthuman world. Other prominent artistic personalities, and not any less challenging in their attitudes, were Ivan Abreu and Malitzin Cortes, both of whom used live coding in their systemic constructions. Above all, with a somewhat self-absolving vision of technology emerged the great indigenous artist Fernando Palma who blended native Mixtec mysticism and technological consciousness in mechatronic artworks like *In Ixtli in Yololtl* or "We the people" (translated from the original Nahuatl title), which were exhibited in MOMA (PS1) at New York (2018).

¹ Interviewed by the author of this article on December 12, 2016

² Interviewed by the author on June 23, 2016

Some of the first lights on the horizon of art and technology in Mexico date back to a complex and somewhat turbulent moment in the sixties like the massacre perpetrated by the government of Gustavo Díaz Ordaz on October 2nd killing more than 300 students manifesting against the lack of democratic system. The manifestations took place ten days before the opening of the Olympic Games. On the one hand, the nation tried to project a progressive image by organizing events of international impact such as the 1968 Olympics. On the other hand, there were repressive events occurring inside a state which became corrupt and dictatorial. The Olympics offered the Government an opportunity to project an attractive image of progress. The exhibition called *Solar* was organized at a time when an artist of American origin based in Mexico, Lorraine Pinto (1933), exhibited her work *The Fifth Dimension* (1968), which was one of the first indications of new media art in our country. The work emphasized the image of a promising future that the government at the time also wanted to promote, but the streets of Mexico City were experimenting bloody days after the massacre of students; the scenario was like the experience of countries in other corners of the planet as well. Therefore, though Pinto's works represented the face of an emerging Mexico they were not tied to the concerns of the real people. On November 16, 2022, we interviewed Ms. Pinto, however she did not recall the disturbing events prior to the opening of the emblematic sportive events.

Artistic production, as it happens in dark moments in history- dictatorships, wars, genocides, pandemics, or natural disasters among others - never extinguishes the artist. Works of great relevance continued to be harvested by artists like those who broke with the Muralist tradition that was appropriated on the PRI facade. Their influence was so deep in the nation during those years that Manuel Felguerez (1928-2020) who was another pioneer wanted to break with traditional art and did so by embracing abstraction for his project *La máquina estética* The Aesthetic Machine (1975), which was finished at Harvard University during a research stay. The project carried out the first plastic explorations in paintings, sculptures and engravings using computer, - thanks to a grant from the Guggenheim Foundation. On June 23, 2016 I met Manuel Felguerez at his studio in Mexico City. He described to me in more details on his project. He spoke on the use of a computer, the problems he had, difficulty getting time to do research in the arts during his work as professor at UNAM. After Felguerez production of the Aesthetic Machine and with the availability of new technological devices, important figures in digital creations emerged, such as Andrea di Castro¹ (1953-), a precursor in the exploration of cinema, photography, and video, as well as the founder of the Multimedia Center of the National Center for the Arts in Mexico City. At the same time, the artist Humberto Jardon² (1953) carried out artistic searches in different media, especially with electromechanical instruments like photocopiers (copy art or xerography) and traditional engraving techniques. In the case of Jardon, we find a set of works exhibited at the Multimedia Center, which became one of the important foundations for the construction of the electronic art community in the country. With the appearance of new technological devices such as printers, fax machines and video games, new proposals were made, such as was the case of video games, which were now manipulated with artistic ingenuity to embody innovative or experimental ideas. One such example is *Atari Noise* (1970) by Mexico City artist Arcangel Constantini³ who

³ Interviewed by the author on October 4, 2022.

obtained new effects with video game consoles and the distortion of the image on the television screen.

Musical works and sound arts were ingeniously connected to living flora or fauna, i.e., inhabitants of deserts or oceans, that arose in figures such as those made by Ariel Guzik⁴ (b. 1960) who recalled workspace travel in science fiction literature with expeditions to the bottom of the ocean just as with outer space. In the same tenor of exploration but in one dealing with the outer world we saw how the artist Juan José Díaz-Infante⁵ (b. 1961) launched a satellite into space, a project he called *Ulises* (2011-2014). It would be difficult to understand some of the aforementioned works and others that would arrive in later generations without the intervention of a key figure like Tania Aedo⁶ (b. 1968) who directed and curated renowned museum spaces, such as the *Centro Multimedia* of the *Centro Nacional de las Artes* and the *Laboratorio de Arte Alameda*, both in Mexico City. Also relevant are artists Iván Abreu⁷ (b. 1967) and Malitzin Cortes⁸ (b. 1986) who contributed to the future of art in Mexico by collaborating with educational institutions. Fresh artistic proposals that are not limited to electronics and new media or live cinema, but involved architecture and fashion were combined by them with deep environmental reflections.

2. Recent Development

Inside iconic institutions such as the Multimedia Center and the Alameda Art Laboratory, works of artists Marcela Armas⁹ (b. 1976), Gilberto Esparza¹⁰ (b. 1975) and Iván Puig¹¹ (1977), who are today widely recognized were all exhibited. They achieved international prestige after a substantial and continuous creative output made over several years in the then Federal District, today's Mexico City, although they currently reside in the city of San Miguel de Allende, Guanajuato. This trio of Armas, Esparza and Puig represent one of the few cases of habitation eccentricity since most of the rest of the artists I interviewed during the last ten years had their workstations, for their artistic practice, in the national capital's metropolis. The cultural decentralization pursued by Armas, Esparza and Puig is evident when we take into account the formation of the Taller 30 group¹², an initiative made up of the three aforementioned artists as well as including Daniela Edburg, Arthur Henry Fork, Diego Liedo, Taiyo Miyake, Bruno Monsivais and Leslie San Vicente who joined the group with successful proposals that can already be glimpsed in the short history of the group. A no less interesting case beyond the borders of the country is that of the *Electrobiota Collective*¹³ of the Mexicans Lupita Sánchez (b. 1985) and Gabriela Munguía who live and produce in the extreme south of Latin America, specifically in Buenos Aires, Argentina, where they have found fertile soil for the development of their work and the understanding of ecosystems closely connected to the earth as a living entity.

At this point we will briefly introduce the work of the Nahuatl-speaking Indigenous origin artist Fernando Palma (1957), little known until recent years in Mexico, above all and in part, due to his long stay in Europe (Netherlands and England) but who, from his European experience, experimented with themes of identity and beliefs. Palma rightly demands inclusion

of marginalized indigenous groups in the sphere of contemporary art. During our interview, on June 1st 2019 at Calpulli Tecalco in Milpa Alta, Mexico, Palma explained that there is a pragmatic message in his work and said during the interview:

...indigenous communities do not have a voice, it is drowned out and growing because it is happening in the rest of the continent and on the planet and for reasons that little by little tend to become clearer, that relationship that some call spiritual although it is actually a pragmatic relationship with a discourse of knowledge of the surroundings and from there comes an association with what we know today as environmentalism, because environmentalists in my opinion are urban people who suddenly react to these circumstances and find that there is already a vocabulary to talk about those things but it has always been ignored and now they talk about indigenous activists dying on a hill, in a river, etc., but it is not a new event, that is 500 years old, what happens is that today they can classify it in an environmental movement and call them activists.

The sad contrast emphasized by Palma reveals the characteristic classism of society and is critiqued by him with a view to improving the perception that the population has of Indigenous communities. Few artists dedicate their artistic production exclusively to highlighting the symbology of pre-Hispanic peoples and, in turn, give adequate visibility to their most direct descendants. I believe that in Palma, as in the artists whose interviews we have made¹⁴, there is a deep interest in their social environment, but above all for natural one and in its relations to the transcendental moments of life itself.

Paradoxically, this essay is now being written decades after the historical moment where the youthful claims of the sixties when Lorraine Pinto exhibited her work the *Fifth Dimension*, one that implicitly considers the possible emergence of a greater consciousness, now culminate with an end of the abyss created by pseudo-democratic and repressive governments who governed for more than seven decades and still in power in some states of Mexico. Today art, science and technology flourish in a society that is inclusive and open to the original cultures of the Maya in the south or the Nahuatl in the centre among many others along our country and has been demonstrated after 2018 when a new government has focused their attention on those forgotten and denigrated indigenous societies, one that will be exposed to millions of people, and which hitherto remained impossible to appreciate. There is so much to contribute based on the roots of our culture and for the future as it will be made possible and tangible with the kind of art on which we are focusing today.

2.1. Tradition and Technology

In challenging the secrets of life and earth through innovative artworks, two riveting projects were achieved in

⁴ Interviewed by the author on November 29, 2022

⁵ Interviewed by the author on November 17, 2022

⁶ Interviewed by the author two times, one on June 23, 2016 and September 15, 2022.

⁷ Interviewed by the author on October 5, 2022

⁸ Interviewed by the author on October 5, 2022

⁹ Interviewed by the author on June 12, 2016

¹⁰ Interviewed by the author on June 4, 2016

¹¹ Interviewed by the author on October 22, 2022

¹² Interviewed by the author on November 4, 2022

¹³ Interviewed by the author on November 4, 2022

¹⁴ The collection of interviews mentioned here will be published by the end of 2024 in an open access eBook entitled *Artes Electrónicas Digitales en México. Entrevistas y Testimonios*.

recent years by a collective and a leading women artist. One artwork named *Codex Virtualis* (2021) was achieved by the collective *Interspecifics* (Emmanuel Anguiano, Leslie García, Paloma López, Felipe Rebolledo) the other is *Tsinamekuta* (2016-2021) by Marcela Armas. The first project explores life on earth and the way it can be shaped by AI. The second case goes into the entrails of earth in trying to find connections between the minerals exploited in the mines and the cultures and traditions of communities that had lived on the surface of those mineral-rich land. In both cases artists are engaged in discovering and deciphering the codes hidden under the surface of our planet as much as in the living creatures of the same celestial body, one on macroscopic scale, the other in a microscopic universe. *Tsinamekuta* is closely tied to cultures and traditions developed in rural communities, especially the *Wixarika* in the Mexican State of San Luis Potosí while *Codex Virtualis* was conceived in a community of scientists and technologist using the tools of AI and life itself. Both projects are connected to the idea of mining: one of minerals, the other of data that nurtures algorithms of AI. *Tsinamekuta* explores the earth that produces precious metals like gold and silver as well as copper while *Codex Virtualis* looks for the precious information produced by humans in a scientific as well as a materialist context. One project was closely connected to a rural and traditional community, the other was developed thanks to the information collected in urban settings.

Knowledge is power declared Spinoza, and in recent poststructuralist times Jean Francois Lyotard stated in *The Post-modern condition* that “Knowledge is and will be produced in order to be sold” leading us to data mining exploited by multinational enterprises, especially those focused on e-commerce, that collects information from their platforms as well as social media. Data mining digs into the personal histories of social media and marketing information, while on the opposite side, the mining activity links the *Tsinamekuta* project to the rocks that carried the geological history of the place. The conception of *Tsinamekuta* owes some procedures to *Sideral*, another innovative project developed by Marcela Armas and Gilberto Esparza, in which they invented a system that read the magnetic field in meteorites but in the case of *Tsinamekuta* the reading of the magnetic field was not to a meteorite but to a rock taken from 600 meters inside the mine as Armas explained. In both cases, the artist aims to know much more about the past of the rock than only what is revealed on the surface. Both artworks *Codex Virtualis* and *Tsinamekuta* are strongly connected to sound, in the first case is the creation of life with the help of Artificial Intelligence. In the second case the sound is combined with the biting heart of the artist and Mara’akame Jairra a member of the *Wixárika* community in the Potosi region of Mexico, as Armas describes. For the performance or ritual, a sophisticated musical instrument was created, a sort of accordion that was adapted to a system that recorded the sound of the two hearts in the rock itself, a sort of ritual offering that keeps alive the traditions of the *Wixarika* community.

Conclusion

Thus, in such ways as described above we note how digital art history has been evolving in Mexico, creating taste, creating technological hybrids, and impacting social vision in a slow but

steady way. What is confined to the art world will eventually pour out into the whole society -since society lives with technology and always overtakes itself in the race with its own innovativeness to generate life, or simulations that give new directions and create new pathways for life and its values of allegiance and rebellion. From Felguerez to Armas Mexico has contributed to this modern and futuristic world order of art and technology.

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Worlds Shifting

Entanglements and Transformations in WangShui's Practice

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Abstract

This paper discusses the different layers of entanglements, and the transformations they enable, in the New York—based artist WangShui's practice by centering on their mixed-media installation *Gardens of Perfect Exposure* (2017–18). In this installation, WangShui creates an entangled microcosm in which boundaries between life and nonlife, human and more-than-human, industrial extraction and nature, and dominant modes of social being and emergent lives of the otherwise become fragile, bleed into one another, and shift. By mainly following the critical language developed by Elizabeth A. Povinelli, I intend to explore how entanglement in WangShui's work occurs between the biological and the technological, different spatial dimensions, transparency and opacity, humans and more-than-humans, as well as ideological fantasy and distinct immanence. How do these entangled relations make both dominant modes of social being and emergent forms of lives of the otherwise visible? How do these entanglements further bring about a perpetual dynamic and force of transformation, like the never-resting ocean?

Keywords

WangShui, Projection, Intimacy, Entanglements of Existence, Display, Exposure, Relational Movement, Transformation

1. Introduction

Taking the artist WangShui's mixed-media installation *Gardens of Perfect Exposure* (2017–18; below: *Gardens*) as its focus, this paper discusses the different layers of entanglements that emerge from the New York-based artist's practice, as well as the transformations these entanglements in turn enable. *Gardens*, as its title suggests, is perfectly exposed: the installation's focal point is an exquisitely designed and brightly lit habitat suspended in the center of the exhibition space.¹ The habitat consists of cheap artificial fixtures, roof repair fabric, laminated hair, translucent glass stones, and selfie ring lights. In it, silkworms feed, move, and defecate as they await their moment of metamorphosis. The installation expands to another field—livestream images of the habitat are projected onto the surrounding walls, magnifying the silkworms' transformation.

Different relations are formed and entangled through the collaborations between the silkworms, artificial habitat, live projection, and human viewers. Soft organic bodies and cold industrial objects become entangled within a temporary and interdependent environment where life keeps moving, towards the end and the start. The life cycle of the silkworms is interfered

with by the aggressive lighting, surveilled by three cameras, and surrounded by livestream images. Additionally, viewers find themselves accidentally captured on the wall when they step too close to the artificial habitat, contributing another layer to the already multi-layered installation. In this entangled microcosm, boundaries between life and nonlife, human and more-than-human, industrial extraction and nature, and dominant modes of social being and emergent lives of the otherwise²[1][2] become fragile, bleed into one another, and shift.

In my examination of WangShui's work, I intend to reveal what is entangled. However, my intention is not solely to identify the entangled relations, nor will I simply assert that the boundaries of different existences are blurred. While taking care not to be blinded by the globally visible syntactic arrangement that comes from "a form of power long operating in the open in settler late liberalism"³[1] and that "recapitulates a form of colonial reason even though it seeks to confront and unravel it," [3] I intend to explore how these multi-layered entangled relations emerge in *Gardens*. Furthermore, how do these relations bring about transformation in different layers of this installation? What exactly is transformed and how?

2. The Entangled Relations

In WangShui's live projection installation, various relations form, endowing this installative space with multi-layered entanglements and an overall hybrid quality. In the following section, I intend to reveal what is entangled and how entanglement occurs between the biological and the technological, different spatial dimensions, transparency and opacity, humans and more-than-humans, as well as ideological fantasy and distinct immanence.

2.1. Solid and Vapor

Even before approaching the artificial habitat that hangs in the center of the spacious exhibition space, viewers who have just stepped into the exhibition can see a magnified view of part of the habitat on one wall, or the bodies of other viewers who are already standing next to the habitat. Upon slowly approaching the center of the installation, viewers see the artificial habitat—a horizontally oriented, hanging slab on top of which the habitat has been constructed. Viewers are surrounded by the vertically projected images when standing in front of the habitat. Through WangShui's employment of projections, they might feel that the spacious exhibition hall is fully filled with the projected images, as if the image surface has depth. As a medium that is a play of light and dark, a technical arrangement for displaying images, and a transitive and ambience-altering

¹ The version of the installation discussed in this paper appeared in the solo exhibition *WangShui* held at the Julia Stoschek Foundation in Berlin in 2019.

² In this paper, I adopt the specific terms used by Elizabeth A. Povinelli in her exploration of a critical language "to account for the moment in which a form of

power long operating in the open in settler late liberalism was ... becoming visible globally under the name of Anthropocene and Climate Change."

³ As Povinelli suggests, casual syntactic arrangements of theoretic statements could result in significant differences for figuring the present.

“cultural technique,” [4] projection can be configured in a way that both time and space are affected. In her research on projection and surface materiality, Giuliana Bruno suggests that the materiality manifests itself on the surface of projection because of its tactile nature: projection enables the tangible sense of space, and its surface can become an extensive form of textural contact. [5] When the surface meets its material depth, a space emerges. This space shaped by the surface further engages and connects with the viewer, in which viewers can inhabit. [5] In other words, the live projection in *Gardens* affects the concrete architectural space and enables the emergence of an additional spaces that are conjoined and inseparable. Beyond the architectural space, a new space is created through the material dimension of projection.

This new space also brings about a haptic experience for the viewers who inhabit it. In *Gardens*, both the artist and curatorial team intended to build a field in which “[t]he livestream creates a disorienting shift between the material presence of the work and its mediated image.”⁴ A sense of tension as well as one of immersion is therefore generated in the architectural space through the inclusion of projections in the installation. The tensions that emerge in this field allow me to further relate *Gardens* to Bruno’s ideas on the cultural conjunction of atmosphere and projection. The art of projection has the ability to express weather conditions: it enables the climatic enhancement of interior spaces and allows the viewer to be sensitive to the particular effects and atmospheric characteristics of each space. It furthermore “mobilize[s] our sense of how landscapes are constructed and our notions of their temporality and volatility.” [4] In other words, projection creates its own elemental environment. In *Gardens*, the projection of the cold habitat dresses the wall with a layer of magnified livestream images, and through the immersive arrangement of the installation—the bright light, dark atmosphere, and dissonant scales of the habitat and its mediated images—a sense of tension is created in this field. Much like the projection of weather onto the material world, projection transmits light and possesses a shadowy, vaporous materiality of an atmosphere. [4]

The projection surface thus acquires a not-so-solid material depth. Projection also transforms: it evaporates or liquefies in the air—a process in which the viewer inhabits the haptic rather than the visual experience. The word “haptic” here is not identical to physical tactility but refers rather to an interactive contact between viewers and their architectural surroundings. [5] In the transformation of projection, the architectural space, the projected space, and the space in between them are therefore affected and entangled vaporously.

2.2. Intimacy and Care

Intimacy is then brought about through projection and the hapticality it gives rise to. The enlarged projections create an atmospheric environment for *Gardens*, providing viewers with a haptic experience that allows them to feel the space tangibly. The exhibition space itself could evoke a sense of hapticality, for, as a “connective architecture,” [5] it develops public intimacy, which is described by Bruno as a “haptic affair.” [5] As the dominant spaces of visual culture, art spaces enable a private dimension “visited in spectatorial itineraries that trigger private, affective responses.” [5]

However, in *Gardens*, intimacy arises through diverse dimensions. It is not confined solely to the nature of exhibition

spaces, nor is it solely the result of the haptic experience enabled by projection. It is also activated through an intricate relationship of care orchestrated by the interplay of intense observation, deliberate intervention, and heartfelt engagement. Amidst the act of observation, viewers do not merely gaze upon the silkworms with indifference. Instead, as their eyes and bodies draw nearer to the delicate forms of the silkworms and the encompassing installation, intimacy arises through proximity. This intimacy is further nurtured through a gaze imbued with affective care. Viewers undergo an affective journey alongside the silkworms’ existence. Initial amazement at this soft organism transitions to concerns about the silkworms’ sustenance, from how they delicately nibble on mulberry leaves to their arduous crawl through the cold installation, facing challenges of survival. Do they find solace under the intense selfie lights? How does their excrement commingle with their habitat within this artificial exhibition space? It is this caring and attentive gaze that stirs intimacy, kindling an inner turbulence within the viewer. In this encounter, the intimacy between the viewer, the silkworm, and the installation is enriched with affective resonance.

Yet this exposure of the silkworms’ bodies to the viewer inevitably confers a certain power dynamic in which the silkworms occupy the inferior position. Perhaps the caring gaze is benign in intention, but excessive observation and intervention still reinforce the dynamics of observation and even surveillance. In other words, bodily exposure here is one-way and therefore asymmetrical. Furthermore, WangShui’s artificial “second nature” is rife with additional signs of human dominance: The silkworms displayed in this installation are a domesticated breed, a result of human intervention. These domesticated silkworms, it turns out, demand more specific rearing conditions and meticulous care than their wild counterparts. However, rather than placing them in an environment tailored for their well-being, they are situated within an artificial habitat that seemingly departs from their ideal conditions of life in terms of air, light, humidity, and more. The act of refining wild species for delicate fabrics and fashionable textiles, an act that is motivated by human desire, represents the first layer of aggressive species dominance. The subsequent imposition of an unsuitable environment as well as the silkworms’ subjection to excessive observation reinforces the overwhelming dynamic that asserts human supremacy over the realm of the more-than-human.

This narration reveals a simplified two-side relationship in which one party is subordinate and the other dominant. However, in this caring relationship, silkworms are not entirely passive entities but active agents capable of inspecting their environment. Moreover, rather than incorporating arbitrary components into this habitat, WangShui intentionally employs chrome bath fixtures and thereby brings the power struggles inherent to bathing into contact with the exposed bodies of silkworms. Body exposure in bathing can be an unequal linear power dynamic that “used to underwrite relations of domination,” [6] whereas bathing in a relationship of care is full of conflict and struggle in which the dynamics of power are not easily definable. In other words, relationships of care unfold as a mutual and intricate interplay interwoven with the subtle, often imperceptible threads of power dynamics. In the relational exchange presented in *Gardens*, the silkworms, as recipients of care, are empowered surprisingly and ironically through the way they are exposed because they are displayed in an environment

⁴ See exhibition booklet, *WangShui* (Julia Stoschek Foundation Berlin: 2019).

where they can only be viewed from afar, not touched. Their unavailability intersects with but deviates from the asymmetrical power of overexposure. Thus the habitat, through its alignment with bathing culture, becomes a sanctuary in which their exposed bodies are scrutinized but shielded, and even worshiped. In the tension between excessive observation, meticulous care, and aggressive display, WangShui's artificial habitat does not point to a single form of asymmetrical power; rather, it allows multi-layered frictions to emerge and relationships to become intricately intertwined, a process in which power relations are dynamic and entangled. The renunciation of the supremacy of humans not only recognizes the mutual linkage between different existences, but also directs care and attention to existences of all kinds.

2.3. Distance and Scale

In the catalogue accompanying the exhibition, the curatorial statement mentions the curators' intention of "playing with scale and forms of viewing."⁵ Recalling nineteenth-century panoramas and dioramas, *Gardens* is exhibited in a way that "the spectator is both immersed in the scene and able to view it from a distance."⁶ The different forms of viewing here can be observed through inspecting the notion of distance and scale. Upon entering the exhibition space, viewers can see the horizontally placed installation a few meters away from themselves; captured by cameras from various viewpoints, it is also enlarged and projected on the vertical wall. The clear spatial scale of the architectural space and its relationship to the individual units in the space thereby become dynamic. As viewers stand near the installation and enter the field between the installation and the wall projection, they can no longer escape the bizarre, charged field created by the intersection of horizontal and vertical space as easily as they could at distance. This disorienting feeling is brought about, as I mentioned earlier, by the arrangement of the projections in the installation. It is furthermore generated by a relational movement—a motion in relationship that is distinguished from the relational aesthetic of Nicolas Bourriaud. [7]

The concept of scaling an image involves altering its relationship with its depicted thing. While the thing itself remains unchanged, the images representing it can be manipulated through, for example, cropping, zooming in or out, or presenting the original object from different viewpoints. Scaling an image disrupts the fixity of physical space, transforming it into a variable. However, panoramas are limited by the boundaries of the medium, and scaling is constrained by proportion. The borders and scale of an image depend on the medium used and the available length and width formats. A zoomed-in image—for instance, one showing two or three silkworms on a soap holder—magnifies the details of a specific section of the habitat while providing distant viewers with a sense of immersion similar to that of a panorama. Alternatively, juxtaposing enlarged images from various tracks capturing different parts of the habitat—a format which recalls the diorama—extends the single-track display format and reinforces the feeling of immersion. In essence, the panorama and diorama facilitated through projection undergo reformatting and editing to highlight the interplay between the panoramic and dioramic views. Viewers observing the projection from a distance are essentially engaging with a reformatted panorama and an enlarged diorama. *Gardens'* play with scale and distance

necessitates a sophisticated form of viewing, one in which different perceptions collide and the viewer's vision becomes dynamic. This might align with László Moholy-Nagy's relatively fixed schema that links vision with movement: vision in motion is a "creative performance seeing, feeling and thinking in relationship and not as a series of isolated phenomena," and "a synonym for simultaneity and space-time; a means to comprehend the new dimension."^[8] Moreover, because of the projective and spatial arrangement at different distances and scales, not only do the viewers' perspectives and their relation to the space result in dynamism, but the individual components of the space—the human being, the soft silkworm, the cold object, the projected image, and so forth—also shift in relation to one another.

However, I do not seek to emphasize the perhaps "classic" argument in many film media studies that the joining of time and space always results in mobilization. While I draw inspiration from Moholy-Nagy's explorations of light, space, and movement, my intention is to address a relational dynamic and the immanence of movement and illumination to both human and the more-than-human worlds. I argue that the relational and moving nature of this piece of work initiates a manifold spatio-temporal relationship that distinguishes itself from the pre-existing, highly subjective experience of time and space by drawing in experiences of the otherwise that are independent of humans and fostering the imagining of entangled coexistence among multiple species. [3] In the exhibition's architectural space, the way to perceive the world becomes haptic, relational, and unstable. Hence the individual components of the space—the human being who is always the formidable subject, the soft silkworm, the projected images, the cold installation, and so forth—change in relation to one another, in a way in which, as in Rosi Braidotti's notion of becoming, there is no fixed subjectivity but rather variations of forces that are mutually codependent.^[9] In short, I argue that *Gardens* kindles the everlasting relational movement impulse—which differs from Western epistemology and ontology marked by aggressive conquest and linear evolution, and lies beyond the normative understanding of the spatio-temporal relationship—as a tool of critical analysis.

Up to this point, I have delineated how different entangled relations are enabled in *Gardens*. One sees that in between solid and vaporous, intimacy and care, distance and scale, entanglements lie between the installation's different constituent elements—the silkworms, artificial habitat, live projection, and humans. They coexist in this microcosm and relate to each other in multi-layered ways that seem neither solely collaborative nor fully resistant, but somewhere in between, much like the notion of becoming as a "process of intersecting forces (affects) and spatio-temporal variables (connections)."^[10] The coexistence of these multi-layered relations not only endows the installation space with a hybrid quality, but also questions the colonial reduction by which the complexity and specificity of existence have long been invisible to the dominant culture. In other words, what Povinelli calls the "entanglements of existence" [3] and a specific and different immanence of the otherwise are brought about in the entangled relations that WangShui weaves in *Gardens*. In the following section, I intend to further explore how these entangled relations make both dominant modes of social being and emergent forms of lives of the otherwise visible. How are different ways of linking to the world reduced to a singular relation that feels indifferent and "oceanic?" [11] How

⁵ See exhibition booklet, *WangShui*.

⁶ Ibid.

do these entanglements further bring about a perpetual dynamic and force of transformation, like the never-resting ocean?

3. Display and (In)visibility

I want to begin my discussion of these questions by first exploring another way to read distance in this piece. Distance does not merely remain in the physical dimension; it can also be found in aesthetic contemplation. In describing the “transparent society,” Han Byung-chul claims in a Heideggerian fashion that aesthetic contemplation can be acquired only in inhabitation that has distance. “Because distance is lacking, no aesthetic contemplation, no lingering, proves possible.” [12] Silkworms are displayed in an environment where their bodies are exposed to cold fixtures, viewers, and the exhibition as a whole. They become ubiquitous, like the mediated image to contemporary society. To quote Han again,

“Compulsive exhibition entails the alienation of the body itself. It becomes impossible to dwell within it. It is a matter of exhibiting it and thereby exploiting it. Exhibition is exploitation. The imperative to display destroys dwelling itself. When the world becomes a display room, dwelling proves impossible.” [12]

In this manner, the possibility of inhabitation and aesthetic contemplation is proved impossible. Moreover, the live projection makes the bodies of the silkworms, the habitat, and the entangled existences ubiquitous in the space. Does their forced, extreme form of display interfere with the development of intimate and caring relations between humans and silkworms? The initial distance and aesthetic dimension that are enabled through viewers’ attentive care to the silkworms, and the intimacy derived from this, are challenged by the ubiquitous images of the silkworms and the habitat. Thus another layer of friction arises and adds complexity to the relationships between display and exposure, de-distantiation and inhabitation, and, furthermore, transparency and visibility.

In *Gardens*, the idea of transparency manifests in various dimensions. As described above, soft silkworms are displayed as they perform their daily activities of feeding and defecating in an industrially manufactured environment. WangShui further projects intense selfie lights onto the habitat, which is magnified and thereby opened to excessive scrutiny. Everything that is happening in this habitat is exposed to the lens (machine), the viewers (human), and the exhibition space (environment). The selfie lights seem to gather up all the ambient brightness of the room, and under their light, the violence of exposure is unleashed. It seems as if every thing, even that as small as a hair’s breadth, is relentlessly captured and displayed in the projection. Within the multi-exposed habitat, any engagement—human or nonhuman, object or subject—is subordinated to the violence of compulsive display and exposure. Participation across various layers, including the architectural, the living organisms, everyday materials, and detritus, becomes what Han terms “transparent pictures,” [12] for the “[c]ompulsion to display exploits the visible. The gleaming surface is transparent in its own way.” [12] Transparency furthermore ensures the impossibility of inhabitation, because it “re-moves [*ent-fernt*] everything into uniform de-distantiation that stands neither near nor far.” [12]

The notion of transparency links to a broader connotation of *Gardens*, and it is presented in the various explorations of the notion of (in)visibility in this piece. For instance, the title of this work draws inspiration from the Chinese Imperial Gardens of Perfect Brightness (*Yuan Ming Yuan*) in Beijing. Once the most prestigious imperial palace of the Qing Dynasty, it was tragically burned and destroyed by the British and French forces during the Second Opium War in 1860, leaving behind only ruins. Here, visibility undergoes a significant shift, from the opulent imperial palace to the desolation of ruins. The *Gardens* habitat features inexpensive bath products adorned with pendants that recall chinoiserie, an eighteenth-century European design movement inspired by early interactions and trade between Europe and East Asia. In this context, being visible could be seen as an allusion to how cultures and aesthetics are dependent on economic trade and are selectively displayed and gazed upon by other cultures. Furthermore, silkworms have been exploited in trade between China and Eurasia since the inception of the Silk Road and the development of the silk industry. The visibility of silkworms is not only entwined with both nature and industry but is also embedded in the multiple layers of *Gardens*.

The display of an object and the different ways of viewing are shaped by various forms of display, [13] which, as Martin Beck suggests, “regulate[]—through [their] visibility or invisibility—the political and economic status of what [is] exhibited, as well as how a viewer [is] positioned.” [14] The arrangement of the installation in *Gardens*, with its nearly fetishistic attention to detail and live projection of highly magnified images of the habitat and silkworms, not only underscores the complex interplay between the visible and the invisible as an extension of transparency, but also explores the imagination and position that imposed on, and the brutal and violent selection as well as exposure of the life of the otherwise in human dominance.

4. Coda: Transparency, Transition, Transformation

If, as envisioned, silkworms are able to complete their entire growth cycle during the three-month duration of the exhibition,⁷ a remarkable transformation occurs when they begin cocooning. During this phase, they gradually weave a protective surface around their soft, cold bodies, giving rise to a new surface. As the silkworms slowly spin their cocoons of silk fiber, the initially translucent material becomes increasingly opaque due to its thickness. When the cocoon reaches complete opacity, the silkworm undergoes a profound transformation within, resurfacing with a completely altered appearance. Throughout this process, the visibility of the silkworm does not depend only on their display and overexposure: the silkworm itself is also an active agent in the negotiation of visibility and invisibility. In her research on seaweeds like Sargassum and giant kelp in the ocean, Melody Jue argues these organisms operate as active agents within the distributed media system of satellite imaging. What makes seaweeds become available to photographic capture is “the[ir] physical and metabolic qualities that make them sensible to satellite detection.” [15] They are not passive subjects of surveillance and monitoring but, owing to their “photo-availability,” [15] can emit a radiant presence akin to a blazing bonfire. [15] Therefore, the transparency in *Gardens* reveals the entanglement between active display (transparency) and passive exposure, a relationship involving various

⁷ The silkworm’s growth cycle, beginning with its hatching into a larva and ending with the breaking open of its cocoon, lasts about thirty to forty days.

modalities and mechanisms of biology, light, display, and exposure.

This transformation of silkworms from transparency to opacity, visible to invisible, is crucial because it links the ancient cultural metaphors and furthermore opens up form another critical dimension of the work. In ancient Chinese mythology, the dragon as Shen possesses healing, therianthropic powers and influence over water. The Shen, a spiritual existence that people worship, connects the human world and the world beyond it. The Shen dragon can shape-shift and can therefore become as small as a silkworm or so large it can cover the sky:

“The dragon also lives in the water, but it acquires the five colours of water, so it becomes a spirit. If it wishes it can make itself as small as a silkworm or caterpillar. Alternatively, it can make itself so large that it can cover the whole world. If it wishes to go up it can fly among the clouds, if it wishes to go down it can visit the deepest springs. Constantly changing, it can go up or down whenever it likes” [16]

The juxtaposition of the metamorphosis of silkworms and the shape-shifting Shen dragon engages in a dialogue with the intertwining relations manifested in WangShui’s work, offering an alternative way of connecting with the world. Within this context, I find the transformation of silkworms, oscillating between transparency and opacity, the visible and the invisible, profoundly captivating in relation to Edouard Glissant’s concept of the liberal politics of empathy.[17] Being transparent while acknowledging the “right to opacity” ensures a specific and different immanence, unlike an undifferentiated oceanic feeling, which, according to Povinelli, “seeks to stop being attuned to our specific and different immanent and ancestrally present entanglements”[11]

In analyzing *Gardens* and the different entangled relations between the human and more-than-human, and between the biological and the technological, I want to emphasize the highly entwined relationship that is enabled by the arrangement of WangShui’s work. The emergent forms of lives of the otherwise—be they nature, the more-than-human, the cultural others from geographical spaces that are alien to the dominant modes of social being—are displayed or forced to gaze at the historical events, or selectively ran into the dominant clusters through economic trade or aggressive and violent conquest. These entanglements of existence enable alternatives to both the presuppositional Western colonial ontologies and epistemologies, and furthermore to the critical discourses that derive from the late liberal power. Moreover, by invoking Braidotti’s nomadic thought, to “reassert the dynamic nature of thinking and the need to reinstate movement at the heart of thought,” [18] I want to focus on the relational, moving, and transformative forces in this work. The process of transformation is continuous, involving intersections at various levels of relationships. It extends beyond Bruno’s concept of the projective space as a transitive climate to transmit and transform; [4] it also encompasses the literal metamorphosis of silkworms. In this work, diverse entangled existences, interconnected relationships, and networks are in constant flux. Transparency appears intermittently or continuously, while spatiality and the distance of perspective shift explicitly or implicitly. The force of transformation is perpetually dynamic, and transitions occur continuously. The ideological fantasy of “desir[ing] not to face and hold actions and consequences” [11]

dissolves in the face of *Gardens*’ entanglements and dynamic transformations, which are akin to the shifting ocean.

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Convulsive Automation

Notes on the Resurgence of Surrealist Aesthetics Within Soft Robotics

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Abstract

Surrealism and robotics share a connection through the concept of “the uncanny”. Art historians have, for instance, remarked on the persistent presence of archetypically uncanny motifs, including automatons, dolls, and prostheses, within surrealist art and research on social robots frequently cite the concept of the “uncanny valley” to explain findings of human-robot interaction experiments. In this paper, however, I seek to construct a different pathway of connections between surrealism and robotics, focusing on the recently emerged field of soft robotics. Soft robotics designates a radically novel class of robotics technologies and a line of research that eschews the traditional ambitions of robotics research (e.g. the quest for precision) in favour of leveraging the functional benefits that come with constructing bioinspired machines from pliable materials with mechanical similarities to organic tissue. Albeit more often inspired by the anatomy of animals than that of humans, soft robots, arguable, sit uneasily between the perceptual categories of inanimate objects and living beings, as well as those of the intimately familiar and the morbidly strange. Soft robotic designs are often composed of silicone modules and structures with simple abstract geometrical shapes yet possess smooth surfaces with skin-like haptic qualities. During operation, they bulge out and assume highly biomorphic forms, they are able to perform smooth movements (often by means of pneumatic actuation), and diligently adapt to their surroundings. They can deform, alter their shape, or even go shapeless and dynamically change back and forth from being hard to being soft – operations and procedures that figure prominently within surrealist visuality and the surrealist imaginary. Drawing on selected surrealist artworks and theoretical writings as well as art historical accounts of surrealism, this paper presents an argument that a surrealist aesthetic can be seen to reverberate throughout soft robotics. Furthermore, it seeks to interrogate how soft robotics activates categories and themes of surrealist art

understanding and contextualizing soft robotics as an emergent cultural phenomenon – are their affinities merely a surface phenomenon or could they run deeper?

CCS concepts

Human-centered computing~Human computer interaction (HCI)

Applied computing~Arts and humanities

Keywords

Soft robotics, surrealism, aesthetics, convulsive beauty, human-robot interaction

1. Introduction

Surrealism and the field of robotics share a connection through the central surrealist practices and techniques of automatism and automatic writing and their associated ideals of being machine-like in performance to achieve unhindered and ego-less creation. Likewise, art historians have remarked on the persistent presence of archetypically uncanny motifs, including automatons, dolls, and prostheses, within surrealist art and social robotics frequently cite Masahiro Mori’s concept of the “uncanny valley” to elucidate findings of human-robot interaction experiments [22]. In the present text, however, I seek to construct a different pathway of connections between surrealism and robotics. More specifically, my interest lies in interrogating affinities with the recently emerged field of soft robotics, a novel subarea of technical robotics research that endeavors to construct robots from pliable and elastic materials such as silicones for functional gains. The work is part of a larger effort to rethink and recontextualize soft robotics in relation to historical art traditions and art practices to construct a cultural genealogy of their aesthetics [10–14]. The wider interest of the paper is thus to use surrealism as a lens for interrogating formal and material aspects of soft robots and their design aesthetics and to shed light on the aesthetic reception of soft robots in human-robot interaction. I will argue that facets of surrealist aesthetics reverberate throughout soft robotics and that soft research robots activate visual motifs and central thematic interests of surrealist art. Furthermore, I will seek to illustrate how concepts from surrealist theory may hold relevance for understanding and contextualizing soft robotics as an emergent cultural and material-semiotic phenomenon and for elucidating.

2. Soft Robotics and “Surrealist Style”

Soft robotics research is founded on the simple idea of constructing robots, not from metal or plastic, but from pliable materials such as silicone rubbers with mechanical similarities to soft organic tissue. Within technical robotics research, this shift is motivated by the observation that soft body parts are essential to the ways in which animals easily and adeptly can accomplish sophisticated mechanical tasks [21]. In addition, the

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practice (beyond “the uncanny”). Lastly, the question is raised as to what explanatory force surrealist concepts and ideas, notably Breton’s concept of “convulsive beauty”, might have for

technical advantages of soft robots over traditional robots include an increased adaptivity and better maneuverability in unstructured environments, simplified control, and increased energy efficiency [26]. Due to their passive compliance, soft robots are also considered inherently safer for humans to interact with and have been proposed for applications that require close physical contact, including collaborative work, care, and rehabilitation [25]. The research field of soft robotics eschews several of the traditional ambitions and normative criteria of robotics research. For instance, the quest for speed and precision is to some extent sidestepped in favor of leveraging adaptivity, simplification of control, and energy efficiency from constructing machines that are soft. Moreover, the change to soft materiality endows soft robot it with a different set of affordances for interaction with humans and, as will become evident in the following, entails a novel and distinct robot aesthetic. This aesthetic departs from perceptions of robots as clunky inhuman machines within the cultural imaginary [7] and instead brings the field of robotics into contact with different aesthetic traditions, including surrealist art.

The lack of a unified visual style within surrealist painting has frequently been lamented by modernist scholars. In fact, the only solution the modernists found to this problem was William Rubin's idea to bifurcate the movement into two separate branches – an “automatist/abstract” and an “academic/illusionist” [24]. This problematic of “surrealist style” of course creates difficulty in arriving at a unified and general description of the surrealist visual aesthetic especially within the privileged modernist medium of painting. However, if we, following subsequent scholarship, consider the visual and textual production of the surrealists as a whole, including, e.g., photography and print media, shared formal traits and interests obviously exists across surrealist art. Interestingly, a number of these recur in the specific aesthetic characteristic of contemporary soft robotics technology.

In the following, I will seek to introduce these overlaps through juxtapositions of select surrealist artworks and examples of soft robots and soft robotics research projects within technical research to highlight parallels between these otherwise radically disparate fields of practice. As a note of clarification, it is necessary to mention here that the selective readings proposed of specific surrealist works are anchored primarily in the specific understanding of surrealism emergent within the art historical and art critical writings of the members of October group. Most notably the paper draws on Rosalind Krauss' postformalist work on “dissident surrealism” and surrealist photography. Hence, unlike some parts of recent surrealism scholarship [6,16,23], which affirm a continuation of Surrealism in the 1950s, 1960s, and 1970s, my focus is restricted to surrealist artworks and concepts hailing from the inter-war period.

3. Biomorphism and Othered Animals

A first and perhaps most obvious point of entry to exploring potential overlaps between surrealism and soft robotics is through the shared use of biomorphic shapes. The concept of the *biomorph* was first used by British anthropologist and ethnologist Alfred Cort Haddon to describe “representation[s] of anything living” and subsequently came to denote elements within painting, sculpture or design that reference organic life forms [8]. When Alfred H. Barr referred to *biomorphism* in “Cubism and Abstract Art” (1936), he thus used this term to describe a trend of “curvilinear,” “decorative,” and “romantic”

forms in abstract art [1].

Biomorphic forms draw upon the organic shapes in plants or animals and are free-flowing, rather than structured according to a grid or rectilinear compositions as, e.g., geometric abstraction. These are, as is well known, abundant in surrealist visual art and sculpture. An apt example is Hans Bellmer's photographic series featuring the life size pubescent doll he constructed in the early 1930s (Fig. 1). A parallel to soft robotics is evident here, as similar bulging, bulbous, biomorphic forms are generated when flexible fluidic soft robotic actuators made from silicone elastomers are actuated with pressurized air (see Fig. 1). Interestingly, in “Formless a User's Guide” Rosalind Krauss in fact describes the uncanniness of Bellmer's series as related to the fact that, through the framing, staging, and reconfiguration of the doll that occurs in the photos, this life-like doll is reduced to “nothing but the swells and bulges of a pneumatic torso” [2:196], hinting at its at once highly organic and object-like character.

The surrealists' preference for biomorphic forms also resonates with their fascination of exotic life forms and animals in general and here lies another point of contact. Soft robots are frequently based on bioinspired design strategies, and moreover, their designs are usually derived from the physiology of bodies and limbs of fully or partially soft animals that are particularly apt for accomplishing certain mechanical tasks that roboticists aim to replicate [17]. André Breton wrote retrospectively in the essay “Caught in the Act” (1949) about the surrealist fascination with animals that: “The surrealist bestiary, gives pride of place, above all other species, to animals that are sui generis and have an aberrant or decadent appearance such as the platypus, the praying mantis, or the anteater” [3:129]. Similarly, the kinds of animals that have served as inspirations for soft robot designs are not common domesticated pets, but rather animals with which most humans have no sustained direct contact. These creatures possess radically othered bodies compared to the human one and include classes and species such as cephalopods, earthworms, caterpillars, jellyfish, and snails. In both surrealist art and soft robotics designs, we encounter appropriated organic shapes, structures, and proportions that can be traced back to outlandish appearing animal body parts from such species (Fig. 2).

4. Material Transformation – Formlessness and Decay

There are also pictorial elements within surrealist visual art with which soft robotics share a connection not based on formalism nor referent but instead via a thematic interest in material transformations and the tension between structured organization and chaotic formlessness. The process of liquefaction or going

shapeless, for instance, as exemplified in, among others, Salvador Dalí's famous soft watches or melting clocks in *The Persistence of Memory* (1931) (Fig. 3).

Within soft robotics research, this ability to change from being hard to being soft (and sometimes back again) has been pursued through several different technical means with a view to attaining robots that can deform their bodies to maneuver confined spaces or can adjust their mechanical firmness (impedance) for increased safety in collisions [20]. Fig. 3 (bottom image) shows an early example of this, where a wax lattice, imagined to constitute the body of a soft robot, was heated to switch between its solid (1) and soft state (2) [4].

Extending the theme of transitory existence implied in *The*

Persistence of Memory, it is also worth noting how cheap, mundane, and mass-produced materials as well as matter capable of degradation fascinated the surrealists. In Brassai's photographs for Dalí's series of involuntary sculptures, published in the dissident surrealist journal *Minotaure*, for instance, one sees pieces of paper scrap including bus tickets and theatre stubs, which have had structures unconsciously imposed on them through fiddling, rolling, and folding by restless hands (Fig. 4 Top). These bear strong likenesses with soft robots and folded soft actuators made from paper and other degradable materials using origami techniques (Fig. 4 Bottom).

The involuntary sculptures photo series also includes a close-up photograph of a smear of toothpaste that recalls soft robots made from gooey materials such as deformable magnetic slime (Fig. 5).

Such examples of unruly material accumulations of course also resonate with Georges Bataille's concept of the *informe*, the formless, which figures centrally in the work of the dissident surrealist group centred around Bataille. Bataille's *informe* constitutes "the category that would allow all categories to be unthought", as Rosalind Krauss puts it. The *informe* does not possess meaning but is posited by Bataille as having a task or a job – "to undo formal categories, to deny that each thing has its 'proper' form, to imagine meaning as gone shapeless". Hence, it "transgresses boundaries of terms, "producing formlessness through deliquescence, putrefaction, decay" [19:39–40]. Interestingly, here the surrealist aesthetic again arrives back at connection point with soft robotics research, which by now has a whole subfield of dedicated to constructing biodegradable robots from materials such as chitosan, gelatine, or cellulose that eventually can decay and be absorbed into natural environments more easily than rigid and traditional materials used for making robots [9].

5. Proto-Signification Through Spacing

The overlaps between surrealist aesthetics and the emergent aesthetic of soft robotics, I have highlighted so far, were identified via a strategy of close observations of form and content of surrealist artworks and by paying attention to the shared thematic interests of both surrealism and soft robotic research related to material process. However, within Rosalind Krauss' poststructuralist-deconstructivist theorization of surrealist photography, a parallel emerges that instead goes via structure and semiotic image operations. In the seminal article "The Photographic Conditions of Surrealism" Krauss argues that surrealist photography is characterized by a tension between image and physical reality, instituted by an infiltration of the photographic image by signification. Surrealist photographs, she asserts then "are not interpretations of reality...They are presentations of that very reality as configured, or coded, or written" [18:29]. Krauss arrives at this conclusion by theorizing the framing and visual manipulations occurring in surrealist photography as instances of what she, drawing on Jacques Derrida, refers to as spacing. Her argument is that spacing occurs in surrealist photography, through the frequent use of manipulations and techniques such as solarization, which accentuates contours as in, e.g., Man Ray's *Lillies* (Fig. 6), and doubling of the same motif within the photographic print.

These photographic devices maintain the seamless unity of the photograph, but at the same time break it up from within, by compartmentalizing or repeating its elements so they are read sequentially rather than all at once (see Fig. 6) [18:22–25]. Through the repetition of a series of elements, Krauss argues,

drawing on Claude Lévi-Strauss, a precondition for deliberate meaning is established, whereby "raw matter" is transmuted "into the conventionalized form of the signifier" and the paradox of seeing "reality constituted as a sign" emerges [18:25–31].

Albeit Krauss' theoretical account, concerns surrealist photography specifically, I want to argue that it can also elucidate the simultaneously artificial (i.e., constructed) and biological appearance of the large portion of soft robots that use a modular and bioinspired design. Consider the two examples in Fig. 7 – a tentacle-inspired manipulator (top image) and an earthworm inspired crawling robot (bottom image). These robots are highly abstracted designs that visually diverge quite a bit from their biological inspirations or counterparts. But more importantly, they are designed and constructed by assembling a series of identical actuated modules to compose their bodies. Spacing of these parts is further augmented via the inclusion of passive elements, connector pieces or "spacers", that functionally only serve the purpose of holding together the actuated main parts of the morphology. Taken together, these aspects contribute to instituting repetition and a compartmentalization of parts within the coherent overall body plan of the robot, which echoes the photographic effect obtained through solarization or doubling within the photographic image and results in an infiltration by the sign, as described by Krauss.

6. Soft Robots Will Be Convulsive?

In the preceding sections, I have sought to highlight parallels between the two historically separate and, in many respects, disparate phenomena of surrealism and soft robotics. The former a heterogeneous revolutionary historical avant-garde art movement from the first half of the 20th century with a strong anti-rationalist bent, the latter an emerging technology with an associated set of techno-epistemic research practices anchored in positivist science, set a century later. I have argued that a surrealist aesthetic can be seen to resurface in soft robotics, despite no deliberate or explicit influence between the two. Yet it remains an open question what significance and effects the surrealist traits of soft robotics may have?

If one turns to empirical studies of how people interact with soft robots, published within the interdisciplinary research field of Human-Robot Interaction (HRI) there are indications that the contemporary aesthetic reception of soft robots indeed entails responses that dovetail with the experience of a central surrealist aesthetic concept, namely *convulsive beauty*. Convulsive beauty designates a combination of attraction and repulsion at the centre of the surrealist notion of beauty and surrealist aesthetics. In fact, Krauss argues that "If we are to generalize the aesthetic of surrealism, the concept of Convulsive Beauty is at the core of that aesthetic". Convulsive beauty is both shocking and enchanting as well as unexpected and can arise from juxtapositions of elements that are disparate or contradicting, as in the famous quote by Lautréaumont (Isidore Ducasse), favoured by the Surrealists, about the beauty of "the chance encounter of a sewing machine and an umbrella on an operating table" in *Les Chants de Maldoror* (1868). The concept first appears in Breton's novel *Nadja* (1928) and is further developed in his *L'Amour fou* (1937), which contains a part that was previously published under the title "Beauty Will Be Convulsive..." [18]. In the latter text Breton characterizes convulsive beauty through three examples, and the first of these interestingly centre on mimicry of nature, which, as already mentioned, is also integral to the design practices of soft robotics. Moreover, in human-robot interaction studies on soft

robotics technology, descriptions of experiences that align with the ambiguous aesthetic experience of convulsive beauty interestingly recur. In a study where people were asked to interact freely with robotic manipulators based on tentacle-inspired designs, for instance, this was the case especially with respect to how people experienced touching and being touched by the robots. As noted in the publication, “participants were intrigued to touch the robot, but also expressed ambivalence”, and “For most participants, being touched by the robot seemed a somewhat transgressive yet simultaneously enjoyable experience” [15]. Similarly, in another recent study, where participants were exposed to prototypes of soft robots with designs that deliberately sought to amplify their biomorphic aspects, it was found that “[Their] organic qualities were variously ... described as being desirable and uncanny” and that “Some participants .. felt that these qualities could contribute a sense of emotional comfort”, while “Other participants ... found ... [them] ... uncanny because they made the prototypes appear very ‘natural-appearing’ (P1.2) or like ‘alien’ versions of organic things” [5].

The dynamics encapsulated in the above quotations should of course not be taken to constitute a naturalizing nor deterministic aesthetics that is universally applicable, as the cultural and historically situated character of aesthetic processes cannot be elided. Hence, it is an open question to which extent culture modulates the experiences cited above that emphasize ambiguity and alterity in the encounter with soft robots, but also to what extent these qualities result from a novelty effect that will eventually wear off. The argument could perhaps even be made, that the fact that the study participants are able to make a distinction between at once both appealing and off-putting qualities in soft robotics, might in part be a consequence of the surrealist aesthetic and sensibility’s recuperation and diluted afterlife within popular culture. This would appear to indicate that time might have caught up with the surrealist aesthetic and robbed it off its once revolutionary potential. That is, within surrealist theory and practice, art assumed its importance because it could lead to liberation and revolutionize society through altering the individual’s mind state and “normal” way of experiencing the world, by inducing the indistinction between imagination and reality characteristic of the experience of surreality. The testimonies of study participants, however, illustrate that there might be a potential and some distinct advantages in using surrealist concepts including convulsive beauty within HRI research on soft robotics, instead of the concept of “the uncanny valley” that is habitually cited by robotics researchers. This conceptual shift would, for instance, allow for articulating the coexistence of alluring and off-putting sensations in the aesthetic reception of artificial yet biologically appearing agents. Judging from the above, this appears to be a more adequate and nuanced way of conceptualizing experiences rather than referring to increasing or decreasing levels of affinity, as proposed by the “uncanny valley” theory [22].

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Mediating Media Arts

On the Educational Responsibilities of Media Art Institutions across Time Zones

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Abstract

While the history of Media Art has seen the growth of an international network of travelling exhibitions, curators, artists, and artworks, there has hardly been any exchange among media art educators internationally. This knowledge gap has been the starting point for the research project “Mediating Media Arts”, funded by Goethe Institute and UNESCO City of Media Arts Karlsruhe, with the goal of initiating an intercultural discourse about art education practices in relation to media art, both inside and outside media art museums. With different institutional histories, educational systems, and cultural funding policies, understandings of media art mediation vary from time zone to time zone. This paper brings together perspectives from the Netherlands, Germany, Korea, and Indonesia, to discuss current trends in media art mediation. What are the pressing issues for media art mediation practices with regard to different local contexts? It also puts issues of media art education on the map, positing that art education is an underrepresented field in the study of media art history deserving more academic interest.

CCS concepts

Keywords

Mediation, Media Art Mediation, Education, Curation

1. Introduction

What we hope to propose with this paper are different perspectives on the educational responsibilities of media art institutions. We are coming together as authors because of common interests and shared missions: we consider ourselves – in different ways and with a different definition, but in a kindred spirit – as mediators. We all work at the intersection of arts and technology education, promoting alternative ways of learning, exploring community-based practices and encouraging critical perspectives on technology, both within institutions and outside of the museum context.

Our conversation started in the frame of the research project “Mediating Media Arts”, initiated by Fanny Kranz and Barbara Zoé Kiolbassa. Seeing how the media art field relies on an

international network of travelling exhibitions, curators, artists, and artworks, we observe a lack of knowledge exchange and practice sharing among media art educators. This gap led us to apply for a travel grant from Goethe Institute and UNESCO City of Media Arts Karlsruhe with the aim of visiting art educators in their own specific local context, with a focus on Korea, Japan, and Indonesia. We visited museums, cultural institutions, initiatives, collectives and freelance practitioners dedicated to media arts and digital culture in different local contexts. One issue we discussed with many education teams within museums was: art education is chronically underestimated in curatorial processes and institutional structures. It doesn't come as a surprise, then, that what we propose to call “media art mediation” – or art educational practices in relation to media art and technology – is an underrepresented field in media art history and the contemporary discourse¹.

We are interested in the term of “mediation” because it holds the notion of being in the middle, whereas Education or Pedagogy seem to imply a different set of hierarchies². It was quite interesting to see that some institutions we visited in Korea, like the MMCA in Seoul or the NJPAC in Yongin, recently changed the name of their educational departments to “learning” rather than “education”. One of the main goals of our exchange is to explore how ‘media art mediation’ is understood and practiced across different time zones.

This article is the result of a conversation between three time zones - the Central European Time Zone, Korean Standard Time, and Waktu Indonesia Barat, between Fanny Kranz, Barbara Zoé Kiolbassa, Jeong Ok Jeon, Youjin Jeon and Shirley Hendrikse. The first part situates the exchange in different local contexts and infrastructures. The second part follows the discussion between the authors, held as a panel during the 2023 RE:Source Conference in Venice, discussing local communities and the impact of technology policies on art education programmes.

2. Media Art Mediation Practices Across Time Zones

Barbara Zoe Kiolbassa (B.K.): Let's start by situating ourselves in the different local contexts you work in. Could you

¹ Speaking from the German art educational discourse, a few publications exploring the intersection between art education, media art, media literacy, digital culture and technological critique are: Haus der Elektronischen Künste Basel (2018). *Share - Medientechnologie und Kulturvermittlung*. Edited by Sabine Himmelsbach, Basel: Christoph Merian Verlag; Korte, J. & Unterberg, L. (2022), *(re)united!? Neue Forschungsperspektiven im Schnittfeld von Kultureller Bildung und Medienpädagogik*, accessed 12 October 2023, <https://www.kubi-online.de/artikel/reunited-neue-forschungsperspektiven-schnittfeld-kultureller-bildung-medienpaedagogik>; Kolb, G., Tervo, J. & Tavin, K. (Eds.; 2021). *Post-Digital, Post-Internet Art and Education: The Future is*

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² For a discussion onology in the German discourse, see Gülec, A., Herring, C., Kolb, G., Sternfeld, N., Stolba, J. (Hg.; 2020). *»vermittlung vermitteln. Fragen, Forderungen und Versuchsanordnungen von Kunstvermittler*innen im 21. Jahrhundert«*. Institute for Art Education of Zurich University of the Arts (ZHdK), Mörsch C., Chrusiel, A. 2012: “Time for Cultural Mediation”. online publication: <https://www.kulturvermittlung.ch/zeit-fuer-vermittlung/v1/?m=0&m2=1&lang=>, accessed 12 October 2023,

elaborate on what technological histories, institutional infrastructures, educational systems, and community needs your media art mediation practice is embedded in?

2.1. Media Art and Non-Formal Curator Education in Indonesia

Jeong Ok Jeon (J.J.): Indonesian media art can be traced back to 1993 when the 9th Jakarta Biennale (*Biennale Seni Rupa Jakarta IX*) was held. This international art platform adopted curatorship, for the first time, as an attempt to present the development of the contemporary art in the 1980s through postmodern perspectives³. Unlike the previous biennales focusing on two-dimensional painting as the main medium, this exhibition featured the presentation of diverse creative mediums, such as installation, video, and performance – artistic practices that are based on time or the fourth-dimension. Since then, the Indonesian art landscape has been defined by a pluralistic array of expressions, with technology-based media art significantly contributing to this development.

Among the pioneers of Indonesia's media art movement is Krisna Murti, who explored video as an artistic medium to critique the ideological power of media technology. Murti's video art elaborated how mass media, in particular the television's 'one-way' communication manipulated public perception during Suharto's 31-year-long military dictatorship. Another Indonesian forerunner of media art, Heri Dono explored the concept of 'interactivity' between art and its audience. In his kinetic installations, he gave new life to second-hand electrical components, questioning the significance of technology in a local context and highlighting the deeply rooted connection between everyday machines and Indonesian tradition and culture⁴.

The video art of Krisna Murti and the interactive kinetic installations of Heri Dono paved the way for younger generations to experiment with advanced technology in their creative process. Growing up with various digital tools such as computers, these emerging artists recognised the potential of digital technology in their artistic endeavours. The earlier groups include HONF in Yogyakarta (est. 1999), ruangrupa in Jakarta (est. 2000) and Bandung Center for New Media Arts in Bandung (est. 2001). Although their subject matter and the way of practice differs from one another, they shared the common goal of integrating art with science and technology to explore the way technological development has transformed daily life in Indonesia⁵.

From a curatorial standpoint, their activities were crucial because they served as curator to initiate video and technology-based art exhibitions and festivals in their respective cities. In the late 2010s, the landscape evolved more dynamic, with independent curators, curator collectives and government

sectors contributing to the promotion of media art in Indonesia. Nevertheless, these opportunities remained concentrated in Java, the main island where the major art cities like Jakarta, Bandung, and Yogyakarta are located. To fill this gap, the Indonesian government has taken steps to foster inclusivity in media art programmes across the nation by organising the Media Art Community Festival (FKSM)⁶.

In terms of formal education for media art curation, Indonesia has seen limited development. There are a few established programs for curators and arts managers in contemporary art, primarily at Bandung Institute of Technology (ITB) and Indonesian Institute of the Arts (ISI) in Yogyakarta⁷. Consequently, many young curators in Indonesia learn from experienced curators by directly participating in projects or engaging in non-formal curatorial programs offered by artist collectives, art organisations, and foreign cultural agencies. However, these programs predominantly focus on curatorship and the discourse of contemporary art in general, leaving a void in curatorial exploration specifically tailored to new media art.

ARCOLABS, an Indonesian curator initiative, has emerged as a key player in advancing curatorial practices related to new media arts in Indonesia. Their efforts aim to innovate new media art projects through experimenting with different conceptual, aesthetic, and practical approaches⁸. One of their key programs, XPLORE: New Media Art Incubation (XPLORE), was originally launched as a mentorship program for young media artists in 2018. In 2021, this non-formal education program expanded to provide lectures and mentorship to young Indonesian curators, fostering their competencies in both the theoretical concepts and practical skills involved in curating new media art projects.

In its 2023 edition, XPLORE programme participants come from diverse locations such as Yogyakarta, Surakarta (Central Java), Gresik (East Java), and Kupang (East Nusa Tenggara), each contributing unique backgrounds and individual interests. The programme's central aim goes beyond addressing the challenges of curating new media art; it actively encourages each participating curator to explore curatorial approaches relevant to their local context while adopting the rapidly changing exhibition landscape in the world. With Indonesia's swift digital evolution, propelled by AI, blockchain, and Web 3.0, media art stands as an essential reflection of the nation's intricate relationship with technology and society. Initiatives like ARCOLABS and XPLORE are ready to serve as instrumental solutions, providing mentorship and resources to nurture aspiring curators.

³ Supangkat, Jim. 2018. *The Emergence of Curating in Indonesia in 1990 and its Background*. This paper was presented at The National Seminar on Imagined Curatorial, Bandung Institute of Technology, 8 August 2018. pp.1-8.

⁴ Hujatnika, Agung. 2009. *Everything Melts onto the Screen: Video and Media Art in Indonesia*. This paper was presented at The International Conference on Arts and Design Research: The Shifting from Traditional to Contemporary Visual Culture, Bandung Institute of Technology, 20-21 July, 2009.

⁵ Jeon, Jeong Ok. 2022. "Online Media Art Curation in Indonesia." This was presented at the online workshop, AV-arkki - Center for Finnish Media Art, 28 November, 2022.

⁶ Farid, Hilmar. "Sambutan/Foreword." In the exhibition brochure of *FKSM: Medi(t)asi Ritus/Rute*. Jakarta: Ministry of Education and Culture of the Republic of Indonesia, 2022.

⁷ Jeon, Jeong Ok, Masunah, Juju and Milyartini, Rita. 2022. *Curator's Competency in the Indonesian Contemporary Art*. Proceedings of the 13th International Multi-Conference on Complexity, Informatics and Cybernetics, 8-11 March 2022, pp.114-119.

⁸ Jeon, Jeong Ok. 2019. *Exploring Media Art Curating in Indonesia: A Case Study of a Locally-grown Curator Collective*. Proceedings of the 1st International Conference on Intermedia Arts and Creative Technology, Institut Seni Indonesia Yogyakarta, 3-5 July 2019, pp.88-100.

2.2. The practice of technology from a feminist perspective in Seoul, South Korea

Youjin Jeon (Y.J.): Woman Open Tech Lab is an artist-driven community situated in South Korea. It was launched in 2017 with the primary objective of advancing a feminist perspective within the realm of technology and media art. In order to explain how it began, it is imperative to contextualise the background issues of media art in South Korea. Media art gained burgeoning interest and considerable momentum during the early 2010s. There were trends such as projection mapping, interactive art, digital fabrication, and the maker movement at the time. Concurrently, the advent of smartphones and the increasing accessibility of technology through an open-source environment contributed to a societal enthusiasm for learning and presenting emerging technologies.

In subsequent years, media art has been recognised as an artistic genre characterised by the use of new technologies. And it has also given rise to a series of critical inquiries. Primarily, a lack of diversity has manifested itself across multiple dimensions. Media art has inherited androcentric tendencies inherent in technology culture, resulting in a gender imbalance⁹. This imbalance extends beyond a mere numerical gender ratio within the field and encompasses a disparity in the roles directly associated with technology. While the presence of non-male artists in roles such as graphic designers, curators, and project managers is easy to find, their representation in technical domains such as hard coding, circuit design, and mechanical design remains scarce. This imbalance has contributed to the uniformity of perspectives on technology, promoting techno-solutionism¹⁰.

In contrast to its remarkable inception, media art encountered considerable challenges in garnering substantial appreciation from both audiences and critics of the art world. A prevailing perception among many is that it is merely a video projection or ostentatious technological promotion. In this context, community-based practices are imperative to enhance inclusivity and foster greater diversity.

The practices of Woman Open Tech Lab can be delineated in two primary directions. The first direction is to empower individuals who have been marginalised within the technosphere, enhancing their technological literacy. Woman Open Tech Lab pursues this objective through workshops and educational programmes, designed to enable participants with various backgrounds to expand their creative possibilities while cultivating an inherent curiosity and nurturing their interest in technology. The spectrum of educational programmes spans from rudimentary skills such as handling a screwdriver to more specialised skills such as welding, electronic circuit design, and coding. The most important consideration is to cultivate a non-hierarchical culture where collective learning and knowledge sharing take the centre stage.

For instance, Woman Open Tech Lab has developed a range of artistic technology kits to alleviate psychological barriers.

They focus on step-by-step learning and learner autonomy. Additionally, certain programmes facilitate interactions with traditional manufacturing technologies, particularly in the local vicinity. Euljiro, where Woman Open Tech Lab is located, is a historical and urban manufacturing area in Seoul. This area boasts the presence of engineers with extensive experience spanning at least three decades, specialising in various domains such as metalworking, electronics, woodcraft, and acrylic crafting. This human infrastructure is a living repository of knowledge, effectively rendering Euljiro a "living school" in its own right¹¹. Woman Open Tech Lab extends beyond the mere impartation of technological skills, serving as catalysts for collaborations and communication with these seasoned practitioners¹².

The other approach is to establish a discourse on technology and art. This approach encourages critical and multifaceted perspectives on technology, emphasising the importance of respecting each individual's independent viewpoint while eschewing the inclination to conform to social trends. Over the past several years, government-supported art programs have played a pivotal role in incentivizing artists to engage in projects with technologies, such as Virtual Reality, the Metaverse, and Artificial Intelligence. While these initiatives have shown positive facets, they have also engendered challenges, particularly in maintaining artists' autonomy. In response to this complex dynamic, Woman Open Tech Lab has held workshops, organised annual technology research groups, and regularly distributed publications. These efforts are aimed at fostering discussions surrounding techno-cultural phenomena, such as AI, data bias, online hate speech, and the coding craze.

The rationale underpinning the practice of media art and the inclusion of multiple technologies fundamentally aligns with the pursuit of diversity. There needs to be more communities wherein individuals can learn and share different perspectives and cultures. Art and the artistic community, in this context, assume a pivotal role as a conduit for acquiring insights from diversity, and its significance is further magnified in a tech-centric era.

2.3. STRP: Bridging, Art, Technology and Education in Eindhoven, Netherlands

Shirley Hendrikse (S.H.): In 2005, Eindhoven's cultural and business scene desired a fusion of technology, innovation, art, and design. This aspiration led to STRP, an organisation infusing art and technology into Eindhoven's culture. One year later, STRP hosted its first festival. This festival offered a unique immersive experience, celebrating new technologies. STRP Festival became a pioneer, reclaiming the abandoned Strijp-S district, once a Philips innovation hub whose legacy includes radio technologies, televisions, shavers, CDs, DVDs, and even luminaries like Albert Einstein.

Initially, the STRP Festival blended large-scale music events with technology-focused exhibitions. In 2007, it expanded to introduce its first educational program, offering

⁹ Katia Kreuzhuber and Elena Robles Mateo. Ars Electronica Blog. 2019. *Women's Networks in Arts & Technology* (English) : <https://ars.electronica.art/aeblog/en/2019/10/18/netzwerke-von-frauen-in-kunst-und-technologie/>

¹⁰ Garnet Hertz (Critical Making). 2018. *The Maker's Bill of Rights* (English) : <http://makermanifesto.com/>

¹¹ Seolha Lee. 2021. *The Shape of Discourse in Urban Movements through the Lens of Social Media: A Case Study of the Anti-redevelopment Movement in South Korea*, Georgia Institute of Technology. pp.17-18

¹² Lee Suh-yoon. 2018. *Euljiro provides window into Seoul's industrial past*, The Korea Times (English): https://www.koreatimes.co.kr/www/nation/2023/10/113_255861.html

guided tours and teaching materials encouraging a deeper connection between education, art and technology.

By 2012, STRP entered a new phase, transitioning into a biennial festival with a thematic approach. The focus shifted to visualising the possibilities of future technologies. STRP began commissioning new artworks, inviting diverse artists to explore technology as a theme, and expanding educational outreach to specific groups, communities, schools, and educators.

In 2018, STRP embarked on a transformation journey driven by a desire for innovation and external shifts in the art and technology landscape. While once the sole festival in Eindhoven and the southern Netherlands, STRP now faced emerging initiatives locally, nationally and globally¹³.

Today, STRP has evolved into an organisation that explores the broader impact of technology on society, addressing global issues through art, festivals, year-round programs, and education.

Art and technology education has gained momentum in the Netherlands, though it is still in its early stages compared to other art disciplines. Eindhoven, a Dutch city of almost 245.000 citizens, boasts over ten organisations offering art and technology education alongside individual providers.

One distinctive aspect of STRP's educational outreach is its appeal to practical, hands-on students¹⁴, transcending the conventional image of art education as exclusive to highly educated individuals. It leverages interaction and immersion to engage a broader student demographic, making art and technology accessible to diverse learners.

However, challenges persist. Many teachers are cautious about embracing new technologies, often feeling less tech-savvy than their students. Art and technology are yet to gain significant traction in art teacher training, where traditional forms dominate. Nonetheless, this is expected to change as technology becomes integral to the new generation of artists and educators.

Concurrently, the popularity of art and technology grows, leading to blurred boundaries in defining art and technology education. STRP recognizes the need to clarify this realm and promote its importance, enabling schools to select activities that align with their educational goals. In 2020, STRP collaborated with cultural institutions¹⁵ in Eindhoven to develop indicators for educational activities within this discipline, highlighting four approaches:

1. Using technology as a tool or medium.
2. Using technology to reflect on society and current topics.
3. Using technology to encourage a critical, open mindset.
4. Using technology to stimulate wonder and imagination.

¹³ LKCA. 2021. Publication about connecting art and technology in education and leisure with references of education, institutions, art spaces and festivals (Dutch): <https://www.lkca.nl/publicatie/technologie-loves-kunst/>

¹⁴ Shirley Hendrikse (STRP) and Harm Hofmans (MU). 2021. Interview about art and technology education for vocational education (Dutch): <https://www.lkca.nl/artikel/kunst-en-technologie-harm-hofmans-shirley-hendrikse/>

¹⁵ Shirley Hendrikse (STRP) and Beppie Remmits (CultuurStation). 2022. Article on profiling art and technology (Dutch):

Since 2012, STRP Education has invested heavily in innovative programs that complement traditional education. These initiatives encompass workshops, tours, networking events, expert meetings, collaboration projects¹⁶, and participant-co-created programmes. As mentioned, STRP now shares the art and technology field with many other organisations and initiatives in The Netherlands. However, what often sets STRP apart from these organisations is the size and importance of its education department. Often, education is a secondary department for art and technology organisations that programme professional and international artists, performers and speakers. Alternatively, some organisations focus entirely on education.

Younger generations constitute a significant portion of STRP's audience, aligning with their belief in involving youth in technology, art, and society discussions. These young participants engage with STRP through various avenues, from school visits to collaborating with artists on their projects. They partake in short, intensive programs that encourage them to contemplate their beliefs, aspirations, and adaptability in an ever-evolving world driven by technology. STRP Education empowers young individuals to shape their futures actively¹⁷. It fosters a critical, curious attitude that promotes open-mindedness, creativity, and social awareness—a mindset indispensable in navigating an ever-changing world and fostering a cohesive society¹⁸.

2.4. Mediating Media Arts with different Communities

After having explored some of the issues and histories structuring the context for media art mediation in different time zones, the conversation focused on the involvement of local communities and the impact of technology policies on art education programmes.

Fanny Kranz (F.K.): One thing all the examples have in common is a strong connection to a specific community, in which your practice – be it about feminist strategies, technological critique, or fostering media literacies – manifests itself. Could each of you talk a bit more specifically about the community you work for and with? How do you work with them, what tools or approaches do you use?

Y.J: Most of the participants in our programme are young female creators in their 20s and 30s. Despite being curious about technology, culturally transmitted gender stereotypes and hierarchical tech culture prevent them from engaging with technology. So, I think one of the roles of my community is to encourage them to use and question technologies and be aware of the deep effects tech has on our lives. A few weeks ago, we invited Lee Jung Sung – the technician of Nam June Paik – to share his experience with hacking analogue TVs and Nam June Paik's strategies. He is from another generation, so we were

<https://www.cultuurstation.nl/nieuws/kunst-technologie-in-het-onderwijs-even-boeiend-als-belangrijk/>

¹⁶ Sanne Drenth and Sietske Prinsen. 2022. Interview with participants of a STRP co-creation programme: <https://onderwijs.strp.nl/en/updates/interview-met-sanne-en-sietse>

¹⁷ Gert Biesta. 2017. Publication Letting Art Teach: <https://artpress.artez.nl/nl/boeken/letting-art-teach/>

¹⁸ Sir Ken Robinson. 2022. Publication Imagine If...: <https://www.penguinrandomhouse.com/books/602762/imagine-if---by-sir-ken-robinson-phd-and-kate-robinson/>

nervous about communicating with him – but he loved us. We spent great moments together and now I think he has become a feminist.

S.H.: I really like how we all use this term of community, because it implies not only working *for* these people, but also *with* them. Our main community in education are teenagers and young adults between the age of 16 to 25, more or less. Museums often mainly reach pre-university students. But how do you reach young adults with practical interests, how do you break through bubbles? We try to engage with students from all levels and educational backgrounds, bringing them together in different formats. For example, during our last festival, a workshop group included one student becoming a nurse, some students studying philosophy, and art students. This is so important, because when you start your professional career, you are most likely to work with different people. It's important to have these encounters with others because it will make you more aware of who you are. We also try to reach students by working with teachers, organising events and meet-ups. I've been thinking a lot about our role as an art organisation, and I really feel that what we do should be complementary to what a teacher does. We are no teachers, and teachers cannot become artists. I just try to initiate meaningful activities where we can both be in our own role but help each other. In the Netherlands there is the term 'learning ecosystem'. In an ecosystem, there are so many different roles, but they all collaborate in some way. All together we form an ecosystem that can thrive.

J.J.: I am actively involved with diverse communities across various projects. In the context of XPLORE, I work closely with young Indonesian curators, predominantly in their early 20s to 30s, who come from an array of unique backgrounds. It's noteworthy that Indonesia lacks a specialised major in curatorial studies. Consequently, many of these young curators have roots in fields like fine arts, graphic design, anthropology, and cultural studies. Their background equips them with distinctive critical approaches, with a particular emphasis on field research and archiving. Each of these promising curators collaborates with a unique local community, reflecting the vast cultural tapestry of Indonesia – a country full with a myriad of ethnicities. The diversity in cultural, religious, and ethnic backgrounds of these communities is something we always bear in mind during our collaborations.

For instance, this year, one of the participating curators comes from Kupang, East Nusa Tenggara, a remote island to the east largely devoid of art galleries. She, along with her team, explores archiving the histories and musical traditions of the Sasando ethnic group. I was enlightened by her insights on the Sasando musical instruments, which hold immense cultural significance. However, these traditions are fading. Her curatorial initiative aims to revitalise the youth's appreciation for the value of these musical instruments.

When I work with my communities, I consider an open mind and deep respect for their origins very important. I try to learn about their local circumstances, challenges, cultural significance, and traditions. While XPLORE operates within a structured framework that provides a comprehensive teaching

and learning methodology, we maintain flexibility to make sure that our communities can reveal their unique work styles, thought processes, and narratives.

2.5. Mediating Media Arts and Technology Policies

F.K. & B.K.: We all work at this similar intersection of art and technology education, and while the local contexts are so different, we share very similar attitudes. That's something that really motivates us in this research and in this endeavour of creating a network and an exchange throughout art educators in different contexts. Another interesting issue is the institutional and non-institutional political level, asking what government interests support or limit our work and where the money comes from. What would you say: what government policies impact your local context and what does this tell us about underlying technological ideologies?

Y.J.: The Korean government tends to encourage artists to use technology in art. On the one hand, this has some positive aspects for artists - but on the other, they recommend specific technologies and it prevents the artists' own motivation and autonomy. It's really hard to develop a critical perspective on technology in our society. This is why we need community-based practices that open the discussion on the politics of technology in a critical way.

J.J.: The Indonesian government, much like others around the world, clearly sees the potential of technological advancements, especially in the realm of education. However, the challenge lies in infrastructure. Every region, from provinces to local areas, has its own distinct needs, making a one-standard approach impractical. I've been involved in projects like the Festival Komunitas Seni Media (Media Art Community Festival in English), spanning areas outside of Java, such as Sumatra, Kalimantan, and Lombok. It became evident that many local artists in these regions might not have been exposed to media art before. So, an exhibition conceived in Jakarta wouldn't necessarily resonate everywhere. Before initiating the festival, we begin with site surveys. We interact with local communities, extending beyond just tech enthusiasts. Our engagement includes theatre groups, filmmakers, traditional painters, and even wayang puppet¹⁹ creators. This two-way dialogue allows us to present our program and, importantly, understand their unique contexts and challenges. In preparation for the festival, we also organise workshops tailored for local art communities. We invite media art experts who introduce participants to create kinetic objects using Arduino—a foundational tool for interactive artwork. Furthermore, our team values open discussions, recognising that while the government may have technological aspirations, these might not align with the specific needs of each community. During discussions, we receive many questions, ranging from foundational concepts of media art to the festival's long-term vision. We adapt and refine our festival approach to ensure it resonates locally while preserving its broader objectives.

S.H.: Technology and technological developments are important topics of our time. As I mentioned, the government

¹⁹ Wayang is a traditional form of puppet theatre play in Indonesia, often performed as shadow play.

supports and stimulates art education in general. However, governmental initiatives focus primarily on digital and technology literacy or implementing technology in education. Technology is approached as a tool, and, in my opinion, too often, it is about its risks and dangers. A different approach could be more appealing to students or teenagers. We can focus on imagination and possibilities with art, encouraging creativity and critical mindsets. This does not mean I think that digital and technology literacy is not essential. I think that complementary to that, with art, we can achieve so much more and really engage youngsters.

Audience: Where would it be most productive for you to collaborate with academic basic research? What would need to happen from the side of academia to find a space where to meet and how to collaborate?

B.K.: I think one thing that we are struggling with in the German museum context, but we also noticed in the media arts institution context in general, sharing this impression with colleagues in Korea, Indonesia, and Japan, is that art education is chronically underestimated. As we said in the beginning, there is not so much interest in that field. There often are tacit hierarchies within institutions, seeing art educators as those who, you know, laugh and draw with kids, but it's not really important. However, I think we can all agree on how important education is and how important it is for media institutions to really, really cherish their educational responsibility. So I guess one thing academia could help catalyse is to underline the necessity of implementing art educational programmes and of giving more voice to mediation processes. There's not so much research in those practices of "mediating media art", I feel not as much as there could be, so maybe that could be one place to start.

Audience: The biggest challenge when working with diverse audiences, especially young people, women or people without an academic background, is to lower the barriers for their participation. How do you encourage people to feel confident about their critical understanding of technology?

Y.J.: I totally agree with your question. It takes a lot of time to build the courage to feel confident in tech skills, the same goes for science, math, and so on. Our community offers programmes for the very basic skills and preliminary processes for technology in the form of kits. Every Kit looks fancy, tempting to have, and very easy - failproof, nearly. It is important to have opportunities to feel successful in developing their own interest in technology. It's crucial to reduce psychological barriers.

J.J.: The most important thing is to remain sensitive to local issues. In one city where we worked with young students, the primary concerns were water pollution and a diminishing respect for the traditional wayang puppets. So, we develop our learning content that addresses these specific issues. This way, while creating art, these students became more aware of issues surrounding them. I believe that emphasising local significance not only encourages participation but also brings a sense of pride and connection to their roots.

S.H.: I want to add to this: Do you have the courage to be open to learning from them? I have learned so much from our participants regarding how they use social media, language,

tools and things that are not familiar to me. It is not that we, as mediators or educators, have all the knowledge in the world. If we are open and want to learn from them, it will give them the courage to open up and do new things.

B.K.: Maybe one more aspect is to play with failure. Just embrace failure, make mistakes on purpose, because that's just the most liberating thing you can do!

Audience: Can you tell us about the ripple effects of learning with your communities? When your participants go back to their communities, what happens then?

J.J.: Whenever we organise our program with the local art community, a pressing concern always emerges: what happens after we leave? We immerse ourselves in the local provinces, deliver a joyful festival experience, but the sustainable outcome is what we all hope for. Because we want them to build their own path forward. To foster this, our strategy has been to keep a small curatorial team from Jakarta and Yogyakarta. We collaborate with local talents, integrating them into our curatorial and management teams. Their approach and work methods often differ from ours, and that's where the magic of knowledge exchange happens. We share our insights, experiences, and equally, absorb invaluable knowledge from them. I have since discovered that some of the local art communities we worked with in previous festival editions have initiated their own projects, continuing the spirit of what we started together.

3. Conclusion

The conversation revealed a vibrant and deeply engaged practice of media art mediation across global time zones. Each panellist highlighted the importance of directly involving local communities in their initiatives - women, young adults, and young curators. They all work "with" these communities, not just "for" them, ensuring the work is relevant, respectful, and responds to local contexts and needs. Each panellist also discussed the different challenges that they are facing. In the context of Korea, the challenges are related to gender stereotypes and technological engagement so that female creators may be discouraged from fully engaging. The challenge of inclusivity and reaching out to diverse groups have been a persistent issue; for example, engaging practical educated or skilled young adults in the Netherlands and reaching various ethnic communities in Indonesia. Government anticipation and response toward technological engagement reveals challenging, as it is often misaligned with the actual circumstances and needs of each community.

While attitudes, challenges and approaches echo similarities across the discussed time zones, the conversation also illuminated the often under-appreciated value of art education within the broader media art ecosystem. There is a lack of academic enquiry into what we propose to call "media art mediation" - or art education focusing on media art and a creative critique of technology - and little attention for media art mediators internationally. In conclusion, the panel and this paper aim to underscore the importance of fostering additional forums for dialogue and collaboration among media art mediators working in diverse communities. Such interactions will pave the

way for the nurturing of knowledge exchange and practices that are mutually enriching, ultimately enhancing the recognition, research, and support for media art mediation. As a result, it can integrate media art mediation into the academic and historical fabric of media art.

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The Power of Virtual Reality Performance Experiences for Education

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Abstract

This paper looks at how empathy and experience, existing within the VR performance medium, facilitate learning. The paper focusses on the importance of soft-skills in education, and highlights empathy and experience as important contributors to developing skills in understanding and communicating with others. It acknowledges that the development of skills and attributes which benefit education and employment, also benefit life satisfaction and wellbeing. The paper contemplates VR as an ‘empathy machine’ and explores how VR performances offer immersive and interactive storytelling experiences. It argues that VR could promote empathy by broadening perspectives through exposure to immersive storytelling, in addition to real-world interactions, helping to advance beneficial soft-skills development. If VR could be an effective ‘empathy machine’, then VR performances could offer an even more powerful medium to develop soft-skills and empathy. The paper draws on three different examples of VR performances to illustrate their education potency, and concludes that, with further research, VR performances could be influential tools in education for soft skill development.

CCS concepts

• VR performances • Education • Empathy

Keywords

VR, performance, education, empathy, soft-skills

1. Introduction

Virtual Reality (VR) performances have been described as a “meeting point between virtual reality technologies and live performance practices” (Wilson 2020), “a mixing of the real and virtual” (Benford & Giannachi in Fuoco 2022), and can be likened to immersive storytelling. Harry Wilson explains how the chronology of VR performance is difficult to ascertain due to the “bursts of activity that do not easily follow on from each other” (Wilson 2020). Oliver Grau traces VR back to the immersive panoramas of classical antiquity, which Steve Dixon claims turns “the whole of art history into a media history” of which the computer is merely the latest tool” (Dixon in Wilson 2022). Robin Nelson suggests that the incorporation of new media and digital technologies in performance necessitate a moving away from an eye-mind “seeing” relationship to ways of “feeling and being” (BayCheng et al. in Wilson 2020) which reflects Lisa May Thomas and David Glowacki’s description of “expanded ways of seeing”, and Josephine Machon’s “fused sensory perceptual experience” (Wilson 2020). Wilson argues

that while performance-based experiences draw on a range of practices, their specific modes of engagement, and ways of ‘seeing, feeling and being’ produced “are the unique result of the meeting point between virtual reality technologies and live performance practices” (Wilson 2020). Jon McKenzie states that VR can be defined as “the intersecting fluctuation of two performances: ...the performance of a human user... and ...the performance of an electronic computer” (McKenzie 1994). Immersion is the defining aspect of VR performances, as the human performance is immersed in the computer performance, and the lack of framed edges, and real-time correspondence of the physical and virtual realms enhances the experience (McKenzie 1994). “VR immersion differs from monitor displays in that the user experiences the space from the “inside out” rather than from the “outside in”” (McKenzie 1994). Scott DeLahunta acknowledges how “historically, the concept of virtual reality/performance work draws on several genres of art work” including Happenings, live, participatory, interactive, installation, media and communication art (DeLahunta 2002). He claims that VR performances align themselves with the interdisciplinary experiments of the 1950’s that challenged borders of conventional disciplines and “sought to break down barriers between performer and audience” (DeLahunta 2002).

Here a consideration of the term performance is required. Michael Csulich calls for a “dissolution of boundaries in the arts” (Csulich 2005) in order to accurately define performance. Csulich cites Erika Fischer-Lichte who demands “necessary reformulation of the traditional concept of performance into a performative event concept... which finally does justice to the “physical co-presence of actors and spectators”” (Csulich 2005). Expanding on the work of others, Katharina Brandl defines performance as “the corporeal co-presence of all those present” and “the simultaneity of corporeal production and corporeal reception” (Brandl 2023). The co-presence of viewers and performers and the sharing of space and time that characterises performance, “is narrowed to an emphasis on a specific live situation” (Brandl 2023). Yet, drawing from the work of Auslander and video performance, Brandl asserts that “action rather than corporeal presence” is more fitting to the performance medium (Brandl 2023). To further define performance, Brandl draws on Alexander Galloway’s claim that video games exist when enacted, signifying that performances exist when experienced; they are “staged at a particular time... in a particular place” (Brandl 2023). Peggy Phelan describes performance as conceptual, subjective, and ephemeral. “Performance’s only life is in the present. Performance cannot be saved, recorded, documented...once it does so, it becomes something other than performance” (Phelan 2003). “The disappearance of the object is fundamental to performance... it

can be performed again, but this repetition itself marks it as “different” (Phelan 2003). This ephemeral nature of performance is complemented with the hardware of technology, of which clarification follows.

This paper refers to VR as opposed to Extended reality (XR), Mixed Reality (MR), or Augmented Reality (AR). XR is an umbrella term for technologies that alter reality by adding digital elements to the physical environment (Interaction Design n.d.). MR refers to the blending of the physical and digital world, and allows “superposition and interaction between digital elements and the real-world environment” (Interaction Design n.d.). AR adds to the physical world with computer-generated input, usually via glasses or a phone screen (Interaction Design n.d.). VR is a “simulated, digital experience that can be similar to or completely different from the real world” (Interaction Design n.d.). “VR experiences are created with computer technology... which creates an immersive and interactive three-dimensional environment” (Interaction Design n.d.). VR is a more frequently used word in industry and the public realm; some performances are varyingly described as AR, MR, XR, or immersive, but most performances are advertised as VR as a more commonly understood term (McKenzie 1994). The performances explored in this paper all incorporate a VR headset and so VR is a fitting description, yet with the fast evolution of technology, being too equipment focussed can result in outdated or obsolete definitions. VR can apply to the type of experience created rather than the technology used alone, there is more than one way to create a virtual reality experience, such as with headsets, glasses, or projections, and the creative potential of technology means that VR performances are a versatile medium, defined as much by the virtual realm they incorporate as the technology they utilise. Therefore, in this paper VR is used, and can be thought of, in terms of the virtual environment experience it creates.

VR technology allows for various types of experience; audiences may be seated or standing, virtually static, or free to move around the virtual and physical space simultaneously. They may experience the performance physically or virtually alone, or with others. Varying degrees of control and autonomy can be made available, and interactions may be actual or imagined. The performance may be live or pre-recorded, and the performers may be remote, or physically co-present. This description illustrates the creative possibilities of VR performances before exploring any content, thus highlighting the mediums’ versatile nature. For use in education, performances can be tailored to any subject, discourse, or learning outcome. This paper looks at how empathy and experience, existing within the VR performance medium, facilitates learning. The paper focusses on the importance of soft-skills in education, and highlights empathy and experience as important contributors to developing skills in understanding and communicating with others.

1.1. Soft-Skills and Empathy

Soft-skills contribute to life satisfaction and wellbeing, as well as job employment and career success (Feraco et al. 2023). Skills such as creativity, persuasion, and collaboration are in higher demand and more social, imaginative, and creative capacities are required for future employment (Edmondson, Formica & Mitra 2020). These sought-after social and creative

capacities encompass a range of broader skills; among the most prominent are teamwork, flexibility, innovation, problem-solving, critical thinking, and negotiation (Edmondson, Formica & Mitra 2020). Compared to previous years, critical thinking and creativity have risen significantly in the rankings of desired skills, and emotional intelligence had the most significant rise in demand (Edmondson, Formica & Mitra 2020). In 2020, the most desired skills were related to self-management and working with others, and included “active learning, resilience, stress tolerance and flexibility” (Whiting 2020). The above findings highlight the desire for employees with well-rounded personal growth and an understanding of others, yet these much desired soft-skills are also fundamental to life satisfaction and wellbeing (Feraco et al. 2023). Soft-skills can benefit employment and job retention, but also personal aspects such as social-connection, sense of purpose, and personal enlightenment. Despite the steering of education-to-job acquisition and corporate-focussed funding for educational institutions, which are typically workplace orientated, the transferrable skills desired by employers can in turn benefit the personal life of individuals through improved relationships, teamwork, communication, decision-making, and resilience, which are also beneficial life skills for dealing with trauma, turbulence, obstacles, action, and change.

Although the range of soft-skills desired by employers (and individuals) are broad, they all have a common characteristic, which is their dependence on “the character or personality building of the individual” (Edmondson, Formica & Mitra 2020). This character building, or personal growth, “involves the development or enhancement of empathy, sensibility and the imagination, without which soft-skills cannot exist” (Edmondson, Formica & Mitra 2020). Many employer-desired soft-skills stem from an ability to understand and relate to others. Empathy and interdisciplinarity are needed to develop breadth of vision, adaptability to change, acceptance of uncertainty, and flexibility (Edmondson, Formica & Mitra 2020), and empathy is shown to play a positive role in the development of collaborative practice and interpersonal communications, and helping individuals reflect on abilities, biases, emotions, and motivations (Ratka 2018). To summarise, empathy and emotional intelligence contribute to the development of skills and attributes that aid education and employment (Stanley & Bhuvaneshwari 2018).

There have been many studies on VR as an ‘empathy machine’. Much research argues for VR’s ability to enhance empathy by increasing exposure and understanding (Schutte & Stilinović 2017; Dyer, Swartzlander & Gugliucci 2018), whereas other research claims that VR is incapable of eliciting empathy due to the distancing effect of technology (Hassan 2020; Bollmer 2017). Further research argues that VR is effective in perspective-taking by facilitating the psychological identification with others (Buić et al. 2020; Mado et al. 2021). Robert Hassan claims that empathy is a contestable term, and cannot be generated from a digital source, as the digital medium reduces the effectiveness of communication. “What VR does produce is a powerful ‘integrated spectacle’ that is a pale substitute for the form of interactive experience needed for the generation of empathy” (Hassan 2020). Hassan asserts that should VR become more commonplace, users will be “further distanced from the analogue reality of the actual world” (Hassan 2020). Yet, while acknowledging the distancing effect of

technology, it could be that VR can still promote empathy through exposure and broadening perspectives, not as a substitute, but in addition to real-world interactions. Hassan draws attention to Ana Luisa Sánchez-Laws argument that “immersive technologies can indeed generate empathy” through data-rich facial-recognition and facial expression fidelity that VR can produce (Sánchez-Laws in Hassan 2020). Sánchez-Laws bases her definition of empathy in neuropsychology and evolutionary biology, stating that “empathy is a survival instinct embedded in the human brain” to help us gather information, and understand and co-operate with others (Sánchez-Laws in Hassan 2020). She claims that “such technology can activate and ‘enhance’ this hardwired response and thus generate empathy” (Sánchez-Laws in Hassan 2020). Hassan concedes that the main barrier to empathy generation is the current limitations of the technology itself, and notes Sánchez-Laws’ assertion that as “VR develops in sophistication and fidelity... then the...‘empathy machine’ scenario may become a reality” (Hassan 2020). Grant Bollmer contests that VR can elicit empathy, stating that “technologies intended to foster empathy merely presume to acknowledge the experience of another, but fail to do so in any meaningful way” (Bollmer 2017). Bollmer rebukes mass-media apparatus, thought of as the ‘empathy industry’ which includes podcasts, tv, movies, and blogs, that are “legitimated through the assumed goal of ‘feeling connected’ with others by consuming, and assumedly then ‘understanding’, firstperson narratives designed to recreate what it’s ‘really like’ for another” (Bollmer 2017). Bollmer’s issue is his claim that VR does not foster real empathy, and merely mimics connections, instead proposing “radical compassion as an alternative to empathy” (Bollmer 2017). Whilst acknowledging this, it can yet be argued that VR can facilitate the practice of empathy, a pale imitation, a presumed acknowledgement of the feelings of others, and an assumed goal of feeling connected to one another, but a practice nonetheless.

Despite discourse on VR as an ‘empathy machine’, it is evident that empathy, as with other skills, can be practised and developed (Sánchez-Laws 2017). Research in Performance and Media-Art describes how engaging the viewer often involves creating an empathetic bond (Bench 2020; Chatzichristodoulou & Zerihan 2012; Woolford 2020). This empathetic bond can be elicited through the experience of stories, role-play scenarios, real-world contexts, and exposure to role models (Ratka 2018). Storytelling has always existed as a form of human communication in the giving and receiving of stories (Fisher 2021). Humans are naturally programmed to identify with the human-like form, personifying and empathising with inanimate objects and fictional characters (Gallese & Wojciehowski 2011). This paper proposes that exposure to VR performances can create empathic bonds through its immersive storytelling capabilities, helping to advance beneficial soft-skills development. If VR could be an effective ‘empathy machine’, then VR performances could offer an even more powerful medium to develop soft-skills and empathy. The next section looks at three very different examples of VR performances and briefly explores ways they facilitate learning and soft-skill development.

1.2. Performance Examples

1.2.1 Whist. *Whist* (2017) by AΦE, is a non-real-time VR performance piece where the recipient, wearing a headset, can walk freely around a large space among other participants. AΦE are a UK based company founded by Aoi Nakamura and Esteban Lecoq that merges dance and technology (Aoisteban n.d.). Their aim is to rethink live performances, push the boundaries of the dance world, and use technology to reinvent audience participation (Aoisteban n.d.). *Whist* is described as a one-hour experience that merges physical theatre, VR, AR, and art installation, bringing audiences into an environment, blurring the boundaries between the physical and virtual (Aoisteban n.d.). Physical sculptures are interacted with to trigger pre-recorded 360-degree scenes. Unknown by the user, the headset tracks their gaze, and queues the next scene depending on where they focus, resulting in highly personalised experiences of which there are seventy-six possible outcomes.

The scenes are surreal, eerie, and seemingly disconnected; a woman frantically draws chalk patterns on the floor, a figure slowly approaches with an outstretched hand, a seated trio once serene and impassive, suddenly laugh theatrically. The dream-like quality and inexplicable actions of the performers, are thought-provoking and encourages curiosity. *Whist* does not offer a traditional learning style; the recipient tries to make sense of what they are witnessing, which heightens their in-moment awareness and retention of information, which is not merely factual. This encourages skills in comprehension, lateral-thinking, awareness, and understanding others. Because several audience members experience *Whist* at the same time, yet have different experiences, it stimulates discussion and comparison afterwards. This process is important in education as it solidifies learning by revising cognitive engagement with information or concepts (Johnson 2019). Post-performance, the recipients receive a link to a unique psycho-analysis based on their subconscious focus of attention. Discovering that they influenced their own unique experience encourages self-reflection, prompting individuals to think back to how they felt and responded during the experience, and resulting in a highly memorable experience. Recipients have an element of control over their experience, some of which is conscious (moving round the space and choosing where to look) and subconscious (their focus triggering which scene plays next). This gives the audience an element of authorship, and their active presence aligns them with the role of navigator. This is akin to self-directed learning, where the recipient has the freedom to make independent choices. *Whist* can be seen to facilitate education through the development of skills such as lateral thinking and problem-solving. This is achieved through seeking to understand others and creating a story out of abstractness. The psycho-analysis of their choices and personalisation of different journeys, encourages self-reflection and the acknowledgement of different perspectives. The practice of observing, comprehending, and reflecting on complex scenarios and relationships in *Whist*, can help learners to better approach complex issues in education.



Figure 1: AΦE, Whist, 2017. Multidisciplinary Performance. Kent. Photo by Paul Plews.

1.2.2 *Facades*. *Facades* (2021) by Displace Studio is a non-real-time VR performance piece that is experienced independently through a headset. Displace Studio is a MR performance studio founded by digital dance Artist Kerryn Wise and creative technologist Ben Neal (Displace Studio n.d.). Their feature piece *Facades* is described as an immersive VR dance theatre experience (Displace Studio n.d.). The audience moves around the physical and virtual space simultaneously, and experiences an emotive and figurative narrative. It facilitates learning through exploration of the space and empathy with the performer, both of which are prompted by feelings of curiosity in the audience.

A virtual house is used to encourage the user to move around the space. It first appears at a distance, a movement inside compel the viewer to move closer. When stood in the doorway, the viewer is not able to enter, but are encouraged to peer in to see the performer inside. Later the viewer is situated inside the house and can walk around the virtual room. The virtual house shifting in location and proximity, and the changing confines of the virtual environment, reinforces the possibility of the environment having hidden potentials, and encourages the viewer to test and re-explore the parameters. This curiosity and exploration help develop skills awareness, decision-making, confidence, and autonomy. The performer sits on the bed gazing intently straight ahead, which makes the recipient look to see what she is staring at. The performer comes towards the viewer offering an embrace, the proximity triggers a response in the viewer, either feeling compelled to reach out their arms, or to step backward impulsively. She passes through them and her continued trajectory compels the viewer to turn around. She runs round the outside of the house looking behind her, causing the viewer to turn their head and body to see her. Each recipient will respond differently to the piece; not everyone will feel compelled to reach out a hand, follow the performer, or turn to see what she is looking at. However, the piece does play on fundamental human instincts that are naturally and socially embedded, such as natural responses to proximity and eye-contact, attention being drawn to motion, and symbols or images such as doors representing openings.

Facades facilitates education through the development of skills in problem-solving, discernment, lateral thinking, and understanding others. The combination of performative, expressive, and task-based actions elicit curiosity in the recipient as they try to decipher the reasons behind her actions. The

performer runs frantically whilst looking behind her, repetitively places and replaces a pair of shoes, sways about, and suddenly crouches to the floor. The viewer is made to construct their own narrative based on what they observe. The piece encourages empathy in the viewer through the expressive gestures and dynamics of the performer. She displays a mixture of desperation, fear, melancholy, and serenity, and her movements change from efficient and intentional, to erratic and mournful. This performative expression promotes empathy and lateral thinking in the viewer in discerning the feelings and motives of others. Many respondents find the piece moving and emotional, and some feel compelled to comfort the performer, even though they are conscious that a) the emotions are not real as it is a performance, and b) they cannot interact with the performer because they are situated in a non-real-time virtual environment. Empathy motivates people to act (Höfker 2023; Sánchez-Laws 2017) and so the empathetic effects of *Facades* are evidenced by the audiences' interaction with the piece.

As an abstract, emotive, narrative, *Facades* does not teach verifiable facts, but instead offers a holistic form of learning. It is able to teach the recipient about behaviours and emotions. Empathising with the performer can help develop social skills, emotional intelligence, and communication. Experiencing a piece where there is no clear storyline, and where there is no means to interact or intervene, could develop a person's resilience, patience, acceptance, or compassion. Further to this, *Facades* can teach recipients about themselves, in terms of their own understanding of their actions, responses, and feelings towards others. On a more philosophical level, it can teach users about not knowing the reasons behind something, and not knowing the beginning, middle, and end of a story, which can encourage creativity and discernment, as well as furthering decision-making and problem-solving.



Figure 2: Kakilang. HomeX, 2023. London. Multidisciplinary Performance. Photo by Lidia Crisafulli.

1.2.3 *HomeX*. *HomeX* (2023) by Kakilang is a real-time VR performance that can be experienced either as a physically present or online audience member. Kakilang (formerly Chinese Arts Now) was founded in 2005 and produces “world-class interdisciplinary art from a wide spectrum of Southeast and East Asian voices” (Kakilang n.d.). The four Artistic Directors from diverse creative backgrounds work to push artistic boundaries and “champion diverse voices and communities” (Kakilang n.d.). *HomeX* is described as a multi-disciplinary performance that combines dance, theatre, music, gaming, and VR, and

connects performers in Hong Kong and London in real-time using volumetric capture (Kakilang n.d.). Although the audience do not wear headsets, they are either semi-immersed physically (in a panoramic 270-degree projection of the virtual world) or behaviourally (interacting through an avatar in the virtual world).

The physical performance consists of a seated audience and a dancer, behind which a virtual world is projected onto three walls. The headset-wearing live performer is transmitted in real-time into the virtual world, and interacts with a second, live but remote dancer. Within the virtual realm, the two dancers, an online protagonist (virtual creature), and online audience members (more virtual creatures) interact in real-time. The physically present audience explores the virtual world with the performer as the narrative unfolds. They witness the protagonist's arrival in another world, their discovery of the virtual creatures, the digging of resources, the building of houses, and finally the destruction of the landscape. *HomeX* enhances education through the use of immersive storytelling, perspective-taking, and metaphor, which creates an empathetic response in the audience, manifesting as discovery, awe, belonging, and loss. There then follows a section of film extracts where people from around the world share their real-life stories about immigration and what 'home' means to them. This puts the *HomeX* narrative into real-life context and aligns it with current issues surrounding immigration, resources, and global warming. Offering an entertaining, fictional narrative that is then directly followed by real life stories, creates a strong emotional impact and effective perspective-taking. This is very effective for education, as it engages the learner's attention and emotions, before putting it into context, thus making complex themes more comprehensible. *HomeX* combining fictional narrative with real-life stories demonstrates how VR performances can benefit education by addressing issues that are complex, multifaceted, and involve multiple perspectives. VR performances such as this can help learners to consider alternate viewpoints, think broadly, and be open-minded and inquisitive.

Comparatively, the online audience experiences the performance through a computer, appearing as a virtual creature. They control their on-screen avatar using keyboard commands, actively exploring the virtual world independently and up-close, and moving freely around the on-screen environment. This is important because as they explore and become more familiar with the environment, they become more attached to it, and therefore are more likely to feel emotion when the environment gets destroyed. The audience are prompted to perform tasks, contribute to the story, and are very much an active participant in the piece. They begin by planting seeds, and riding animals, and when the human dancers appear they dig up materials, chop down trees, and build houses. Pressing different keys allows the avatars to perform actions and effects, such as sending up love hearts, crying tears, emitting black smoke, bowing, or shooting sparks at each other. The audience is given a sense of purpose, as they learn the simple controls that elicit effects from their avatar. Their anonymity gives the online audience member freedom to engage without self-consciousness, and allows them to be. This proximity and exposure of being situated 'on stage' with the performers intensifies their engagement and commitment to the telling of the piece; as they embrace the role of a performer, they become more invested in the story. Because

the performance is live there is an added element of interaction and personalisation possible. The dancers and online protagonist respond directly to the actions of the online audience members, which makes the performance feel more 'real' and full of possibility. Feeling important and acknowledged, reinforces the online audience's commitment and engagement with the piece, resulting in a positive, memorable experience. Performing online also makes the online audience bond with their fellow online audience members, perceiving a connection through a sense of synergy, much as co-actors in a play respond to each other and feel connected through teamwork. They are made to empathise with a perceived audience, through their performative actions, as they imagine themselves from an audience's point of view, and recognise their own exposure and potency. *HomeX* is effective for educational purposes, because it allows the audience to understand the story from the inside out. The interaction offered in the piece offers memorability, personalisation, and purpose. By experiencing the story as an active participant, the audience is more committed, aware, and present in the moment, which deepens their understanding of the story. Performing encourages the practice of perception and imagined perspective-taking, which are beneficial skills to have when working with others.

1.3. Conclusion

VR performances facilitate learning through entering an alternate, immersive reality, and engagement with the performance story. A VR performance can arguably offer more immersive storytelling compared to 2D storytelling where the audience is distanced from the performance by the fourth wall. Combining audio, visuals, and movement, creates a more accessible form of learning than any of the mediums alone. Additionally, VR's ability for almost unlimited creative potential means that an infinite number of stories, environments, and characters can be presented. Furthermore, the multi-media aspect of VR performances allows for the facilitation of different types of learners. What makes VR performances educationally effective is their capacity for interactive and immersive experiences. The combination of memorability, purpose, contextualisation, and meaning, is what makes experiential learning so powerful (Jarmon et al. 2019). A main contributor to the effectiveness of experiential learning is awareness and reflection. Thinking about what is happening and reflecting on the process, is what *Whist*, *Facades*, and *HomeX* all effectively facilitate, through the experience of a differentiated virtual experience. VR offers a rich environment for education; the versatility of the medium allows complex issues and abstract themes to be addressed, and allows for complete immersion in an alternate reality, offering new perspectives and experiences that are engaging, memorable, powerful and emotive. VR performances can encourage greater self-awareness and reflection as users identify with the content and attribute meaning to their experience. In summary, the accessible, immersive, embodied experiences that VR performances offer, make for a powerful learning tool in the facilitated development of soft-skills and empathy.

This paper highlights the benefits of incorporating VR performances in education, however further research necessary. In order for benefits of VR performances in education to be yielded, research whether VR definitively promotes empathy,

and if so under what circumstances and form, and to what degree VR performances enhance learning, and evidence of the benefits, need to be conducted. More consideration of how VR performances can practically be implemented into educational settings is needed; looking at how students and teachers respond, what advantages or disadvantages they observe, what authorities decide which performances are suitable for education, which best promote particular soft-skills, and whether specifically designed performances are needed. There are some evident limitations and challenges regarding the implementation of VR performances in education, such as approved content of the experiences, funding for VR performance works, programming, and the possibility of a virtual educational hub. Some concerns are risk-based, such as possible abuse of the medium, biases, capitalist interests of hardware and software, privacy, ownership, and AI/algorithms for content creation. Safety, storage, access to VR equipment, and incurred costs, and usage training, as well as exposure to content, parental permission, physical effects such as nausea, and the handling of sensitive issues, need to be addressed. Even with the need for further research, and the concerns highlighted, the benefits of VR performance experiences in education could be impactful.

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Image Descriptions:

Figure 1: The image shows a large room with five people wearing VR headsets. They are spread out amongst abstract sculptures and are looking around the space. One man has his arms folded, another is standing tall, looking straight ahead. A woman in the foreground is seated on the floor, reaching out a hand to touch a glass resin sculpture.

Figure 2: The images show a dancer wearing a VR headset. He is looking upwards and has his arms out to the side mid-movement. The backdrop is a digital projection of blue and green with many white dotted stars, over which there is a translucent shape that looks to be part of a figure.

Memory through New Media Art

Memory through New Media Art - From Implantation to Remembrance in a Posthuman Society

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This paper deals with the progression of permanent and mutable memory through Eduardo Kac's 1997 performative BioArtwork *Time Capsule* and M. Eifler's 2020 AI artwork *Prosthetic Memory*. Through a methodology of critical analysis, this paper breaks down the antithetic and analogous dynamics between organic and synthetic memory. Using BioArt and AI art as points of posthuman observation, we explore Kac's and Eifler's use of invisible networks to dematerialize human presence as a substitute for the physical body. The artist's use of digital human prosthetics situates New Media Art History as a vital fixture of contemporary cultural and scientific change surrounding corporeality, migration, and augmentation. Comparative analysis between *Time Capsule* and *Prosthetic Memory* reveals mutual outcomes in which body and memory become issues of corporeality, bodies, and technology highlight migration, and technology and memory evolve through augmentation. Consequently, memory becomes the binding agent leading to an expanding transdisciplinary and multifaceted approach to art history.

In *Time Capsule*, Kac pioneered the genre of BioArt by implanting an RFID microchip into his ankle and registering himself in a remote database. In a prescient and symbolic gesture, Kac's action signified a transcendence of physicality by existing simultaneously as virtual and organic in real-time. By outsourcing physical memory, *Time Capsule* symbolized progression in the face of rapid contemporary cultural and scientific change. Twenty-three years later, virtuality extended past bodily memory into the neurological. In 2020, M. Eifler received the Ars Electronica S+T+ARTS Prize for their AI artwork, *Prosthetic Memory*. Eifler, who lost their ability to form long-term biological memory, created an artificial system that stores, processes, and recalls their information as part of a total experience. In a performance of preservation, *Prosthetic Memory* demonstrates the fragile temporality of memory in the face of infinite and rapidly developing information production. Together, Kac and Eifler progressively situate their artwork on a cyclical timeline that traces memory's evolutionary consequences through action, media, and material. From BioArt to AI art, *Time Capsule* and *Prosthetic Memory* present a holistic evolution of digital memory to include the entirety of the body and mind.

In 2020, total virtual existence was vital to the sustainability of our civilization. Social distancing requirements during the covid-19 pandemic converted entire societies into digital; concepts once thought to be theoretical anecdotes of science fiction are now necessities of modern survival. All aspects of human interaction were outsourced digitally and remain intact within the internet. *Time Capsule* and *Prosthetic Memory*'s use of hosts, technological extension, and Cyborg Theory present theoretical outcomes of these

evolving dialectic relationships between technology and organic bodies. The issues presented in our analysis of these artworks, augmentation, corporeality, and migration, highlight

how New Media Art can shift the conversation about human evolution. Through those who experience these artworks, *Time Capsule* and *Prosthetic Memory* are active examples of networks archiving the growing indivisibility of organic life and virtual data. One from the dawn of the internet and the other to the posthuman condition's cusp.

CCS concepts

HCI theory, concepts and models • Biology-related information processing • Collaborative and social computing theory, concepts and paradigms • Philosophical/theoretical foundations of artificial intelligence • Interaction design theory, concepts and paradigms • Sensor devices and platforms • Knowledge representation and reasoning • Web-based interaction

Additional Keywords and Phrases:

BioArt, posthumanism, implant, bioethics, cyberculture, cyborg theory, internet anonymity, memory, archive, prosthetics, telepresence, interactive art, AI Art

1. A dawning of 90's subculture

In the dawn of the rapidly expanding worldwide web, philosophers, artists, and scientists began to speculate how technology would one day erode the prominence of humankind on our planet. Posthumanism describes a philosophical consideration that emphasizes the role of non-human agents in the realm of man [1]. It is a concept that encompasses both the biological and the digital dimensions of our planet and describes the presence of our species as only one facet within a network of all living things. As we evolve in the wake of the Internet, it includes telepresence and memory within a digital omnipresent network in which humans collectively exist and modify in real-time. The BioArtwork *Time Capsule* and the AI Artwork *Prosthetic Memory* demonstrate two points on a continuum of simultaneous digital and analogue human existence. Centring on an infinite, nonmaterial consciousness unconstrained by time, space, or organic biology, these artworks store and retrieve information. Corporeality, migration, and augmentation play an essential role in their discussion, as they present a timeline of posthuman evolutionary change. *Time Capsule* and *Prosthetic Memory* present a unique opportunity to observe the conversion of subjective experience into objective memory through disembodied encoding. Both are the disembodied generation and storage of encoded information initially gathered from organic human life. Through the critical analysis of their parallel yet linear existence, art history provides the opportunity to demonstrate and explore the rhetoric surrounding posthuman memory.

This symbiotic relationship between humans and machines is new in our biological and technological development schema. In 1997, our digital "self" did not exist. Physical interaction with technology was not attached to sleek, ergonomic mobile devices

and wireless broadband connection but was constrained to a slow, heavy, stationary dial-up connection [2]. In 1997, engineers at Microsoft initiated innovation by replacing aluminium with copper in computer chips. These new, smaller chips coupled efficiency with a larger storage capacity. Not only making way for faster and cheaper computers, the copper chip-enabled and supported new multi-directional 3D processing between chips- a development that led to a flexible and effective method of transmitting information in real-time [3].

1.1. Time Capsule: blurring organic and digital presence

Seizing upon the new technology, artist Eduardo Kac created the controversial new media artwork *Time Capsule* - a site- specific work located simultaneously in Kac's ankle and a remote database. At 10:00 pm, Tuesday, November 11, 1997, *Time Capsule* was realized at the cultural centre Museo Casa da Rosas in São Paulo, Brazil. Containing the sequence of numbers 026109532, Kac implanted a biocompatible, hermetically sealed copper RFID microchip into his ankle and registered his body as both "pet" and "owner" of himself in a remote database [4]. The microchip uses a transponder to receive and transmit radio waves using connective tissue to prevent the microchip from migrating inside the body [5]. After implantation, Kac placed his leg into a scanning apparatus, activated via a telerobotic finger. When scanned, the waves retrieve the programmed identification number using an integrated coil and capacitor. At the same time, the chip identifies, records, and logs the location of the chip wearer in a remote Chicago database. Generally used on animals, the chip remains inside the artist and readable by a scanning device.



Figure 1: Eduardo Kac implanting the RFID chip into his ankle. Eduardo Kac, *Time Capsule* (1997). RFID chip, transponder, database. © Eduardo Kac (<https://www.ekac.org/figs.html>)

Simultaneously, broadcasted live on television and the Web, *Time Capsule* utilizes the human body and artificial memory as reflections of time between temporal and eternal life. Interpretations of time play a significant role in the function of the artwork. Amongst the ornate exhibition space in Sao Paulo, Kac paired Museo Casa da Rosa's parquet floors and plaster ceiling with seven sepia-toned photographs showing Kac's ancestors in Poland at the beginning of the Second World War. Brought to Brazil by Kac's grandmother in 1939, these seven photographs hung across from a diptych containing an X-ray of his ankle and a screenshot of his implant's registration. Connecting *Time Capsule* to the artist's familial legacy, these photographs reflect the various impacts of transplantation and migration on history and contemporary culture

1.2. Prosthetic Memory: blurring organic and digital experience

Twenty-three years later, posthuman memory evolves with the use of neural networks. Presented at Ars Electronica 2020, M. Eifler's artwork, *Prosthetic Memory*, is an artificial supplementary memory system used to record and index the loss of organic memory. Like *Time Capsule*, *Prosthetic Memory* functions as the artist lives- gathering data on the material world of "events, experiences, thoughts and feelings" and storing them as immaterial constructions of binary code [6]. Termed an "alternative archive," the artwork depends on "assistive intelligence, computer vision, and machine learning" to systematically arrange memories archived "as paper paint, video, audio, sketchbook, and ink" [7]. Coalescing into three components: handmade paper journals, video documentation, and a custom machine learning algorithm, the result is a cohesive digital collage of the "real and virtual objects which make up [their] prosthetic memory" [8].



Figure 2: Gallery set up of *Prosthetic Memory*. M. Eifler, *Prosthetic Memory* (2020). Mixed Media, Artificial Intelligence. ©M. Eifler (<https://www.blinkpopshift.com/project-pages/prosthetic-memory>)

Prosthetic Memory generates a collaborative posthuman gestalt - a construction of senses based on multiple participants through digital networks. Translating personal memory into a shared encounter, the artwork manifests a new multipoint singular perspective. The visitors continuously shift and evolve the artist's original perspective into an endless multiplicity of their unique experiences. Participants enter the gallery and see a copy of a journal on a desk. Computer vision and AI project a corresponding video onto the desk as they turn the pages. Here, electronic prosthetics digitally align audience perspective with Eifler's internal frame of reference. The fused experience is a singular moment in which a person's internal memory intertwines externally with another person's present perspective. Combined, they create a new memory based on the present moment. As the audience turns the journal pages, Prosthetic Memory's interactive and personal interface forces us to reflect on the authenticity of digital experience and how the disembodied subjective sensation obscures authorship.

1.3. Together: creating and archiving posthuman memory

Both *Time Capsule* and *Prosthetic Memory* are functioning time capsules that archive and preserve the lives of the artists through the construction of the digital "self." Time capsules are typically a collection of objects representing a specific time period to future generations. In contemporary culture, they include the preservation of digitized memories. In the posthuman realm of new media art history, *Time Capsule* and *Prosthetic Memory* retain and collect information on specific

times and places but do so within a permeable structure that interacts and shifts in real-time with the outside world. In this way, posthuman memory dissolves the distinction between genres and broadens the possibilities within the sciences. Although distinct in their perspective mediums, BioArt and AI Art share in the cultivation of this organic process. *Prosthetic Memory* is an example of AI Art, which preserves subjective memory through objective expression. *Time Capsule* is a work of BioArt involved in preserving objective memory. In both *Time Capsule* and *Prosthetic Memory*, time is the categorical enclosure that binds the production of information into the memory of a single corporal source.

2. Corporality, migration and augmentation: posthuman memory in action

Over two decades, Kac's and Eifler's approaches to memory reflect a progressive migration between real and virtual identity. Delegating memory to technological augmentation reconnects human identity constructs to a more expanded external network [9]. Although the material states of their outputs and incomes vary, Kac and Eifler reignite a primitive drive towards tribalism by dissolving the self into a multifaceted network of telepresence. Combining digital memory and physical action, their use of prosthetics to translate biological time and sensation demonstrates a two-decade-long process of using corporal-mathematical transmission to self-realize posthumanist existence. *Time Capsule* and *Prosthetic Memory* articulate the anthropological impacts of this biological change using virtual transcendence to contextualize the variations in cultural and technological evolution that have sustained human survival for the past twenty-five years. These terms, corporeality, migration, and augmentation, describe the central issues that fuel innovation in telepresence, with Kac's and Eifler's prescient artworks buttressing the ends of a spectrum of innovation.

2.1. Corporality

In modern society, we see the advantages of digital prosthetics and memory as a fundamental attribute of our bodies [10]. The biological mind is forever connected to an artificial network. In 1985, feminist and posthumanist philosopher Donna Haraway challenged the traditional linearization between biology and machine in her "Cyborg Manifesto." Embracing combining the human body with technology, Haraway states, "The machine is us, our processes, an aspect of our embodiment" [11]. Haraway's cyborg theory was particularly significant in the discourse of digital technology, as it politicized and tore down categories of human, gender, and machine. Similarly, in Peter Steiner's 1993 New Yorker cartoon with the caption "On the Internet, nobody knows you are a dog", borders between private and public identity were shifting. There was a newfound feeling of anonymity on the Internet. As humanity became virtual, there was a growing sentiment surrounding disembodied corporeality and identity.

Only four years later, *Time Capsule* realized Steiner's cartoon and Haraway's posthuman philosophy. As Kac's body was physically augmented, it became a technical expression of a future integrating subject and object. The artist became a work of art mediated through his body, which coexists in a global wireless network. Conversely, in *Prosthetic Memory*, external technology enables Eifler's holistic embodiment. Here, artificial intelligence subsidizes a physical component of the human body. In both artworks, Kac and Eifler utilize extraction from the body as a method to digitally extend their presence. Between them,

they establish an art historical timeline that culturally situates a transforming presentation of corporeality with the ongoing utility of disembodiment. It is the same method coupled with different intentions.

Though the intentions are different, with *Time Capsule* seeking to expand and *Prosthetic Memory* to contain, their use of interactive networks instantly converts individual time-bound organic memory into perennial external digitized storage. These digital records move freely and augment in real time depending on the interactions the memories encounter with other networks and user experiences. This transcoded information is in contrast to the traditional structure of history. Memory moves from the isolated perspective of one person's biological experience; instead, it moves in sync with a global hive of responses that alter its interpretation state. It can be uploaded and downloaded, replicated, and edited without the consciousness that initially created it.

2.2. Migration

While our species becomes more intertwined by technology, the breadth of the Internet expands our presence amongst a collective consciousness and acknowledges the prospect of migration. Through *Prosthetic Memory* and *Time Capsule*, we can see how the topic of technological symbiosis has shifted from fear of confinement to emancipation. While networks deconstruct aspects of human autonomy due to our dependence on the Internet, they also open migration

pathways. As we move from the analog to the virtual, cultural perspectives between digital growth's positive and negative impacts rely on the individual's self-perception regarding telepresence. Embodying human culture's collective realization of its ubiquitous interconnectivity, *Time Capsule* and *Prosthetic Memory* present a lucrative alternative to technological subjection. In both, connectivity places the individual within an expansive global community. Here, the dissolved self has unlimited potential to grow, shift, and connect with other human beings.

Time Capsule is a cultural precursor to the occupation of the present-day constellation of wireless communication and memory. The concept of technological bondage draws from the potential vulnerability interconnectivity brings to the conservation of individuality. However, the current survival of our species depends on digital networking and telepresence. As seen in *Prosthetic Memory*, modern developments over the past thirty years have revealed connectivity as a liberation of the mind from the limitations of physical presence [12]. Periods in human history, such as the COVID-19 pandemic, have shown the power of telepresence in adapting the social structures necessary for a thriving global environment [13]. As telecommunications create new standards of presence, instantaneous transfer of information enables every facet of modern society, from food supply to political change. The consequences of this global technological network enable virtual social movements, such as Black Lives Matter and #MeToo, to manifest into physical action. During the COVID-19 pandemic, the Internet enabled digital migration to retain global social and economic stability through mandatory social distancing procedures. Vital attributes of society, including education, retail, culture, organized religion, entertainment, and interpersonal relationships, depended on network connectivity for non-physical interaction. Reflected in a recent Pew Research study, 87% of adults in the U.S.A. confirmed the vitality of digital interaction in modern society by saying the Internet has

been essential for them during the pandemic [14]. The pandemic demonstrated how virtual presence supports biological sustainability by strengthening a global medical infrastructure to include virtual consultations and access to life-saving medicine [15]. Within the scope of these examples, we see the range of tension telepresence places on humanity.

In this way, *Time Capsule* and *Prosthetic Memory* are crucial placeholders in the possibilities virtuality present in the transition to a posthumanist state. Between the material and the immaterial, infinite variations in mobility augment the human need for bodily presence. In both Kac and M. Eifler, the implications of that transition manifest in different ways as the bodies' external existence hinges on both the theoretical and unnecessary, while the other is dependent. The consequence of this spectrum of impact is a revaluation of the role of the human body and its transition into a critical battleground on the topic of immateriality. Here, our species either resists or accepts the augmentation of biological and cultural selves.

2.3. Augmentation

The fluid and ambiguous networks of nature inspire digitization. *Time Capsule's* digital augmentation of the human body places organic corporeality at the edge of the cyberculture frontier. In 1997, it presupposed a new type of human migration and presented a preface for the ongoing conversation on the impacts of a permeable identity. Disembodied presence lacks the boundaries of the corporeal body and supports an amalgamation of lifeforms constantly augmenting themselves in favour of a common goal. Posthumanism dematerializes our species through digitization into a new amalgamation within a pre-existing biological structure. As the RFID chip inscribed itself into modern technological circuits, Kac observed "a sense of ever-faster cycles of technological invention; there was a notion that social patterns and the self would be re-invented" [16]. Rather than breaking humanity from the confines of physical existence, this idea

postulates that the species changes in place of being liberated [17]. Both liberation and augmentation circulate the idea that digitalization removes the person from the body and dissolves it into a more extensive network of combined experiences.

Eifler performs the opposite. In *Prosthetic Memory*, the physical implications of augmentation are demonstrated by using AI to supplement their biological memory. It is the use of technology as a prosthetic to extend the self into a disembodied state to reconfigure it back into the self. *Prosthetic Memory's* use of material objects to transform ephemeral experiences into recoverable data demonstrates the multi-directional fluidity of networks. These networks reveal the scope and power of posthuman augmentation. Anything, including people themselves, can be broken down and reconstructed in various forms and places.

In both artworks, augmentation represents the movement of entities and objects between the infinite states of telepresence. Kac and M. Eifler use of memory to demonstrate digital augmentation is poignant in its ability to showcase the conversion of a subject's internal and external state of being. In their networks, two states of being are transparent to one another as memory exists within and without the physical body. In *Time Capsule*, memory augments from an internalized phenomenon into an external digital reconstruction. In contrast, *Prosthetic Memory* augments external experiences into fresh internal ones through a blurred exchange of subjective experience between

individuals and the world around them. Both artworks demonstrate the power of network fluidity to transform an individualized physical being into an immaterial collective entity. Through art, Kac and M. Eifler have shown the evolution and existence of our species in the multitudes of its current reconstructed forms and the growing changes in the machines that facilitate these transitions.

Disembodied digital memory is also changing our relationship with tools. The range of augmentation in *Time Capsule* and *Prosthetic Memory* reveals potential changes in the concept and function of anthropology. Blurring the distinctions between tools and the people who use them, Kac and M. Eifler's use of the medium challenges traditional notions of objecthood. While both artists use modern tools to realize their work, their work augments the nature of the tools used as the artwork progresses. In effect, the augmentation is reciprocal between the artist and the technology used. The information it collects mutates the medium through parametric information from our behaviour, preferences, social relationships, and biometrics. Social psychologist Shoshana Zuboff describes this phenomenon as a culture inherently tied to surveillance capitalism, in which technology feeds off our data for growth [18]. The convergence of advanced technologies, such as artificial intelligence, geared to collecting individually or collectively generated data points to an augmented future in which cyborg characteristics, such as a prosthetic memory, are becoming an everyday function of natural survival [19].

While the technology was on the cusp of discovery and utilization, Eduardo Kac demonstrated the larger cultural implications of telepresence on concepts of autonomy, migration, and physicality. By 2020, *Prosthetic Memory* stood at the far-reaching consequences of the burgeoning cultural landscape introduced by *Time Capsule*. Through artificial intelligence and art, M. Eifler proposes a new frontier of subjective flexibility within the possibilities of digital transcendence. Building off twenty years of technological and social change, *Prosthetic Memory* advances Kac's 1997 precedent by surpassing individualized virtual transcendence into an expanded multi-perceptual digital experience. It is a new type of virtual mobility that extends and binds to other individual participants through networks. The result is a

unitary, non-corporal ephemeral experience powered by the migration of subjective experience through digital networking. The two artworks' differences challenge the notion of a purely utilitarian function of the global Internet and force us to consider permanent social changes to our species realistically.

3. Conclusion

Time Capsule's materialization of memory and the temporality of *Prosthetic Memory's* amnesia centres posthumanism within a debate bound by the differences between destruction and preservation. The two artworks' differences outline two decades of post-humanist progression in telepresence. In *Time Capsule*, the physical durability of the material is at odds with the obsolescence of the body and technology. In *Prosthetic Memory*, the fragility of memory faces obsolescence. While Kac internalizes his prosthetic through his microchip, Eifler externalizes theirs through artificial intelligence. An external neural network mediates the storage and function of their internal memory. While each share several differences created by circumstance, availability of technology, and context, both artworks are theoretically forward-thinking. They consider future preservation a vital function of memory

storage.

Kac's and M. Eifler's memories demonstrate a gradual transition of material and natural structures into synthetic and ephemeral posthuman states. The effects of augmentation, migration, and corporeality on memory, the body, and technology in their artworks preludes the budding of the 1990s cyberculture into today's everyday reality. Contemporary technology surpasses biological limitations in favour of a customized augmented version of ourselves. Continuing life in a digital realm, *Time Capsule*, and *Prosthetic Memory* challenge the viewer to develop a new sense of morality centred around the potential migration of the posthuman body. From smartphones to artificially intelligent bionic eyes, devices and human tissue are forever coupled in a brave new world of scientific reality unimaginable by Charles Darwin. With each gesture, data point, or interaction, *Time Capsule's* chip, and *Prosthetic Memory's* neural network gain a small amount of sentience that transcends history and serves as small messages in a bottle, whose almost romantic titanism was probably never imagined by the artists themselves.

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Are you there? Mediating Distances in Wartime Through Sound Art

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Abstract

Are you there? is a sound intervention that took place in May 2022 in Aalborg's 1896 Fritz Koch Kiosk. Nine sound artists were invited to perform one-to-one audio pieces through an analogue phone. By re-activating a former phone kiosk, the project aimed to create a dedicated time and space for focused listening and connecting in a time of crisis. This paper argues that giving a platform to Ukrainian artists within Denmark had a symbolic value, as it made their voices physically present in Aalborg as a form of anti-war noise in the city, facilitating listening as a form of solidarity. As the artist and audience switched their roles of sender and receiver, they co-created a symbiotic 'sonic space' during the phone call, in which traditional boundaries between performer and public were broken. The project embraces ambiguity as a resource for interpretations, emphasizing the complex affective responses to war. The subjectivity of the listeners was a central mediator, as they interpreted the anti-war message and the noise sounds through a framework of past experiences and identity.

Keywords

Sound art, art intervention, noise, war

1. Introduction

On Thursday, February 24, 2022, the day of the Russian invasion of Ukraine, Sebastian Milewski called his Ukrainian friend in response to what had just happened. The call remained unanswered. A few days later, they spoke on the phone. Although today people connect over all sorts of media and platforms in moments of crisis, a phone call may be the most direct way to get in touch with someone. Across countries and contexts, people experience Russia's war in Ukraine in many different ways. One might feel both horrified by the violence as well as numbed by the information shared online – simultaneously, in other parts of Europe life goes on largely as before. Developed as a response to the contextual disconnect between the team members' geographical context in Aalborg, Denmark, and the reality of war in Ukraine, the project *Are you there?* facilitated a phone call between listeners in Denmark and sound artists geographically and emotionally near to the war.

On May 10th and 11th 2022, *Are you there?* (further referred to as *AYT*) created a sound intervention in the 1896 Fritz Koch Kiosk on Aalborg's Nytorv (see Figure 1). The project was presented during the MicroPOM Aalborg Transition Regimes, the sub-format of the international conference series POM – Politics of Machines, which aims at investigating the histories, theories and practices of machines and technologies in-between and beyond disciplines. *Are you there?* is a collaborative curatorial project by Sonia Milewska (PL), Marijn Bril (NL), Laura Palma (CO), Hanna Hrynkevich (BY), Hugo Sant'Ana (BR).

The project's title *Are you there?* refers to a common sentence in audio communication when people cannot visually establish the other person's presence. Paradoxically the phrase opens up a discussion on space in telecommunication, as the 'there' does not refer to a specific place but rather the common space shared on the phone call. By reactivating a former phone kiosk, *AYT* aimed to create a dedicated time and space for focussed listening and connecting in a time of crisis. The project

used a simple phone call as an abstract way to receive signals and experience distant ambiances in real time. Listeners picked up the analogue phone inside the kiosk and experienced a live and intimate one-to-one sonic connection.

The project included sound interventions by Piotr Madej (PL), Sebastian Milewski (PL), АЙКTRONER (UA), Anastasiya Voytyuk (UA), Ricardo Arias (CO), Sk.ein (BY), Aleksandra Słyż (PL), Camilo Cantor (CO), AETHER.mrct (UA), and Maskitol SAE (UA), who performed a musical composition to reflect on Russia's aggression against Ukraine and the experience of war in general. *AYT* aimed to encourage international audiences to pay attention to the war from a personal viewpoint and review the instability of our reality.

Phone calls mediate between people over geographic distances, and in the case of *AYT*, noise plays an important part in that mediation. In the current context of the war in Ukraine, geographic distances between Denmark and Ukraine also imply large contextual differences between the two people on the phone call. The research question zooms in on the case study by asking: how do a phone call and noise mediate geographic and contextual distances – specifically in relation to the Ukrainian war – between sound artists and participants in Denmark in the project *Are you there?*

As an integral part of the project, the team conducted interviews with the artists and the participants in the kiosk after the performances. These conversations focussed on noise, glitches, intimacy, distance, and the context of war. As the main source of the experiences and interpretations of the project, the interviews are the basis of the analysis of this paper.



Figure 1. *Are you There?* Intervention, Fritz Koch Kiosk Aalborg. Credits to Hanna Hrynkevich.

2. *Are you there?*

2.1. Political Context

It is important to discuss the current political situation in Eastern Europe, by highlighting the events in Ukraine over ten years ago. In 2013, Ukraine's Euromaidan protests and demonstrations resulted in the formation of a new government. Following these events, Russia invaded Crimea, triggering a war in Donbas that began in 2014 and ended with a large-scale Russian invasion on February 24, 2022. Due to a lack of infrastructure to promote their work during the conflict and their

commitment to aiding the Ukrainian army, Ukrainian artists perform special concerts and publish albums. Ukrainian sound artist Heinali played a fundraiser live set from a bomb shelter in Lviv. The performance *Live from Ukraine* is a “wartime statement on the subjectivity, vitality, and resilience of Ukrainian musical communities,” according to the Heinali’s website, to raise international support for the Ukrainian army and humanitarian efforts. In the first months of 2022, charity concerts and experimental music publications were released in support of Ukraine.

In order to show our support and increase the visibility of the Ukrainian sound art scene among international listeners in Denmark, we have provided the channel – the phone call – first of all to Ukrainian artists. Artists from Poland and Belarus were also invited from the Eastern Bloc to support their Ukrainian neighbours with performances.

The project *AYT* placed a strong emphasis on collaboration, as it envisaged a reflection on the situation in Ukraine by not only Ukrainian or Eastern European artists but also from another continent. One of the authors, who is of Colombian descent, invited South American artists to explore war experiences in other cultural contexts. The participation of Colombian artists is a result of an association with different questions about territory, distance, perception and interpretation of the conflict in Ukraine. One of the main drivers of such an association was to consider how people in a country that is approximately 10,762 kilometres away from Ukraine can interpret and perceive this specific conflict, and how a population that already lives through an internal war can relate to this crucial moment in history.

2.2. Extended description

Inside the old phone kiosk in Aalborg’s central square, an analogue yellow phone rings. A local participant enters the booth, whose windows are covered by yellow foil, and picks up the call. On the other side of the line, there’s a sound artist waiting. They start a live performance, transmitted through an analogue display connected to an internet connection. The concerts last between 3-5 minutes and involve the transmission of sound effects and noise and it requires the audience to actively assimilate meaning to them. After the performance is over, a conversation takes place. Artists and participants were interviewed about their experiences directly after the performance.

AYT was an artistic intervention designed as an experience between sound artists and people in the local context involved to encourage close personal engagement. A “contact zone” [1] was designed in the form of physical interactions with the telephone kiosk and the analogue device. The choice of the phone kiosk in the centre of Aalborg created a spatial setting (see Figure 2) and, together with the tactile interface of the telephone device, favoured embodiment and emotional response among local citizens. The symbolic value of the wired phone was preserved by re-enacting its internal workings in combination with a hidden mixed connection (wired+internet). It was based on a 2000s digital adaptation practice: to convert a wired connection into wireless with an internet modem run by a mobile SIM card. The team was able to establish a long-distance phone call, allowing people from different geolocations to connect internationally. A wireless signal could then be connected to any online computer with Skype installed, where sound artists from anywhere in the world could perform and express their messages.

Nine sound artists from Eastern Europe and Colombia were invited to participate in the *AYT* project with live performances or sound recordings. All of them performed works employing various techniques, including electronic sound experiments, electroacoustic compositions, performance on a self-constructed program, the technique of remixing and mixing analogue sound records, sound landscapes, real-time improvisations, and music that spoke about the history of sound experimentation in Eastern

Europe and Colombia, with the attempt to interpret, connect and understand from a different artistic background, the historical and cultural contexts that we are experiencing now.

During the sound intervention, the participant had the opportunity to listen and experience unique approaches that in the end, the authors were able to associate through topics or techniques. Artists used objects or symbolism from a specific context and culture. Piotr Madej (PL) played a sound composition on a blouse with original Ukrainian embroidery. Ricardo Arias (CO) created a mass of tones that gradually turned into a sort of communal lament using the Ukrainian folk song *Oy tam na gori*, and sounds of recent fights in the ongoing internal conflict in Colombia. АЙКТРОНЕР (UA) with Anastasiya Voytyuk (UA) mixed electronic drone textures with the sound and sequences of the bandura, a traditional Ukrainian instrument. The feelings of fear, uncertainty, and anxiety were explored in various works, such as the sound of no one answering a call-in war times was used by Sebastian Milewski (PL) in his performance; to Aleksandra Słyż (PL) using the sound of sirens to create a mood of fear for the listener inside the kiosk; to Sk.ein (BY) presenting samples captured by a friend in Kyiv after an air-raid warning in March 2022. Furthermore, artists used spoken words to communicate during war times, such as Maskitol SAE (UA) did in his sound recording sending an SOS message to the audience in the kiosk about the nuclear threat; to the media poetry group AETHER.mcr (UA) sending and receiving military commands using a system of codes and poetry to inform the audience about the situation in Ukraine; to Guerras Cruzadas or Crossed Wars by Camilo Cantor (CO) telling the stories and testimonies of Colombians in Ukraine and people in Colombian territory using cassette tapes with old cassette players and processing the sounds through analogue pedals.



Figure 2. *Are you There?* Intervention, Fritz Koch Kiosk Aalborg. Credits to Hanna Hrynkevich.

2.3. Theory and operation of the concept of noise

One of the central notions of *AYT* is noise. In the iconic communication model developed by Shannon noise is discussed as the difference between the signal sent and the one received. Shannon’s model describes five elements: (1) the ‘source’ of the message, (2) the ‘sender,’ which turns the message into a signal, (3) the ‘channel,’ which transmits the signal, (4) the ‘receiver,’ which changes the signal back to a message, and (5) the ‘destination,’ where the message ends up. In this model, noise is measured with the aim to be reduced. However, noise is part of the communication model and Shannon acknowledges that it can never be entirely eliminated [2]. Shannon’s model deals with signals rather than signifying, with information transmission rather than meaning [3]. As such, this paper operates a wider understanding of noise than proposed by Shannon.

In this paper, noise is understood as various – sometimes contradicting – functions and symbols. Noise can be "an aesthetic, technical, political and acoustic phenomenon" [4]. This paper distinguishes between technical noise, sonic noise, and metaphorical noise. These categories are not exhaustive and might overlook forms of noise outside of this project's scope. As Shannon discussed in his model, technical noise comprises transmission errors and technological restrictions leading to low-quality or glitchy signals. In *AYT*, this entailed for example transmission errors and audio spikes. Noise that is audible as sound is described as sonic noise. Parikka describes how in the history of sound recording, not only intended sound but also environmental sounds are captured. In addition, the sounds that devices make when being operated can be understood as sonic noise, such as "rhythms and sounds" of computer processes [5]. When picking up the phone in the kiosk, the participants heard white noise before the start of the performance, signalling that the device was working. Metaphorically, noise can be understood as a rupture in a system, intercepting signals in the case of surveillance or sending false messages in the example of spam. However, the metaphoric understanding of noise also has a transforming potential, as it can give space to alternative voices and it can critique existing power structures [6]. Throughout the paper, noise is addressed in its multiple meanings and used as a central notion to discuss the *AYT* project.

3. Discussion

In the discussion section, this paper returns to its research question: How does a phone call and noise mediate geographic and contextual distances during the Ukrainian war between sound artists and participants in Denmark in the project *Are you there?* This section builds on interviews with the artists and the listeners and reflections of the project's team members. First, this section approaches the concept of a 'sonic space', as both the physical enclosed space of the kiosk as well as the social audio space of the call that is shared by the artist and the participant. Secondly, the occurrence of noise in the phone call is discussed, and its potentialities for ambiguous interpretations is analysed. Thirdly, noise is approached on a macro-level, positioning the project as an anti-war message in the city of Aalborg.



Figure 3. *Are you There?* Intervention, Fritz Koch Kiosk Aalborg. Credits to Hanna Hrynkevich.

3.1. The construction of a 'sonic space'

In the context of a busy city square, *AYT* created an experience suited for a single person inside the kiosk. The phone call only allowed for one listener at a time – so the horn of the phone could be placed next to one's ear and mouth – to create a connection focussed on intimacy and deep listening (see Figure 3). It could appear paradoxical that only a few people could

experience an intervention that is situated in a busy public city square. The urban intervention was only visually present to an ordinary passer-by – through the yellow foil, the posters, and the presence of people in and around the kiosk. They might have registered that the project activated the kiosk, as some passers-by stopped for a moment and looked at what was going on but could not personally partake.

Both parties on the phone call – the artist and the participant – were physically present in different contexts, spaces, and geographical locations. The artists performed in the seclusion of their studios or apartments, i.e., in an entirely private environment, which undoubtedly influenced their response to the call. Music does not only render walls sensitive and less stable in the context of the artist's presence, but the performance is also personalized in certain ways, as the voice heard on the phone has a body [7]. Even though the recipient could only hear but did not see the artists' private quarters, the moderators could also see those spaces of the sound artist on the Skype call. As such, the private sphere of artists' apartments became temporarily public.

In contrast, the listener who attempted to establish closeness in a semi-private location of a telephone booth was located in a public square. In the cityscape of Aalborg, urban noise such as traffic, talking people, road construction, and 'natural' noises such as the seagulls and the golfing water create a backdrop of noise in the city. Originally, the phone kiosk served the purpose of sonically shutting off from the outside spaces. The kiosk constructs a 'sonic space,' to facilitate a private conversation in a public environment [8]. Although the participants were sonically shut off from their physical environment, they were visually still connected to the square, as they saw passers-by through the yellow film.

Next to their respective geographic places and spatial environments, the artists and participants shared 'space' on the phone call. Phone calls shorten the distance and give the appearance of listener presence [9]. Being in a deep awareness of each other's presence, both participating sides could perceive the power of calling via a phone, which affects how we perceive proximity and distance [10]. Talking about distance, a few participants said in the interviews that they felt a closeness or forgot about physical distance with the artists. Thus, we observed that some of the listeners temporarily forgot about the geographical distance as they were present in the common space of the phone call. The artists mentioned the mediation through distance, time, and culture. Some of the artists sensed the close presence of the participant; Mykhailo Zharzhailo recalls a "shared experience" during the second AETHER.mcr group's performance [11], probably because the listener had an important role in this event and contributed to the work. Zharzhailo's experience may refer to a shared 'space' rather than a feeling of presence in another (geographic) 'place', as the audio-only call did not give any indicators of the listeners' surroundings. Although a phone call mediates the geographic distance, it appears that this distance is not 'felt' within the experience. However, for Colombian artists placed in a location seven hours behind European time, that was the key factor that determined distance for them [12]. Their performances were scheduled in the afternoon in Denmark to be connected to them in the local morning time, which produced to the artists a feeling of being far from the listener and the exhibition in general.

Within *AYT*, some artists and listeners felt close to one another, as they shared presence in the sound 'space' on the phone, whilst geographically being far away. In addition, through subjective associations, the call also reminded listeners of other locations of their past memories, creating an imaginary and extra individual space in their experience. The participant in Camilo Cantor's performance had a powerful emotional flashback because the artist and the listener were both originally from Latin America. Remarkably, their conversation was in Spanish, which is the official language in Colombia and Peru.

The same language has defined the social-cultural context between two people who have never seen each other and had a stimulatory effect on further interaction [13]. Thus, all meanings that the author has put into the piece of art were encoded by the receiver. For the listener, the experience of connecting to someone closer to home while being abroad herself was very powerful. As such, the connections across geographic spaces are not purely linearly connecting two spaces, as in this case, the call reflected a complex understanding of place – oscillating affective associations between Denmark, Colombia, and Peru.

3.2. Noise as ambiguous interpretations

Noise mediated the experience of the artists and the participants in various ways. The glitches and errors occurred in the intervention specifically in two ways: the artist-intentioned noise sounds used in compositions and the signal errors in transmission and technological glitches in the phone device. The sound artists Milewski and Madej adapted their performance a priori, choosing sounds that could be well transferred by the technology to avoid any kind of additional glitches or loss of signal [14] [15]. Some artists actually used distorted sounds and intentional glitches as an artistic strategy in their performances. For example, Maskitol SAE recorded a part of the track using genuine radioactive material produced in a nuclear reactor, using a special tool to deconstruct the soundscape. The listeners inside the phone call heard white noise on the phone before the start of the performance and experienced a reduced audio spectrum during the performance. For some performances, this resulted in loud spikes, so that the participants in the kiosk moved the horn away from their ear for a moment. Other participants noted how the low-fi quality rendered the transmission realistic [16], as it underlines the material properties of the phone. Similarly, Cantor mentioned that the analogue device added a special ‘texture’ to the sound, facilitating another form of listening [17]. Initially, the team wondered whether the technical noise would repeal the listeners, resulting in disengagement. The interviews suggest that the technical noise in the channel added to the experience, emphasizing the instability of analogue phone calls and the uncertainty of calls amidst conflict.

The aspect of noise fostered ambiguity of information [18], which created an interpretative space in the information transfer. This was mentioned by one of the listeners in the interview: “It felt like we were missing part of the message, but in a way, it works with the concept because it feels like you want to get to something, get to someone, but you’re not quite reaching them, not quite getting the whole thing” [19]. The ambiguous messages in *AYT* raise questions such as: Does the receiver understand the message as it is intended by the sound artist? How does one understand the noise? How does the tension between specificity and abstraction play out? How does one fill in the blanks? From a post-structuralist perspective, it could be argued that the intention of the sender and the interpretation of the receiver are always distorted. Derrida believed that signification is produced by the receiver, not the sender. Signs can signify a multitude of things, in different situations, in different moments in time. Communicating means constantly negotiating semantic ambiguity – as it can not be completely eradicated [20]. Within the experience, the participants were both senders and receivers, as they were on a direct phone call with the artists. There were various ways for the participants to find out more about the messages of the artists. The listener could read a description text of the piece they were listening to, and they could also simply ask the artist to elaborate on their compositions. These handles supported the listeners in navigating the ambiguity of the signals, and as such, challenged them to become active participants in meaning-making.

Most of the listeners connected the abstract noises in the project to the topic of war, due to very clear sounds, such as sirens, news reports and also due to their conversations with the artist. Some recalled the traumatic memory of potential nuclear

danger, some elaborated on the desensitizing effects of these sounds, the feeling of sadness and empathy when thinking about the people in the war context, curiosity about the artist’s backgrounds in relation to the topic and an increasing sensation of proximity to the topic of the Ukrainian war. For some participants, the war sounds in the art message were traumatic and pretty obvious [21]. Meanwhile, other listeners only understood the political message from the conversation with the artist, not necessarily from the sound artwork itself [22]. Some international persons among the participants had already experienced the brutal fact of the war back in their home countries. Having this knowledge in the past, they understood the military message without any effort. Those participants who were already familiar with war and conflict became involved [23] and relived it again [24]. Noise meant different things for different listeners, who experienced the noise through the subjective lens of their personal memories, experiences, and associations. Although too much ambiguity might dilute the message too much, a certain level of ambiguity allowed for creating a space for reflection and personal interpretations. The majority of the audience connected the noise to the theme of war and audiences navigated abstraction and specificity through their subjective frameworks.

3.3. Noise as an anti-war message

Making noise is a purposeful act of anti-systemic opposition, especially in times of war. The artists then send anti-war messages by means of their sound artworks. Some artists disclosed the messages in a discussion after the performance. For example, Milewski explained to the listener that the sound of a telephone signal in his composition symbolized the day when the war in Ukraine started. On the other hand, there is a track by Maskitol SAE, whose message was a clear appeal for help but distorted by radioactive material noises. As an unwanted, irritating element inserted into the system, noise draws attention to itself – artists use this to draw attention to the war. Ricardo Arias’s track created a communal lament between the conflict situation shared between Colombia and Ukraine as a sonic protest with the sounds of war that resound loudly every day. They demonstrate through their art that something is not working, as a protest that aims to provoke a reaction. These protests were voiced in different ways by the artists in their sound pieces.

In the *AYT* intervention’s performances, the theme of war was addressed in various ways, both directly and indirectly. During the intervention, the most direct communication was provided by Maskitol SAE, who utilized a recording of his voice to deliver direct information about Russia’s war on Ukraine, the nuclear threat posed by the conflict, with a request for help. The AETHER.mcr group also included spoken references to the conflict, both in terms of background sounds and the performer’s poetic narration. These performances specifically pointed to the war in Ukraine, as did the composition by Ricardo Arias, in which he mixed a Ukrainian folk song. Another way to make a comment in compositions was to use sounds directly associated with war – alarm sirens were used by Maskitol SAE, Sk.ein, Słyż, AETHER.mcr group, and Cantor. These sounds, which were universally interpreted as a threat and also referred to as war sounds, could be interpreted as not only relating to the conflict on Ukraine territory but also to the conflict in Colombia in the case of Camilo’s work. The artists allowed more room for interpretation in these circumstances, and the source of the sirens’ recordings is only revealed in the performance description. Others picked more subtle and indirect statements: Madej spoke about Ukraine, but more about the culture that should be preserved, while Milewski alluded to people and acquaintances that he was concerned about and attempted to contact.

The curatorial group attempted to investigate the awareness of people in Denmark about the ongoing war in Ukraine,

emphasizing the closeness of real danger. Even a direct design of the official poster with a hand that was breaking the kiosk window with a handset accentuated a radical message of the art intervention. There is no doubt that today when people have armed conflict worldwide, “presence globalizes global war again” [25]. While the topic of the war became a leading issue for the artists to make a piece of art, the participants listened to and interacted with this message to decode it. As such, the process of interpretation of the artwork was very important. From a metaphorical point of view, the intervention itself can be seen as a form of noise in the square in Aalborg, in which the performances represented an anti-war message.

4. Conclusion

Are you there? re-enacts the former function of a phone kiosk in Aalborg, exploring the restrictions of landline calling as possibilities for creating intimacy and sustained focus. The phone call created a combination of one-way transmission and two-way communication, breaking traditional boundaries between the performer and the public. During the experience, some of the artists and participants noted a feeling of closeness to each other as they were present in the sound ‘space’ of the phone call, despite being geographically at a great distance. There was also an instance in which a participant was reminded of a third location, through the memories that the call induced. The artists intentionally used glitches and errors in the construction of their sound pieces, whilst noting that transmission noise emphasized the realism of the transmission and the war theme in their performance. For the participants, the technical noise in the channel emphasized the instability and uncertainty of phone calls amidst conflict. They understood the noise through their respective subjective lenses, mediated by their memories, experiences, and associations. Especially participants who personally experienced war felt the performances activated their memories. From a metaphorical point of view, the intervention itself can be seen as a form of noise, in which the performances represented an anti-war message.

How do a phone call and noise mediate geographic and contextual distances – specifically in relation to the Ukrainian war – between sound artists and listeners in Denmark in the project *Are you there?* The curators gave a platform to Eastern European and Colombian sound artists to make their voices physically present in Aalborg, Denmark, as a form of anti-war noise in the city, facilitating listening as a form of solidarity. The phone call became a shared sonic space in which sound artists and listeners felt present. The project created a space of ambiguity, in which the abstract character of sound art and the performances allowed the listeners to interpret the noise through their subjective frameworks, reflecting and relating to the war messages ranging from abstract to more specific meanings. As the affective responses to war differ per person and are complex, the project embraces ambiguity as a resource for interpretations.

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Co-Creation with AI in Cambrian Games

Human Transformation in Media Art

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Abstract

We examine the history of relationships between humans and technology to reveal that technology has created boundaries between creators and users such that technology's pressure for efficiency has caused a separation of the field of engineering which has suppressed creative activities from the field of art which has resisted the suppression. We point out that given the rapid advance in Artificial Intelligence (AI) combined with the separation of creators and users, a likely scenario is that human creators will be pushed to extinction and we may all become consumers of products created by AI. The Cambrian Game[1] is a media art based on Japanese traditional "Renga (linked poem)" in which a limited number of players connect images with each other to create a large network of linked images. We have observed that players find more interest in unexpected connections between images. We analyzed the experience of a group of students who participated in a Cambrian Game session in which they used AI tools to generate new images in addition to photos. We found that participants observed more interesting connections when the AI generated images that they had not expected. Furthermore, such unexpected connections between images when using AI gave them some interesting discoveries. Some students mentioned that they discovered some new potentials in the world such as expanding their views of the world, or finding new meanings in images. We interpret these findings as a deepened consciousness required when trying to connect unexpected images. We present a model of collaborative dialogue in which as multiple people exchange their views of the world through images, their views will circulate among them to create a view of the world they can share. Also, some students mentioned that they discovered some value in creating new expressions such as interests in the creative process itself, or interests in how other members created images. For example, one student mentioned that he realized that he had viewed the world through a limited perspective, which he could expand while connecting unexpected images. Based on these observations, we propose three conditions for avoiding a world without creative activities. First, we do not create boundaries between creators and users. Second, we do not create boundaries between experts and beginners. Third, we are open to transforming ourselves through collaborative creation. The first and second conditions were achieved in the Cambrian Game. We suggest that to achieve the third condition we need to treat technology, including AI, as collaborative partners, not as convenient tools that someone creates and we can just use.

Keywords

Media Art, Transformation, Technology, Creativity, Collaborative partnership

1. Boundary between creators and users, and separation of engineering and art

Media art uses computers as a tool in its creative activities. In this paper, we would like to discuss the relationship between media art and Artificial Intelligence (AI). We begin by examining the relation between tools and creative activities in general in the history of tools. A tool is usually first created by the person who wants to use it. A person involved in a creative activity tries to create a new tool in order to improve the products or to make the creative process more efficient. We would like to call this kind of tool created by its user a "First-person tool". First-person tools give the creator/user the learning and joy of creating because the creator/user of a new tool discovers new possibilities in using it leading to further improvements, creating an endless cycle of challenge and curiosity. "Second-person tools", defined as tools that are created for a specific user(s), such as family, friends, or members of a community, have the potential to enhance the learning and joy of creating for both the creator and user(s) because they tend to develop constructive relationships through direct communication.

In contrast, a "Third-person tool", defined as a tool created for many and unspecified number of users, often suppresses the learning and joy from its users. Especially, if a tool is used to create something to achieve a purpose, its designer tends to design the tool by eliminating small creative activities so as to maximize the efficiency of achieving the purpose. For example, designers of woodcraft tools have created many electric tools that replaced hand tools like saws, planers, and chisels, which used to give us learning and joy in the creative processes of using hand tools, in return for faster and easier processing of wood. Similarly, air conditioning systems have replaced creative learning in working with wood and making a fire in wood stoves with efficient control of temperature. Microwaves, frozen foods, and automatic cookers have replaced the joy of cooking with quick and easy foods. Users of these tools can just consume without learning by trial and error. Creating and using are separated and the cycle of "creating", "using" and "learning" stops.

On the other hand, if a tool is used to create something that has no outside purpose, the process of creating can have more value than the product of creation and the creative process becomes the purpose of using the tool, as in playing music or sports. In such cases, the creative process is not replaced by more efficient processes. This may be the process in which the field called "art" has taken shape separating itself from the field of

“engineering”, preserving creative activities despite pressure for efficiency. With this understanding of “engineering” as having suppressed creative activities because of the pressure for efficiency and “art” as having resisted it, we would like to explore new possibilities of collaboration between the two.

2. How computers changed art

How has the recent rise of computers influenced creative activities? Papert[2] predicted that computers would open up opportunities for everyone to learn through creative activities and developed the LOGO language to promote education based on constructionism. His student Resnick developed the Scratch programming environment which has enabled millions of people to engage in creative activities with computers. However, most computers of today are designed as tools for consumers and are no longer tools for creation for most people.

What happened in the area of art with the development of computers in the area of engineering? Masao Kohmura (the teacher of one of the authors) used a plotter to draw his innovative artworks reprinted on silkscreen. In the next generation, Kazufumi Oizumi[3] created a drawing machine declaring that he would let the machine do the drawing for him. The recent rapid advance of AI has certainly accelerated the replacement of human creativity with technology, producing “drawings without a body” at super speed. One might say that the computer's involvement in creative acts accelerated the “death of the author” (Barthes). However, the most significant influence of the computer on art has been its ability to make an unlimited number of perfect copies. For example, in music, before computers, even with printed copies of a composed piece, each performance needed to be created anew. After a period of copies of performances in the form of records, the computer brought a breakthrough in the accuracy and efficiency of copying, and millions of copies of each digital recording are played on the internet. Platforms like YouTube may seem to enable everyone to become a creator, free competition creates disparity and in actuality for most people music has become something to be consumed and the diversity of music has been rapidly lost.

What will happen if AI is involved in the creative process in this kind of situation where creators and users are separated? The most likely scenario will be that most human creators will be defeated by AI creators in the free competition, and will become a “useless class” who can only consume what AI creates as Harari[4] warned. It seems unavoidable that the disparity between a small number of creators and a consuming majority will only expand. Will human art, which has so far resisted the suppression of creativity by engineering's involvement in the act of creation, be at last cornered into extinction by engineering?

3. Using AI in Cambrian Games

The “Cambrian Game” by Toshiro Anzai and Rieko Nakamura shows one possibility to answer this question. (Figure 1) This is a multiplayer online artwork inspired by an old Japanese Renga (連歌, linked poem), in which multiple participants connect images associated with a single image to generate a collective story as a giant tree of connected images. One of the characteristics of Cambrian Games is that the participants are not only the users (viewers) of the artworks but also the creators. By eliminating the boundary between the

creator and the viewer, Cambrian Games offer a mechanism for restoring diversity in creation. Since it is played by a small group of less than several dozen people, it may be considered a “second-person tool” that involves human relationships. The Cambrian Games started in 2003 and have been held every year from the end of the year to the beginning of the next year, with this season marking its 20th year.

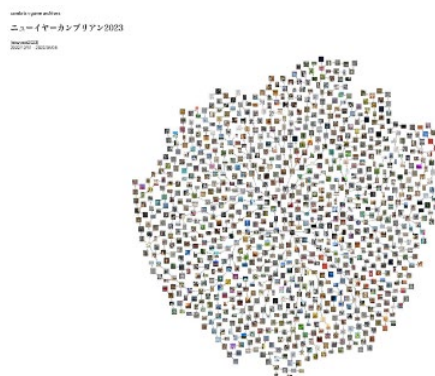


Figure 1: Cambrian Game

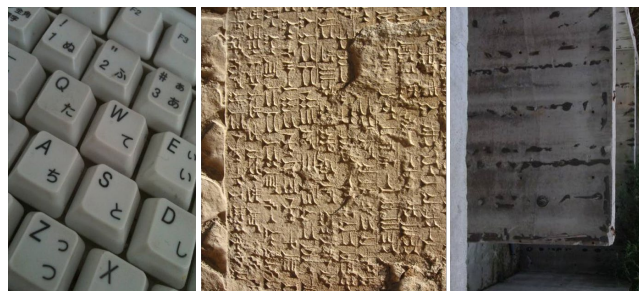


Figure 2: An example sequence of images in a Cambrian Game session.

In the example shown in Figure 2, an image of the cuneiform inscription in the British Museum (centre) was connected to the first image of a computer keyboard (left), to which a photo of stains on a concrete wall was connected (right). When connected in this way, the wall stains look like sentences.

Initially, the images submitted to Cambrian Games were mainly drawings. Later, with the spread of digital cameras and camera-equipped cell phones, the style changed to which photos linked together. Until 2022, the submitted images had to be photos taken by the participants themselves, but in 2023 the rules of the game have changed, and for the first time, the use of images generated by artificial intelligence is allowed. By reviewing and analysing this practice, we would like to clarify what happened when AI was involved in the cycle of “create,” “use,” and “know,” which was created by eliminating the boundary between the creator and the viewer described above.



Figure 3: An example sequence of images in a Cambrian Game session with AI.

By including AI generated images, we could expand our imaginations. Figure 3 shows an example sequence of images in this session: from the left to right, J.S. Bach composing in a space odyssey; Bats flying out from Bach's ear; a sound engineer recording in Bach's ear; an embodiment of a counterpoint; a three-voice fugue; a pipe organ in a church. All images were generated by AI except the last one.

Also, the use of AI has shed some light on the process by which we have been connecting photos. To explain the process of connecting photos in more detail, the following two methods were the main operations in the previous photo-connecting games.

1. Selecting effective photos from your own stock of photos to connect.
(Actually, there are two cases: one is to find a photo from one's own stock of photos to connect to a specific photo in the game, and the other is to find a photo from among multiple photos in the game to connect to a specific photo one has.)
2. Finding and photographing connected scenery in daily life
When using AI-generated images, the following operation becomes possible.
3. Let AI generate effective images for connecting.

4. Analyses of reflections by students who experienced Cambrian Game with AI

In a class of Waseda School of Design for Culture in which Rieko Nakamura was in charge, a similar 2-week session using generative AI was held. In this section, we present some analyses of the reflections by the participating students.

4.1. Unexpected connections with images generated by AI.

10 out of 42 students mentioned the "unexpected connections" as interesting in their reflections:

The more unexpected the connections to my own images were, the more interesting I found them.

When generating images with AI, (omitted) there was an interesting aspect because it was unexpected.

One of the authors, Tomohiro Ueshiba, participated in the session mentioned above and had a similar impression that it was very interesting when the AI output images exceeded the scope of his own imagination. This can be said to be a characteristic of Cambrian games, in which the intervention of others leads to discoveries beyond one's own intentions. The use of AI has made it possible to create such unexpectedness in the participants' own creative work without the intervention of others. They tended to find the unexpectedness of connection especially in the AI-generated images.

In the past sessions of Cambrian Games, the following two types of connecting images were observed:

- A. Intentionally conceiving the next picture.
- B. Reading meaning from unintentionally arranged images.

When a player tries to work with type A and first creates a prompt, gives it to the AI to generate an image, but the result is often not as intended and after some trials the player often switches to type B, trying to find meaning in the given images.

This gives the player an opportunity to see the world from different perspective.

The following is an example of reflection by a student who discovered a new perspective.

I was inspired by a certain image and wanted to create an image of "a person in pain due to a sprained neck," so I entered a prompt such as "sprained neck, pain," and the AI generated an image of a dog in pain. However, I had assumed that the AI would generate an image of a human being, since only a human being would unconsciously get a pain in the neck from sleeping wrongly. Contrary to my expectation, AI produced an image of a dog with a sore neck, and that was the first time I realized that I had an assumption that only humans have a sore neck.

The image of a "dog lying on the wrong side of the bed" does not come from type A. It can be said that there is a limit to what humans intend.

One student described his experience of using AI as the following.

AI image generation can strip an image of its intent. If you intend to produce a certain image, you will get something completely different. AI does not do what you want it to do. In other words, you can go outside of your own thoughts. In this sense, I thought that the use of AI image generation would be a key to open the door to venture outside of the real world, encouraging a leap in thinking that is not bound by stereotypes and stereotypical ideas.

An interesting point of using AI is that it does not give us an interesting image by sheer coincidence, but rather by subtle deviations from what is expected. AI goes beyond our limit and generates an image that is slightly outside the boundary of human imagination. In this way, the generative AI functions not as an intentional drawing device, but as a device to give extension by accidental emergence. And what is more interesting is, as this student stated in the latter half of his reflection, that he was aware of his own internal limitations and was able to expand his possible world outward from there. In the following sections, we analyze what the students discovered when they went beyond their boundaries.

4.2. Discovering potential of the world through deepening of consciousness.

The students' discoveries mentioned in their reflections could be categorized into two basic types:

- One type mentioned that they discovered some new potentials in the world such as expanding their views of the world or finding new meanings in images.
- Another type mentioned that they discovered some value in creating new expressions such as interests in the creative process itself, or interests in how other members created images. We will show some concrete examples in the following.

We found some interesting conceptualizations of the first type. For example, here are some excerpts from their reflections who discovered new potential in the world

- I felt the potential of AI in its ability to show me the world that I never knew existed.

- I discovered unlimited possibilities in my photographs that I don't even remember why I took.
- It transformed images that I felt were meaningless into something with very significant meaning.
- Images that I did not intend to be very interesting got more interesting reactions from the other members than the ones that I expected to be popular.

These reflections can be understood as the boundary of their consciousness became deeper. Each triangle in Figure 4 represents the understanding of an image by a person, from conscious level at the top to unconscious level toward the bottom. In our daily lives we need to process most images at a relatively shallow conscious level and don't need deeper understanding.

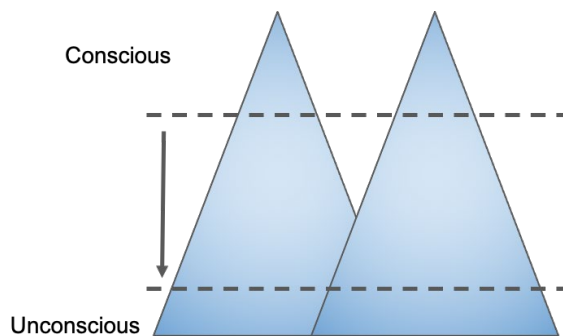


Figure 4. Deepening of consciousness through connecting images

However, when you try to find some relationship between two images in a Cambrian Game, you need to deepen your level of consciousness so that the two triangles overlap. The greater the difference between two images, the deeper you need to expand your conscious boundary to find connection between them.

4.3. Viewing the world at a deeper conscious level

Such deepening of consciousness in connecting images seems to have changed how they view the world in their daily lives. (Figure 5) Here are excerpts from one student's reflection.

- It changed the way I view the world in my daily lives. For example, I found an interesting pattern of the surface texture of a plant leaf I had never taken notice of.
- Also, I was amazed by the shape of a clothespin.
- I had understood the world through my shallow consciousness. My experience of working with AI expanded my consciousness to view the world in finer details.

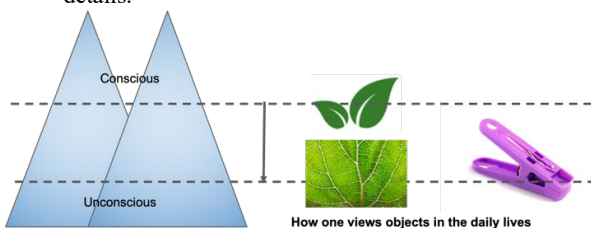


Figure 5. Viewing daily objects in finer details through deepening of consciousness.

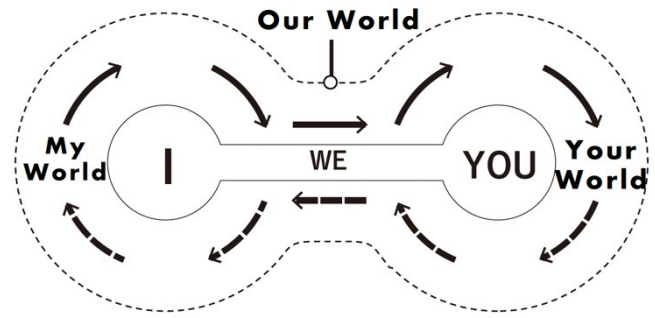


Figure 6. A model of creative dialogue.

What makes such deepening of consciousness possible? In our model of creating artworks through dialogue (Figure 7), based on models by Yokomizo [5] and by Saeki [6], "I" and "You" exchange expressions of "My World" and "Your World", which circulate between the two, to collaboratively construct a new meaning in "Our World" that We can share. Applying this model to the Cambrian Game, the green circle in the centre represents the system. The white circles represent the players who contribute images through the system. (Figure 7-upper) Through the dialogue of image exchange between the players, each player's "They World" will expand but does not exceed the limit of human imagination. When AI was incorporated into the game, each player had the option to use AI to generate a new image, (Figure 7-lower) allowing each player to expand the "They World" beyond the limit of human imagination. This can lead to the deepening of consciousness discussed above.

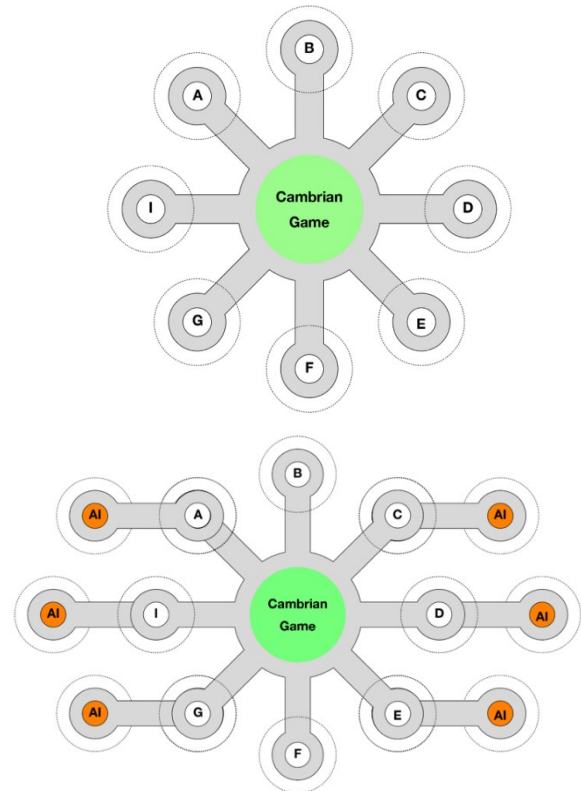


Figure 7. Understanding the Cambrian Game with the model of creative dialogue in Figure 6.

4.4. Finding potentials of the world

Miyata and Suzuki [7] pointed out that in modern society, the relationship between people who make tools and people who use them has been lost, resulting in a narrowing of the "vision of creative acts" due to the inability to recognize the social significance of small everyday creative acts (e.g., making first-person or second-person tools), and proposed an extended CBAA model. (Figure 8) The upper half is "Creative Behavior as Agentic Action (CBAA) model" developed by Karwowski[8] in his book "Creative Self" in 2017. It postulates that important factors necessary for a creative behaviour are "Creative Confidence" such as "I am creative!", and "Perceived Value of Creativity" such as "My creativity is important". The bottom half of the model is our "Extended model" in which we proposed two additional factors: "Perceived Value of World Change" such as "I can make the world better" and "Perceived World Potential" such as "World can change". According to this model, when one can recognize a possibility of transforming the world through one's own actions, by recognizing the broader meaning of one's creative acts (e.g., making things we use daily by hand thereby reducing resource consumption and waste instead of consuming mass-produced goods) and expanding one's "vision of creative acts," it becomes possible to realize such creative acts.

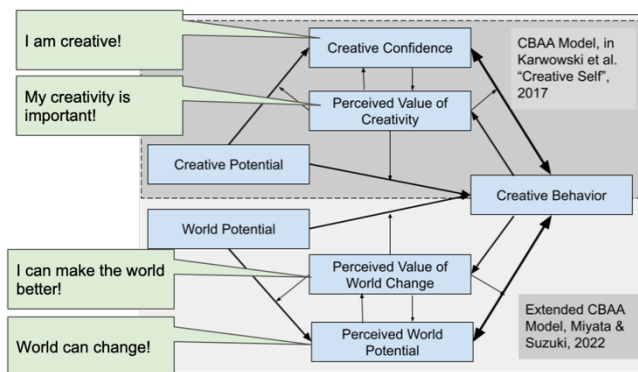


Figure 8. Extended CBAA model

Many instances of "Perceived World Potential" were found in the students' reflections. There was only one instance that could be categorized as "Creative Confidence".

- Creative Confidence:
 - *Creativity hidden inside me opened up.*
- Perceived Value of World Change:
 - *I felt happy when someone linked an image to mine because I was able to contribute.*
- Perceived World Potential:
 - *Experience of working with AI expanded my consciousness beyond my pre-conceptions and I could view the world in finer details.*
 - *I realized the unlimited possibilities in my photographs.*
 - *AI can expand the possibilities of art by showing images that we never knew.*

These reflections illustrated that the introduction of AI into the Cambrian Game has expanded the "vision of creative action" of each participant, which has led to the recognition of the "possibility of transformation of the world" that had not been

recognized before and has facilitated the circulation of creative action.

5. Conclusion: How Can Engineering and Art Collaborate to Shape Our Future?

We began this paper by examining how engineering and art separated from each other in the way they used technology. Now we would like to conclude with a discussion on how engineering and art can collaborate so that they can enhance, rather than suppress, our creativity. Toshihiro Anzai[9] discusses the interaction between the engineering method **Me** and the artistic method **Ma**. (Figure 9) Here, "method" includes not only the physical systems but also mental systems like knowledge and skills. He compares the case where the two methods **Me** and **Ma** act on each other on one hand (3 and 4 in Figure 9), and the case where each method acts on the objects **Oe** and **Oa**, on the other hand. We suggest that the Cambrian game is the case where an engineering method **Me** acts on an artistic method **Ma**, thereby asking the question "what is art?" which can potentially change the paradigm of art. We have seen in the analysis of the players of the game that the experience of working with AI in the game could deepen their level of consciousness and open their mind's eye to see the world from different perspectives or in finer details in their daily lives. On the other hand, the automatic generation of artworks by image-generating AI may be the case where an engineering method **Me** acts on an artistic object **Oa** which allows human creators to bypass **Ma** in creating **Oa**, turning them into consumers and leading to the suppression of creativity mentioned above.

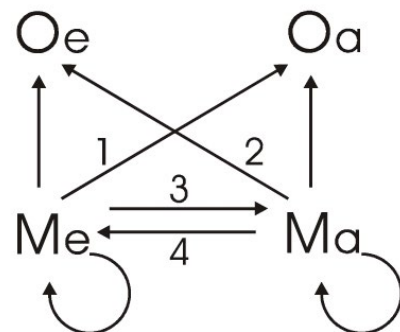


Figure 9. Symbiotic Paradigm System [9]

Will machine/AI eventually replace humans? Will we be just consuming artworks by AI authors? The Cambrian Game has demonstrated some conditions in which AI can help us to expand our world of creative activities:

We do not create boundaries between the author and the audience. This is achieved in the Cambrian Game in which every player is an author and an audience.

- We do not create boundaries between the beginner and the expert. This is achieved in the Cambrian Game in which the established method of art **Ma** is questioned and becomes something to be created anew.
- We treat AI as a collaborative partner, not as a servant. This is achieved in the Cambrian Game because the current image-generating AI cannot become a servant who can generate what we intend

them to generate. They are like an “unpredictable (often risky) partner” rather than a collaborative partner. It is up to us to find out how we can design them as a good collaborative partner rather than a good servant. This leads to the final point:

- We are open to transforming ourselves through collaborative creation.

We would like to conclude this paper by elaborating on the last point about the need for our openness for transforming ourselves. Through our experience with AI described in this paper we learned that we need to rethink the relationship between ourselves and our tools. We have been treating tools as something that we create and use. We already discussed that this division of “creating” and “using” has resulted in many boundaries between producers and consumers and between authors and audience, which tend to suppress our creativity and learning even before the rise of AI. In the early stage of AI, the engineers thought that they could create AI by teaching it. However, they decided that it was better to let AI learn instead of being taught by them. In other words, the engineers gave up the idea of creating AI: they realized that they could not be the creator because they could not explain what they were creating. However, the consumers who regard themselves as the users of what the engineers create, just try to use AI as a convenient tool, and follow Harari’s scenario we discussed in section 2 in which humans will become consumers of what AI creates in the world of no joy nor learning of creating.

If we wish to avoid such a scenario, we need to transform ourselves and instead of regarding AI as a new tool that someone creates and we can just use, we should treat AI as a partner of collaboration to learn from each other. This principle of “From tools to create/use to collaboration partners” can be applied to all aspects of our relationship with the world we live in. [10] We have already started to learn that we should regard the ecological system not as a tool we can use freely, but as a collaboration partner. Our experience with AI helps us to understand that this principle of “no boundary between creating and using” applies to all tools we create and use, not just AI. We have been treating it properly all along in producing our foods with fermenting and natural and organic farming. These areas may provide us with many useful resources that can help us transform the relationship between ourselves and the world we live in.

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Sonic Laboratories and the exhibition lab as a practice-based research methodology

Laura Netz

Abstract

Through my research, I have reviewed the laboratory definition, including the overview of different types of labs. In addition, I have extensively researched case studies of artists working in laboratories and current examples of sonic laboratories in the academic environment. All this investigation has given me a chance to understand how laboratories behave in society and how they build society, too. Moreover, I found that hegemony is central to my research as establishing a scientific view of the lab turns the lab into a scientific place.

Despite that, I can demonstrate there is a hybrid lab that represents a counter-hegemony. I have investigated creative methodologies in laboratories through practices such as Do It Yourself, workshops, curating, and archiving, which turn labs into creative places. This paper will present duality in laboratories centred on hegemony vs hybridity. Finally, to overcome some issues encountered through my research, I will explain a future outcome for the sonic laboratory based on the concept of the exhibition lab – a practice-based research methodology for curatorial practices.

Through this research, I have investigated the possibilities of sonic laboratories. Based on the literature review, case studies, and different lab methodologies' analysis, I have been exploring whether sonic laboratories could represent counter-hegemonic practices when studying laboratories. The research indicates that the possibilities of the sonic laboratories are creative and artistic in front of a dominant scientific laboratory. The research has worked on multiple definitions of the laboratory, and I will also overview and highlight concepts such as hegemony and counter-laboratory. This research follows an inquiry that intends to show the hierarchies and constructions of the lab as a hegemonic place.

The research considers the sonic laboratory as another typology of a lab that principally works with sound. I have investigated widely the notion of different labs: academic, industrial, scientific, or those labs ruled by artists, and I have documented on more than one occasion that hegemonic powers help identify and construct other hegemonic notions of labs through a view and perspective based on the technoscientific use of labs. But, contrary to the hegemonic lab, there are also counter-hegemonic practices. And counter-hegemony displaces laboratories and imaginaries of the Global North toward their everyday reinventions and appropriations taking place everywhere through activists, artists, communities, indigenous, anti-racists, and feminists' practices of resistance reshaping planetary and challenging colonialism and extractivism.

This research raises the question of hybrid labs as counter-hegemonic laboratories. But through the research, I have faced some limitations. While studying laboratories' limits and impositions, I have realized that a new approach to the laboratory concept through a more counter-hegemonic position is required. A counter-hegemonic view of the laboratory could include hybridity and a more practical approach through the idea of the exhibition lab. The exhibition lab is a practice-based

research methodology that will contribute to understanding the overview of the laboratory from a curatorial approach.

Keywords

exhibition, laboratory, science, curating, hybrid

1. What are the possibilities of sonic laboratories?

This research aims to identify the possibilities of the sonic laboratory. Based on the literature review, case studies, and different lab methodologies' analysis, I have been investigating whether sonic laboratories could represent counter-hegemonic practices when studying laboratories. The research indicates that the possibilities of the sonic laboratories are creative and artistic in front of a dominant scientific laboratory.

The research has worked on multiple definitions of the laboratory, and I also overview and highlight concepts such as hegemony and counter-laboratory. This research follows an inquiry that intends to show the hierarchies and constructions of the lab as a hegemonic place.

The research considers the concept of the laboratory to define and establish the sonic laboratory as another typology of a laboratory that entails principally working with sound. I have investigated widely the notion of different labs: academic, industrial, scientific, or those labs ruled by artists. Through the literature review, I have overviewed many lab types, and I have repeatedly mentioned that hegemonic powers help identify and construct different hegemonic notions of labs through a view and perspective of certain technoscientific uses of labs. Contrary to the hegemonic lab, there are also counter-laboratories. A counter-hegemony displaces technics from the laboratories and imaginaries of the Global North towards their everyday reinventions and appropriations taking place everywhere through activists, artists, communities, indigenous, anti-racists, and feminists' practices of resistance reshaping planetary and challenging colonialism and extractivism.

Through this thesis, I overviewed the concept of a laboratory, to find which are the possibilities for a sonic laboratory to exist and in which measures. In doing so, I had to approach sound artists and sonic practices, because sound is, indeed, a practice that destabilizes hegemony. Sound is malleable, and it can become critical with established practices. Through the case studies, I have studied artists and laboratories, all dedicated to the study, and observation of sound. I have gone through the case studies as examples of the possible practicalities of what a sonic lab is. For example, I have situated artists who collaborate and develop their practice in laboratory environments. In doing so, I had a perspective of what artists do in labs, and it has helped me to construct an idea about the different results attained and which are the different methods that artists use in lab environments. Moreover, the case studies have focused on laboratories that already named themselves sonic labs. The fact that labs become labs through naming themselves labs is explored by Parikka and Emerson in their

book *The Lab Book*. According to them, “Very often the answer to the question of where a lab begins, and ends is that ‘this (whatever ‘this’ points to) is a lab because I say it is.’” [1].

The case studies have brought me a resolution of what type of practices artists develop in labs and which methodologies artists use in laboratories to produce art. The second observation has led me to analyse broadly which lab methodologies can contribute to understanding the possibilities of the sonic laboratory. Through the research, I have analysed methodologies such as learning by doing, experimentation, prototyping, DIY (do-it-yourself), hackathons and workshops, archiving, and curating. What I have reached is that these practices become critical and counter-hegemonic once placed into an art lab environment, creating thus an umbrella for the possibilities of the sonic laboratory. Moreover, I found a limitation in sonic laboratories as they require a curatorial practice to push them to be a hybrid counter-laboratory against a scientifically imposed view of the lab. Through the exhibition lab, sonic laboratories would develop practical aspects that would dissent from the hegemonic view of the lab.

2. Hybrid vs Hegemonic

This research clearly illustrates the many definitions of laboratories, but it also raises the question of hybrid labs as counter-hegemonic laboratories.

Throughout the research, I have faced some limitations. While studying laboratories’ limits and impositions, I have realized that a new approach to the concept of the laboratory through a more counter-hegemonic position is required. A counter-hegemonic view of the laboratory could include a hybrid concept of the lab, but also a more practical approach through the exhibition lab. The exhibition lab is a practice-based research methodology that will contribute to understanding the overview of the laboratory from a creative and artistic approach.

This research clearly illustrates a definition of the laboratory that has been built from a hegemonic point of view. When one thinks of a lab, it results to be a place for scientific research and investigation. Furthermore, the place has been constituted from this point of view when indeed it is a malleable place built through many actors and agents, from the relations inside to the external sources that build the lab. This last definition of the lab also raises the question of hybridity. Can labs be hybrid places? Through this research, I have investigated the concept of the laboratory and have established the reasons why it has been built through hegemony.

Hegemony was first studied and analysed by Gramsci. In his overview of society, hegemony was used as a superstructure above or in conjunction with the state and government powers, established through culture and labor, where certain parameters were beneficial to a class of power.

In my research, I have often linked hegemony with a techno-scientific paradigm that has constituted the base for capitalistic industrialism. Indeed, technology is rooted in capitalist forces, and the laboratory is understood as a key place of manufacture and knowledge production at the core of society. On the other hand, it seems that nature is super-used by technological laboratories as a place of extraction and resource. In Mark Peter Wright’s words, “Nature was, and remains, a financial resource, exploited through techno-scientific exploration, extracted from communities and sites of the neocolonial present.” [2].

But the core of my research is to question whether the possibilities of the sonic laboratory can contribute to designing

a counter-operative process against the hegemonic establishment of the lab. Thus, as labs exist, there are also counter-labs, and these incorporate factors of destabilizing, displacing categories and presenting other perspectives in creation, creativity, and knowledge production.

Hegemony motivates the economy and the state’s existing forms of domination power. In Lara van Meeteren and Bart Wissink’s view, “a hegemony (...) combines dominant views of the nation, religion, and monarchy” [3].

This thesis has identified a hegemony that rules certain acts and methods of commanding the world but it also states how some types of laboratories can undermine this imposed and centric view of the world mostly based on a techno-scientific perspective. However, through identifying hybrid practices in laboratories and through adopting a creative perspective, artists in labs work towards a non-hegemonic view of the laboratory. In Meeteren and Wissink’s words, “art all too often functions as an affirmative supporter of hegemony (...). Meanwhile, there is also a relatively small world of independent art spaces that organize counter-hegemonic events” [4]. This affirmation is very important as takes me to reformulate the definition of the laboratory and develop its contrary, the counter-laboratory, which brings me more possibilities to broaden the laboratory concept in itself, in cultural and economic terms. Hegemony is understood as a form of “domination as it replaces direct coercion for consent through agreement on common sense.” [5]. Thus, hegemony imposes a view of the lab which positions it into the world of science and roots its practical development through the technoscientific apparatus. Moreover, hegemony imposes a technical mode of operating, based on a western notion of society: progress, growth, and development. An example of the technical hegemony of laboratories can be identified in the “big five” digital corporations, developing for-profit and colonizing parts of the world, through a scientific view of the lab. According to Meeteren and Wissink, “hegemony in his conception relates to the dominance of a concrete situated alliance. This alliance and the worldview around which it is built need to be actively constructed and maintained.” [6]. The conception of hegemony in the technoscientific world, and towards the laboratory which is an emblematic place for the chain evolution of technoscience, represent a threat and a risk against inclusivity, diversity, and equality. Thus, a counter-hegemonic hybrid laboratory can optimize the relationships between technology and society. In other words, “challenges to hegemony necessitate building an alternative political alliance—or counter-hegemonic bloc—around an alternative common sense or counter-hegemony.” [7].

Hegemony occupies a central investigation in my research because it appears to be a tendency that imposes a view on the concept of the laboratory. As I have studied labs as places of technology and science, among others (academia, arts, industry), I have also researched counter-hegemonic technologies as a possible remediation to the techno-capitalist society.

There are examples of alternatives to the technoscientific imposition that builds a world model – hegemonic indeed – that constrains the power of technology towards profit and capitalism. According to Krishna, “the scientific establishment (has been created) to serve certain elite sections of the society” [8], and thus it is a hegemony that pushes the lab towards a unique scientific view. Hybridity exists to interfere with technological hegemonic powers and to destabilize through critical and alternative approaches. Considering this, Krishna

follows, “counter- hegemonic action refers to organized and unorganized, individual and group-based reactions both at the intellectual and grass-root level to neutralize or resist hegemonic action in the interest of society. Counter-hegemonic actions are however not sudden eruptions.” [9]. Counter-hegemony is shaped by “critical consciousness” [10]. Examples of counter-hegemonic practices can be found in counter-laboratories which are built through “critical discourse” [11]. Moreover, indigenous techniques for technological hegemonic development can confront a view of the capitalistic society and indeed rebuild the view of the lab not as a scientific place, but as a place for arts and creation, through hybrid practices.

Hybrid is also a concept reviewed by Krishna, as “a (hybrid) form in the sense that a variety of institutions and people with varying societal and knowledge interests participate in exploring the relations between science and society. In other words, the field is constituted by the emerging groups and communities of scientists, engineers, social scientists, doctors, opinion leaders, organic intellectuals, and ordinary people concerned with the social relations of science and technology and alternative modes of knowledge conception, production, and utilization.” [12].

This hybridity occurs in hack labs and maker spaces, but also in the curatorial typology of workshops and the exhibition lab, where different actors such as hackers, artists, engineers, and others, share, exchange, and collaborate, in a very activist way challenging ecological and societal disruption caused by certain hegemonic impositions through techno-science.

Furthermore, to highlight the relationships between counter- hegemony and technology, I have observed the central role of open- source technologies. Open-source technologies could be considered counter-hegemonic practices. Technology has been created under a scrupulous dependence on the scientific objectifying of hyper-structures (technoscientific laboratories, for instance), which result in being extremely hard to disbelieve, doubt, and dissent, leaving the confronters impressed, without power and resources to contest and dispute their authority, as Bruno Latour details in his explanation about counter-laboratories. According to Latour: “The dissenters cannot do less than the authors. They have to gather more forces to untie what attaches the spokesmen and their claims. This is why all laboratories are counter-laboratories just as all technical articles are counter-articles. So the dissenters do not simply have to get a laboratory; they have to get a better laboratory.” [13].

Besides, in Jonathan Kemp’s words, this makes alternatives subsumed to capital. Nevertheless, there is still an in potentia within the capital to cultivate rival forms of production based on what is called, in Kemp’s words, “commons-based peer production (or social production).” [14]. This is based on hacking and open-source methodologies, but their arguments consistently fail to surmount the structural similarities with late capitalism. The labour invested in producing free software is given publicly. Then, since the efforts and end-products of cooperation and collaborative production can be readily appropriated and framed by capital, and it is again an expression of a new form of labour rather than a rival to capital itself, therefore any rival form ultimately operates in a manner subsumed under capital’s organizational form.

Although subsuming processes in late capitalism, Benkler states: “Individuals are using their newly expanded practical freedom to act and cooperate with others in ways that improve the practiced experience of democracy, justice, and the development of a critical culture and community” [15]. Collaboration and self- organization are shared across both

business and free software/open hardware. In this regard, the collaborative practices at the intersection between art, science, and technology and making use of hacking and DIY methodologies are set to criticize the hegemonic phenomena of planned obsolescence produced by ICT companies and the dynamics of desire for technological devices by consumers. Furthermore, open-source practices seen as counter-hegemonic contribute to understanding hybrid processes in labs where collaboration between different actors occurs. I have through his research mentioned how the concept of hybrid has been influencing my research and I have identified which are the definitions of a hybrid lab and how this could influence the definition of the concept sonic laboratory.

Following the previous examples, definitions, and features of the lab or a sonic laboratory could be a place to manufacture sonic devices; a site of knowledge production and investigation of sonic practices; and a place for experimentation with sound. A sonic lab must be a place of collaboration (somewhere in) between the scientist, the artist, the academic, and the industrial, perhaps, and a place of innovation for assuming roles and tendencies in contemporary sound art practice.

3. Exhibition Lab as a practice-based research methodology for curatorial practices

Through this research, I have overcome some issues in sonic laboratories which even creative remain hegemonic. To overcome this difficulty, I explore the idea of a practice-based research methodology for curatorial practices which is based on the concept of an exhibition lab. This research has taken me to understand the possibilities of the sonic laboratory, a lab typology that can contribute to defying hegemonies and certain views of the scientific laboratory. But through the development of the thesis, I have overcome the idea (being a curator) that the sonic laboratory idea can grow and be developed practically through the idea of the exhibition lab. So, I will make recommendations for the future work of this thesis based on the exhibition lab.

The exhibition lab is a practice that considers the parts of the sonic laboratory, the sound, and the lab, but it adds curatorial methods to its development. The exhibition lab is the practical side of the theoretical research on sonic laboratories that I have gone through in this thesis.

The exhibition lab considers a type of setup that includes and mixes different exhibition typologies: exhibition, workshop, concert, and performance, among others. The exhibition lab is a practice-based research methodology that contributes to setting up a sonic laboratory in a curatorial environment. To do so, it reshapes a space (venue, theatre, or museum) into a multi-stage space. The main interest is to give prominence to sharing and collaborating rather than one-to-many relations with spectatorships. Audiences will become actors. For example, there can be four stages in the same laboratory space. One for digital arts, one for acoustic arts, one for arts of movement, and one for workshops. Music will accompany the continuous flux of events, which will be simultaneous. Finally, the multi-stage space can be accompanied by an exhibition of sound art sculptures from the workshop.

I have envisioned the exhibition lab as a counter-hegemonic place where it challenges scientific laboratories but also institutional curatorial practices. Referencing Zenobia Toloudi, through the exhibition lab I want to “explore subjective perceptions of space and user engagement and to investigate subjectivity, neglected notions about sensory experiences,

communal habits, and the ordinary and vernacular elements of culture” [16]. The laboratory becomes a liminal space where to practice “simultaneously both experiments and experiences.” [17]. Through the exhibition lab, I could also encounter an alternative practice to hegemonic labs: “The French philosopher, Bruno Latour claims that science experimentation has now moved outside the laboratory, to the worldwide lab, where we are all engaged in a series of experiments collectively attempting to survive.” [18]. Then, the notion of collective experiments will be set in my laboratory practice. Indeed, through the exhibition lab and developing the notion of collective experience through laboratory practice, “We all collectively participate in these experiments to test an idea, witnessing its appeal and prospect.” [19]. The exhibition lab results in an experiential and experimental laboratory that consists also of a “meta-space(s)” [20] of innovation.

Through the exhibition lab, I would like to develop “a pedagogical model that is based on exhibitions and art installations” [21] but at the same time, it challenges institutional and hegemonic and cultural modes of curatorial practices. Rather than a spectator’s visual static reception, I would like to produce an immersive multi-stage space that would define the exhibition lab. According to Toloudi, the exhibition lab methodology is based on “art, such as installations, exhibitions, and participatory practices, and certain concepts from philosophy and theory, such as laboratories and atmospheres, and relations among experimentation, participation, and emancipation” [22].

All the core exploration in Toloudi lies in the fact that the “Exhibitions are typically focused on the final outcome, well-crafted representations” [23]. This concept of the exhibition as a creation of fixed and constructed objects can contribute to edifying an institutional view of curatorial practices. On the contrary, the exhibition lab is interested in opening the object and the curatorial practices and it does so through “the experimental (allowing maximum creativity to creators), and the experiential (offering closer relation to the public).” [24].

The central aspect of the exhibition lab is the exhibition as laboratory, a concept that Obrist has already suggested as part of the “art installations and experimental exhibitions (that) are the media to expand beyond the object and objecthood to interactions, relationships, events, intensities, and processes [25].

Moreover, Latour’s theories of laboratory such as the World Wide Lab, are used by him to explain how “old divisions between wild and domesticated, private and public, inside and outside, technical and organic, no longer exist. On the opposite side: due to scientific experimentation, which has now moved outside the laboratory, we can all participate and engage ourselves in a series of experiments” [26].

Another example of contributions towards a more open process against hegemonic views of the labs is found in Claire Bishop who explores the laboratory through experimentation and participation. Claire Bishop works on participation through “workshops or extra-curricular educational activities that do not fall under curricular and institutional rules and expectations, the old-style combination of one creator and one large audience needs to break apart.” [27].

Following Toloudi, the exhibition lab is a concept that grows from mixing the laboratory and the exhibition. Laboratories incorporate experimentation whilst exhibitions promote presentation. According to her, “The laboratory includes hands-on experiments, testing of theories, analysis of the results, development of models, and the making of

installations, mock-ups, or prototypes. The exhibition refers to the design and presentation of exhibitions and also includes publications, participation in blogs, social media, and other platforms to engage with communities and various groups.” [28]. So, the mixing of both methods will incur in a hybrid form of the exhibition lab, pushing boundaries away from the hegemonic and scientific view of the lab and opening possibilities of the static and objectual curatorial mode of exhibitions. An exhibition lab promotes participation and criticism. It is, in Toloudi’s words, “less of a collection of artifacts, and more of an assembly of experiences (or) a series of collective experiences that simulated in ‘theatrical’ terms civic actions and unusual collective events.” [29].

I have envisioned the space of the exhibition lab as a hybrid space where to collate exhibitions, performances, workshops, events, and concerts, are “experienced through the shifting of hierarchies among different groups of participants” [30].

Resuming the exhibition lab would appropriate from “collective actions such as (...) hacking, playing, or dreaming together.” [31]. Experimental, immersive, experiential, critical, or collective are some of the adjectives that define the exhibition lab as a place where “Participants explored collective non-hierarchical groups or actions that may offer to individual creators the opportunity to instigate a series of interventions” [32].

The exhibition lab retains the two concepts the exhibition and the laboratory and in doing so the exhibition becomes an experimental and hybrid place that includes in the same space different media sources such as installations, live events, and workshops that require the audiences’ participation. In doing so, “the exhibition offered a medium of clear and provocative expression (without being “bastardized” by processes of bureaucracy) to instigate dialogue in the community that would now question the framework they were working in through this spatial experimentation.” [33].

Through experiments, collaboration, and participation, the exhibition lab breaks the imposed view of the visual non-participatory hegemonic curatorial practices and instead of a model of ‘one artist to many audiences’, presents a collaborative model ‘for many to many’, resulting in an experimental, experiential learning, and creative curatorial model.

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Institutional Critique and Slovenian New Media Art

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Abstract

While we think of new media art as embedded in industries of global reach, it is also surprisingly situated in a manner that can make it highly significant to audiences within an arm's reach of each other. Such appears to be the case in Slovenia, which this paper argues has seen a quiet revolution take place within its borders in the practice of new media art. While the media art under discussion in this paper has important precedents within the Yugoslav context, this paper will centre on the proliferation of new media art production in the last thirty years and suggest the particular valence this generation of contemporary art production and exhibition has acquired as a form of institutional critique within this national context.

Keywords

new media art, NGOs, art galleries, independent art spaces, institutional critique, Slovenia

While we think of new media art as embedded in industries of global reach, harnessing world-wide infrastructures of connectivity to transmit experience to users despite differences in their backgrounds, ethnicities, gender or location, new media art is also surprisingly situated in a manner that can make it highly significant to audiences within an arm's reach of each other. Such appears to be the case in Slovenia, which has arguably seen a quiet revolution take place within its borders in the practice of new media art.¹ A small country of two million people, Slovenia is largely known to the outside world for having belonged to the former territories of Yugoslavia, a geopolitical entity whose rich cultural and artistic history still overshadows Slovenia's own recent heritage. The media art under discussion in this paper has important precedents within the Yugoslav context, including the major international art movement that took place in Yugoslavia of the sixties called

New Tendencies,² but such a longer-range history will not be the focus of this paper, which centres on Slovenian new media art production of the last thirty years and the particular valence it has acquired for institutional critique within this national context.

A quick survey of galleries dedicated to new media art founded in Slovenia in the past thirty years will establish the importance of the new media art world within the Slovenian contemporary art scene. In Ljubljana alone ten venues have been established in the last thirty years to exhibit, support and, although more rarely, to collect and preserve historic new media and new media art. There is the long-running Computer History project that recently found a home.³ The DIVA digital video archive which houses the largest video collection in the country.⁴ Osmo/za is a community hub dedicated to technological literacy.⁵ Projekt Atol is one of the oldest spaces, informally established already in 1992 by the media maverick Marko Peljhan and mainly dedicated to practice-based research of communication infrastructures.⁶ The Delak Institute is a space entirely dedicated to the investigation of what is called "post-gravity art," which actually refers to art practice in outer space.⁷ Cirkulacija² is located entirely underground and displays the wildest range of experimental robotics and sound art.⁸ Two spaces have recently opened for the purpose of showing experimental photography. [IMAGE] The Egon March Institute has been programming systems for interaction, synchronisation and transmission via the Internet since 1986.⁹ Also one of the earliest media art platforms, the Kersnikova Institute and is co-run by the art director and curator Jurij Krpan and serves as an investigative art space working at the interface between bodies and technology in several wet-labs, a vivarium, a gallery (Kapelica Gallery), and a hacker space (Rampa), which have resulted in the artistic research of living systems and a series of

¹Despite possessing a robust history since the 1970s, virtually sources synthesizing the history of Slovenian new media art exist in English or German and only few short texts exist in Slovenian. An exception is Bovcon, N. (2013) 'Literary Aspects in New Media Art Works', *CLCWeb: Comparative Literature and Culture*, 15(7) and Bovcon, N. (2009) *Umetnost v svetu pametnih strojev. Novomedijska umetnost Sreča Dragana, Jake Železnikarja in Marka Peljhana*. Ljubljana: Raziskovalni inštitut, Akademije za likovno umetnost in oblikovanje v Ljubljani; also see short chapters in the three-volume series: Zabel, I. et al. (eds) (2003) *Do roba in naprej. Slovenska umetnost 1975-85*. Ljubljana: Moderna Galerija; Soban, T. et al. (eds) (2004) *Razširjeni prostori umetnosti. Slovenska umetnost 1985-1995*. Ljubljana: Moderna Galerija; Zabel, I. et al. (eds) (2005) *Teritoriji, identitete, mreže. Slovenska umetnost 1995-2005*. Ljubljana: Moderna Galerija. To date perhaps the only available resource that gives a representative overview is the website: https://www.culture.si/en/Category:New_media_art.

²Medosch, A. (2016) *New Tendencies. Art at the Threshold of the Information Revolution (1961-1978)*. Cambridge, Mass: MIT Press; Fritz, D. et al. (eds) (2011) *A Little-Known Story about a Movement, a Magazine, and the Computer's Arrival in Art New Tendencies and Bit International, 1961-1973*. Karlsruhe: ZKM/Center for Art and Media.

³Computer Museum, Slovenia. October 15, 2023. <https://www.racunalniskimuzej.si/en/home-english/>; the museum plans to hosts the first event launching Slovenia's Center for Artificial Intelligence in October 2023 (Republika Slovenija, October 15, 2023, https://www.gov.si/dogodki/2023-10-16-javni-posvet-na-temo-ustanovitve-centra-za-umetno-inteligenco/?fbclid=IwAR0bPdb2WuPCfxLA9naFX3-X7MSrFL_Ot78DuSG-z9Oc_enFONLoqZVcho).

⁴SCCA-Ljubljana, Center for Contemporary Arts, October 15, 2023, <http://www.scca-ljubljana.si/en/diva-station/>.

⁵Osmo/za: a public space for developmental arts and cultures of the 21st century and for the 22nd century, October 15, 2023, <https://www.osmoza.si/en>.

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⁷Delak Institute, October 15, 2023, https://www.culture.si/en/Delak_Institute. See also one of the world's first centers for space "culturalization," the Cultural Center for European Space Technologies (KSEVT), founded by some of the members of the Delak Institute in 2012 and housed in an award-winning reconstruction of the early theorist of modern space flight, Hermann Noordung Potočnik's design for space station and located in a quiet Slovenian valley called Vipava, KSEVT, October 15, 2023, [https://www.culture.si/en/Cultural_Centre_of_European_Space_Technologies_\(KSEVT\)](https://www.culture.si/en/Cultural_Centre_of_European_Space_Technologies_(KSEVT)).

⁸The last time the author was there the gallery had a policy that guests bring their own radio receiver and pair of binoculars. Cirkulacija², October 15, 2023, <http://www.cirkulacija2.org/>.

⁹The founder of the Egon March Institute and new media art pioneer, Marko Košnik, recently initiated one of the first efforts to archive historic new media art in Slovenia, Egon March Institut, October 15, 2023, https://www.culture.si/en/Egon_March_Institute.

experiments that are notoriously corporeally invasive.¹⁰ It is an interesting cross between new media art and Viennese Actionism. Ljudmila, short for Ljubljana Digital Media Lab, is Slovenia's oldest running digital media lab, established in 1994.¹¹ And finally Aksioma, founded in 2002, is an Institute for Contemporary Art, founded by Janez Fakin Janša, and is a combination of a gallery space, research platform, podcast production unit and recently a publisher of research related to the wider societal implications of the proliferation of new media.¹²

And this is just galleries in Ljubljana. We have not mentioned the range of festivals, fairs, and range of university degree programs in Ljubljana or the other galleries and communities located outside of the capital city.

The reason to present the new media art world as a list is not just to suggest the scale at which new media art is being produced, distributed and exhibited in Slovenia. It is to impress upon the reader the significance of the institutions in which it is appearing and what this paper will be arguing to be the locatedness of the new media art object as part of its intended meaning. Although I will speculate about the specificities of Slovenian new media art that distinguish it from other types of art, the overall argument this paper is making holds regardless of whether new media involves certain materials, processes or structures that are distinctively Slovenian. Rather, the point will be that the emergence of a multiplicity of sites at which new media art is being practiced in Slovenia needs to be placed in relation to their collectively shared experience of institutional exclusion and the historic presumptions held regarding what does and does not count as artistic labour that are behind that exclusion. In arguing for the notion of institutional aesthetics, or a kind of institutional *site-specificity* to be added to our understanding of Slovenian new media art, I am seeking to address two questions: firstly, the question of how the new media art object is defined, which has traditionally been answered through an ontological argument regarding what it is or is not. Rather than examining the new media art object through an investigation, of *what* it is, I will be grouping different objects together on the basis of *where* they are. I will then also be considering the new media art spaces' physical location in relation to other cultural institutions as a kind of positionality or emplacement from which the individual art works' criticality might be understood to stem.

But first, to appreciate the semantic importance of the spaces in which new media art is being practiced, one must understand that the institutional network making up the Slovenian art world looks different to different people. After a two-month residency at Kapelica Gallery in 2008, mentioned before, the Finnish visual artist Minna Henriksson created an analytic diagram or map of the Slovenian art world.¹³ Henriksson based the map on anecdotes she heard people in Ljubljana tell about each other. Like a Surrealists' version of the world map, this cartographic projection is symptomatic of certain beliefs, questions and unquestioned, that the system as a whole has about itself.

In Henriksson's diagram, the main agents of the art world appear named in bubbles and include the cultural ministry, the municipality, the main museum, in other words state-financed

institutions. While the resources of the state are shared, the lines of distribution and power, that is the network connecting the bubbles, are determined by informal relationships, here, anecdotes. In other words, while the map of the Ljubljana art world suggests a closed system, the art system as a whole somehow manages to remain dynamic.

What is missing from this institutional map is key to understanding how it remains responsive to change. Practice using media both new and old constitutes the majority of contemporary art practice in Slovenia. Its internationally recognized artists work with media, defined as computer art, net art, internet art, immersive media, but also film, video, Xerox, and photography. Moreover, Slovenians have been working in new media art since 1960. And yet, the vast majority of what gets exhibited in Slovenia is painting, sculpture and prints and drawings. This is visible from the map too. With the exception of Kapelica gallery, which was the location of Henriksson's residency program, none of the spaces with new media art I listed a moment ago appear on this map, and only two appear on the other map. In other words, new media is located in-between the institutions that otherwise represent Slovenian cultural heritage in collective consciousness. Media, and here I mean media both old and new, provides legitimacy to the art world but also exists as a sort of negative backdrop against which the art world forms an image of itself.

What the paper will demonstrate now through concrete examples is that the capacity to develop a critical vocabulary often depends on distance from the cultural mainstream and that, in being largely ignored, some Slovenian new media artists have developed arguments for radical openness and subversive experiment with existing institutional logics. In other words, that the institutions or branches of institutions media artists are being excluded from are reimagined in the light of certain medium-specific properties of a range of media. Media art therefore often can be understood as a medium of radical intervention in institutional protocols and hence to form a kind of institutional critique. And perhaps not surprisingly, given their enactment of a kind of *institutional imaginary*, many of the spaces I have just mentioned instantiate alternatives to current paradigms of the art system and of museology that are utopian, anarchic, and provocative.

Unlike other post-socialist societies and much to the frustration of many of its artists, Slovenia has not yet developed a commercial art market. Between 2001 and 2006/9, Janez Fakin Janša and Igor Stromajer launched "Problemmarket.com—the Problem Stock Exchange" as an imaginary stock market.¹⁴ "The word problem has negative connotations," Stromajer's talking head announces on television, "nobody wants to have problems." But problems are the "spice of life: and as "catalysts of energy," they "have value and can be placed on the market." Advertising itself through physical billboards and mobile touch screens placed throughout the city and reports over radio and television, Problemmarket used a range of media platforms to imagine a market, even if it was not an *art* market, but a platform for market speculation nonetheless to which Slovenian artists could have access and on which they could sell their ideas.

¹⁰The Kersnikova Institute, October 15, 2023, <https://kersnikova.org/en>.

¹¹Planet Ljudmila, October 15, 2023, https://wiki.ljudmila.org/Main_Page. The current Ljudmila Art and Science Laboratory was established in 2010 as a successor to the 1994 Ljudmila - Ljubljana Digital Media Lab programme of Open Society Institute Slovenia.

¹² Aksioma: Institute for Contemporary Art, Ljubljana, October 15, 2023, <https://aksioma.org/>. Aksioma's publishing house includes the Postscriptum series, booklets with commissioned work by Matthew Fuller, Jussi Parikka, James

Bridles, and others, as well as longer pocket books and catalogs. Their year-long lecture series programming, podcasts and range of curatorial projects make them one of the hubs of new media art discourse in Slovenia.

¹³ Henriksson, Minna, *Ljubljana Notes*, Drawing, 2008, <https://www.mg-lj.si/en/exhibitions/1324/artworks-2005-2015/>.

¹⁴ Problemmarket.com: The Problem Stock Exchange, October 15, 2023, <https://aksioma.org/problemmarket/>.

The main modern art museum in Ljubljana, called the Moderna galerija, has often been the brunt of media art's criticality. Among the internet's first e-poets, Jaka Železnikar designed a program in 2003 that will enable users to overwrite the text on any website, hence its name, "Retypescape" (*Pretipkovalec*).¹⁵ Visitors will see that the artist lists certain sites he is suggested to use Retypescape on, but, interestingly, for his exhibition of this piece in 2005, it's the text of Moderna museum's website that Železnikar has decided to target, thus inviting users to commit the ultimate act of institutional blasphemy: *digital graffiti* (fig.1).

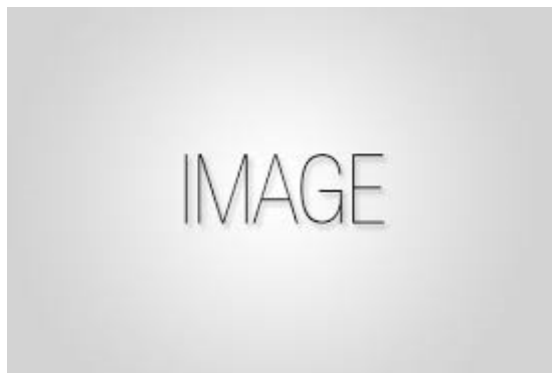


Figure 1: Jaka Železnikar. *Retypescape* at Territories, Identities, Nets, Slovenian Art 1995 - 2005 exhibition, Museum of Modern Art, Ljubljana, 2005.

There is a similar kind of institutional critique that permeates the work of Vuk Ćosić, whose name may be familiar to the reader as the artist has been credited as having helped invent net art in the mid-90s.¹⁶ A more recent plan by him and an anarchist collective called Non-Group to respond to the cultural politics of the Moderna galerija by organizing a flash action overnight to drape its facade entirely in black (December 2021) (fig.2).

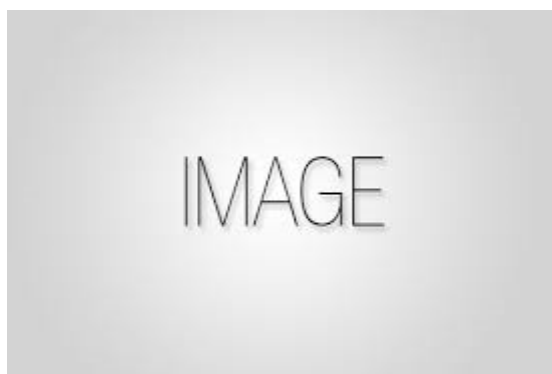


Figure 2: Vuk Ćosić and NonGroup, virtual sketch of Moderna galerija flash action, Dec. 2021, thanks to artist for permission to use.

While it may currently be ignored by canonical narratives, media art does not happen in isolation from other mediums. And with this last example what I want to argue is that it is partially through their expansion into more traditional mediums that new

media art may finally make an appearance inside museums. My last example is of an artist called Tadej Pogacar who in 1993 founded a virtual organization called the PARASITE Museum of Contemporary History.¹⁷ PARASITE, which he uses as both a noun and a verb, "to parasite," involves the successful occupation of pre-existing institutions. Once he has infiltrated a museum, Pogacar replaces the objects on display with his own "contemporary" objects, thereby "parasiting" the museums in the manner of a virus the body of its host. Based on its act of contagion, PARASITE stems as much from the legacies of institutional critique, installation art and sculpture as it does from the reality of new and old media's entry in the spaces of cultural heritage. Pogacar combines the language of traditional media with that of digital media when he describes PARASITE as a "critical model for analysing systems and the institutions within them and as a framework for introducing alternative forms of communication." What museums need first of all is this new framework, the new objects will then follow.

In conclusion, the integration of new media artists into mainstream art historical and contemporary art consciousness is challenging. It is not just a question of making room for more objects, but in understanding the specificities of media and media art that make them incompatible with the image the cultural establishment has of itself and its operational realities and infrastructures. There have been a host of successful combinations of media art, institutional critique and museology, like the ZKM in Karlsruhe, the EYE in Amsterdam, the MOMI in New York. What this paper hopes to have suggested in is that, as the Slovenian new media landscape makes clear, the future is closer than one might imagine—it is being imagined, probably as we speak, by the artists themselves.

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¹⁵ Jaka.org, October 15, 2023, <https://www.jaka.org/2003/pretipkovalec/index.html>. See also Bovcon, N. (2013) and Bovcon, N. (2009).

¹⁶See critical position of Ćosić in Manovich's argument in the final chapter of his book *The Language of New Media*, "Cinema as Code" (Lev Manovich, *The Language of New Media*, Cambridge, Mass., MIT Press, 2001). See also L.Manovich, *Cinema by Numbers: ASCII Films by Vuk Ćosić*, 1999, October 15, 2023, http://www.ljudmila.org/~vuk/ascii/lev_eng.htm and interview with

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Preservation of early computer-based art using ChatGPT

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Abstract

In this paper, we delve into the preservation of early digital art, originally crafted on computers. We explore the utilisation of ChatGPT to recreate this art, which was primarily archived as physical prints generated by plotters and printers. Given that ChatGPT can only process text as input and provides textual output, the process necessitates a detailed description of how the desired print should be produced, either through pseudo code or plain language instructions. The resulting output from ChatGPT materialises in the form of computer code, such as the Processing programming language. When executed on a computer, this code generates the desired image. We describe three distinct experiments: the first utilising pseudo code as input, the second relying on plain language descriptions, and the third involving instructing ChatGPT to generate an image in the style of a chosen artist.

1. Introduction

Computer-based art, also known as digital art or new media art, has played a significant role in shaping the art world since its emergence in the 1960s. This form of art utilizes technology as a medium for creating and displaying works, such as computer graphics, digital animation, and interactive installations. Despite its importance in the history of art, early computer-based art is at risk of being lost due to the obsolescence of the technology used to create it and the digital nature of the works themselves.

The preservation of early computer-based art is crucial for future generations to understand and appreciate the origins and evolution of this medium. In this article, we will explore the challenges and current efforts being made to preserve early computer-based art. We will explore how ChatGPT can be used to preserve early computer-based art through the generation of documentation and annotations, and even new artworks based on early computer-based art styles.

The preservation of early computer-based art is vital for future generations to understand and appreciate the medium's rich history and evolution. We hope that this article will raise awareness about the challenges and efforts being made to preserve early computer-based art and the potential of ChatGPT in this field.

2. Challenges

Preserving early computer-based art poses several unique challenges. One of the main challenges is the obsolescence of technology. The technology used to create early computer-

based art, such as mainframe computers and specialized software, is now obsolete and no longer in use. This makes it difficult to access, display, and preserve these artworks as the necessary hardware and software may not be available or may no longer be functional.

Another challenge is the digital nature of early computer-

based art. Digital artworks can be vulnerable to data loss or corruption due to the degradation of storage media, lack of proper backups, and the absence of proper preservation protocols. Additionally, the file formats and software used to create and display early computer-based art may no longer be supported by current technology, making it difficult to access and preserve these artworks.

Furthermore, many early computer-based artworks were created as site-specific installations and were not intended to be transported or displayed outside of their original context. This poses a challenge for institutions that wish to preserve and display these artworks, as they must ensure that the artworks are presented in a way that is true to the artist's original intent.

Finally, the ephemeral nature of some early computer-based art forms, such as performance-based or interactive art, makes their preservation even more challenging. These artworks are difficult to document, and their interactive nature means they can only be experienced in real-time [1].

Overall, preserving early computer-based art requires a multidisciplinary approach that involves the collaboration of experts in technology, conservation, and art history. It requires the use of specialized techniques and tools, as well as careful planning and execution to ensure that these artworks are accessible and understandable to future generations [2, 3].

In the nascent era of computer technology, the creative realm of computer-based art was largely confined to the realm of line-based artworks, primarily produced using plotters or line printers. During this epoch, the primary mode of preservation for original artistic creations from this period predominantly took the form of printed reproductions on paper.

The preservation of traditional paper-based graphics is the responsibility of the classical conservation profession. However, when it comes to computer-generated art, our goal is to preserve the ability to regenerate these graphics, as many of these artistic works incorporate elements of randomness through the use of random number generators. Therefore, with each program run, the result may be slightly different, but still within the framework of the artist's aesthetic concept.

In computer-generated art, the concept of preserving variability is crucial. Unlike traditional artworks, where a single physical copy can be preserved, computer-generated art often exists only in digital form, and its uniqueness lies in its potential for infinite variations. This uniqueness arises from the incorporation of randomness or algorithmic processes that generate different outcomes each time the program is executed.

Preserving this inherent variability in computer-generated art involves several considerations. First, it necessitates the archiving of the original code or algorithm used to create the artwork. This code serves as the blueprint for generating the art and must be carefully documented and stored to ensure the future reproducibility of the work.

Secondly, it requires the preservation of the computing

environment in which the artwork was created. Changes in hardware and software over time can impact the way the artwork is generated. Therefore, maintaining an environment that mimics the original conditions is essential for reproducing the intended results accurately.

Additionally, metadata about the artist's intentions and the parameters used in generating the artwork should be recorded and stored alongside the digital files. This information provides valuable context and guidance for future attempts to regenerate the artwork.

In essence, the conservation of computer-generated art is about safeguarding not just a static image on paper but also the dynamic and generative processes that make each iteration of the artwork unique. By preserving the code, environment, and metadata, we ensure that the artistic vision, which embraces variability and randomness, can continue to be realized in the digital realm for generations to come.

3. Current preservation efforts

There are a variety of current preservation efforts being made to preserve early computer-based art. One of the main efforts is being made by institutions such as museums and archives. These institutions have begun to acquire and preserve early computer-based artworks, and have developed methods for preserving and displaying these artworks to the public.

Museums and archives are using a variety of techniques to preserve early computer-based art, such as digitisation, emulation, and migration. Digitisation involves converting an artwork from its original format into a digital format, which makes it more accessible and easier to preserve. Emulation involves creating a virtual environment that mimics the hardware and software used to create an artwork, allowing the artwork to be displayed and experienced as it was intended. Migration involves converting an artwork from one file format to another, in order to ensure that the artwork can be accessed and displayed using current technology.

Finally, some artists and researchers are working on creating new versions of early computer-based artworks, using modern technology to update the original works, allowing them to be experienced by new audiences. This approach is called re-coding [4].

4. The role of ChaptGPT

ChatGPT, a large language model, has the potential to play a significant role in preserving early computer-based art. However, ChatGPT cannot analyse images directly. It is a text-based AI model that processes and generates text but does not have the capability to interpret or analyse visual data such as images or videos. Image analysis typically requires computer vision models or specialized image recognition algorithms, which are separate from text-based language models like ChatGPT. Since ChatGPT knows how to write code, we can create images with it by describing what the image should contain, and ChatGPT generates the corresponding code. For drawing, especially in creativefields like visual arts, a programming language called Processing is typically used, which was developed precisely for this purpose.

The process would therefore be as follows:

1. We give ChatGPT a prompt where we describe

what should be in the image.

2. ChatGPT generates the code in Processing.
3. The code is then translated into an image using the Processing compiler.
4. If the image is not exactly as we want it:
 - we can directly adjust or enhance the Processing code or
 - with additional prompts to ChatGTP we can generate new versions of the entire Processing code.

5. Experiment 1: pseudo-code

For our first experiment we selected the print *Gaussian Quadratic*, 1963/65 by A. Michael Noll (Fig. 1).

Nake and Grabowski [4] proposed the following pseudo-code (Table 1) to describe how the print was made:

```
input the value of countMax; input the value of close;
randomly choose a point inside the image frame and call it "P0"; Pold := P0;
count := 0;\
repeat the following until count = countMax:
{
    randomly choose the x-coordinate of the next point, according
    to function
    nextX, and call it Pnew.x;
    randomly choose the y-coordinate of the next point, according
    to function nextY, and call it Pnew.y;
    draw straight line from Pold to Pnew; Pold := Pnew;
    count := count +1;
}
if(close) do { draw straight line from Pnew to P0 };
```

Table 1: Pseudo-code for the image 1 taken from [4].

We used this pseudo-code as input to ChatGPT to obtain Processing code which in turn produced the image in Fig. 1.

If we compare the original version of the print (Fig. 1) with the newly generated version in Fig. 2, one can observe that the new version lacks some vertical tendency in the strokes.

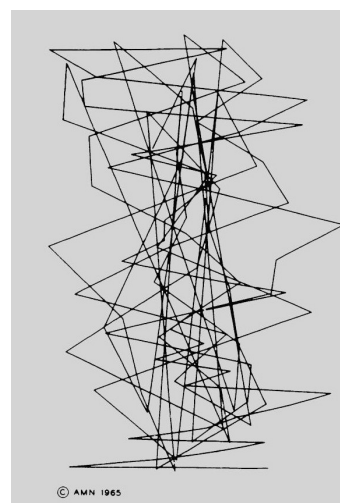


Figure 1: A. Michael Noll: Gaussian Quadratic, 1963/65 — ORIGINAL

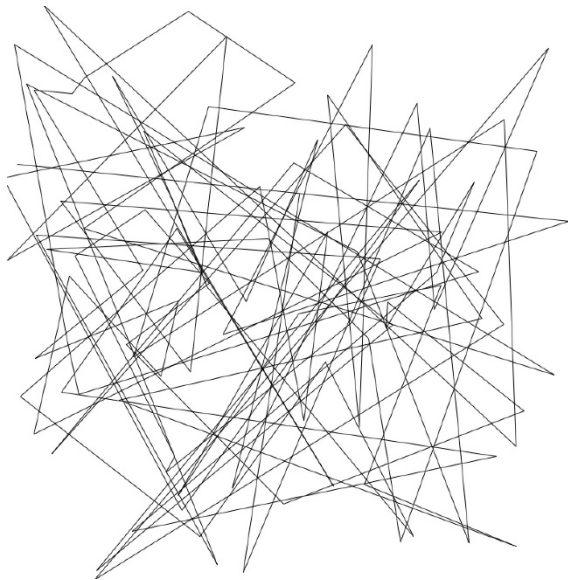


Figure 2: A. Michael Noll: Gaussian Quadratic, 1963/65 — RE-CODED via: pseudo-code ChatGPT Processing code

6. Experiment 2: description in plain language

For our second experiment we selected a print by Vera Molnár [5] from the series *Trapezes inscrits*, 1974 (Fig. 3 / left).

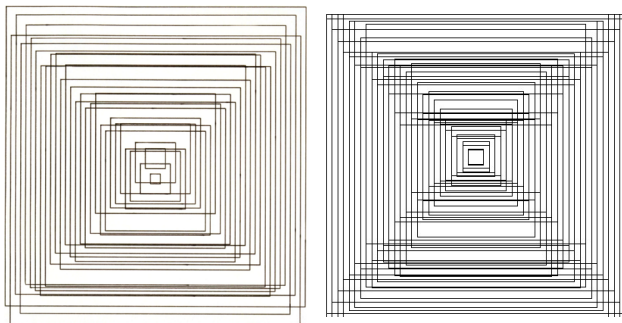


Figure 3: Left: Vera Molnár — ORIGINAL
Right: Vera Molnár — RE-CODED

To reproduce this print we gave ChatGPT the following prompt in plain language:

- draw squares, from the smallest to progressively larger squares, all centred on the centre of the picture field
- now draw the squares so that the value of the x-coordinate is the same as before, and the value of the y-coordinate is randomly up to 10% greater or smaller for each successive square

ChatGPT produced the corresponding Processing code and after running it we got the print in (Fig. 3 / right). Vera Molnár's Artwork can be reproduced also in other modern programming languages such as Python [6].

7. Experiment 3: generate in style of ...

In the third experiment we wanted to test if ChatGPT is familiar with the visual style of Vera Molnár's prints.

We gave ChatGPT the following prompt:

- generate a graphic art in form of Processing code in the style of Vera Molnár and obtained the image in Fig. 4.

Obviously ChatGPT knows something about Vera Molnár's visual style. Let us ask ChatGPT directly what does it know about that using the following prompt: describe the visual style of the art of vera molnar.

The answer of ChatGPT is as follows:

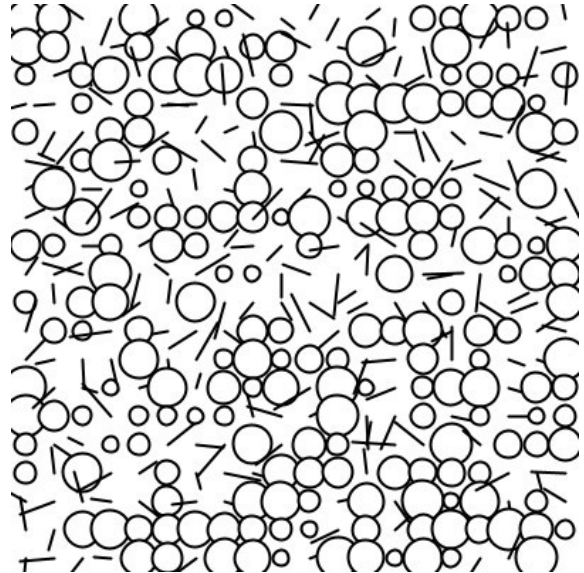


Figure 4: Print in style of Vera Molnár

Vera Molnar is a Hungarian-born French artist known for her contributions to geometric abstraction and algorithmic art. Her work is characterized by a distinctive visual style that combines mathematics and artistic creativity. Here are some key features of Vera Molnar's art style:

1. **Geometric Abstraction:** Molnar's art is firmly rooted in geometric abstraction, which emphasizes the use of geometric shapes, lines, and forms as the primary visual elements. She often employs basic geometric shapes like squares, circles, triangles, and rectangles in her compositions.
2. **Precision and Order:** Molnar's artworks are marked by a strong sense of precision and order. She uses mathematical algorithms and systematic approaches to create her art, resulting in highly structured and meticulously organized compositions.
3. **Grids and Patterns:** Grids and patterns play a significant role in Molnar's work. She frequently utilizes grids as the underlying structure for her compositions, with shapes and lines arranged in a grid-like fashion. These grids may be regular or irregular, but they provide a sense of order and balance to her art.
4. **Repetition and Variation:** Molnar often employs repetition and variation of geometric elements to create visual interest and complexity within her compositions. This repetition can create rhythmic and harmonious patterns in her work.

5. **Minimal Colour Palette:** Her colour palette tends to be minimal, with a focus on black, white, and a few muted or primary colours. This limited colour scheme enhances the starkness and simplicity of her geometric forms.
6. **Digital and Algorithmic Art:** Molnar was one of the pioneers of digital and algorithmic art, using computers to generate and execute her artistic ideas. She programmed algorithms that dictated the placement and arrangement of geometric elements, allowing her to explore new possibilities and create art that was beyond what could be achieved by hand.
7. **Interplay of Order and Chaos:** While her work is highly ordered and systematic, there is often an underlying tension between order and chaos. Molnar's algorithmic processes can introduce an element of unpredictability and randomness, creating a dynamic interplay between precision and chance.
8. **Mathematical Inspiration:** Molnar's work is heavily influenced by mathematics and mathematical concepts. She has a background in mathematics and uses mathematical principles to guide her artistic decisions, resulting in art that is both visually engaging and intellectually stimulating.

Overall, Vera Molnar's art style can be described as a fusion of mathematics and aesthetics, with a focus on geometric abstraction, precision, and algorithmic processes. Her work continues to be influential in the world of contemporary art, particularly in the field of computer-generated and generative art.

8. Conclusions

In conclusion, the preservation of early computer-based art is crucial for future generations to understand and appreciate the medium's rich history and evolution. The unique challenges associated with preserving early computer-based art, such as the obsolescence of technology and the vulnerability of digital works to data loss or corruption, require a multidisciplinary approach that involves the collaboration of experts in technology, conservation, and art history.

Current preservation efforts, including those made by institutions such as museums and archives, as well as by artists and researchers, are utilizing a variety of techniques and tools to ensure that early computer-based artworks are accessible and understandable to future generations. These efforts involve a multidisciplinary approach and collaboration between institutions, artists, researchers, and other experts in the field to preserve this important aspect of art history. Additionally, ChatGPT, a large language model, has the potential to play a significant role in preserving early computer-based art through documenting and annotating, generating new artworks, emulating and simulating early computer-based artworks, and recreating the context and ephemeral art. From September 2023, ChatGPT will have additional functionalities. It will be able to recognise images, listen and speak. These functionalities will be introduced gradually. Recognising and interpreting images will make the reproduction of early computational art with the help of ChatGPT even easier. Overall, preserving early computer-based art is an ongoing

effort that requires the participation of multiple stakeholders and the use of advanced technologies. It is important that we continue to raise awareness about the challenges and efforts being made to preserve early computer-based art, and the potential of ChatGPT in this field. This will ensure that these artworks are accessible and understandable to future generations and that the legacy of this medium is preserved.

The reconstruction of artworks as described in this article is also beneficial for art historians. An attempt at reconstruction quickly reveals whether the description of the artwork, be it through pseudo-code or natural language description, is sufficient for an accurate reconstruction of the piece, or if we have overlooked any crucial elements in the description.

In the described method of work, ethical considerations and adherence to copyright are also of significant importance. The question arises as to whether the described copying of an artwork is in line with accepted principles of preservation.

Art historians find value in the process of reconstructing artworks as it provides insights into the accuracy and completeness of existing documentation or descriptions. It serves as a practical test of whether the information available about an artwork, whether in pseudo-code or natural language, can faithfully recreate the work in question.

Furthermore, addressing the ethical aspect is essential in the context of reconstruction. It raises questions about the ethical implications of digitally recreating or copying an artwork. This involves considerations of copyright and intellectual property rights, as well as the preservation of the artist's intent and legacy. Striking a balance between preserving cultural heritage and respecting artistic integrity and copyright is a critical aspect of this endeavour.

In summary, the reconstruction of artworks serves as a valuable tool for art historians to assess the accuracy and completeness of descriptions, while also prompting ethical discussions about the preservation of art and the boundaries of copyright in the digital age.

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From first festivals to institution. WRO Sound Basis Visual Art Festival and the polish digital turn*

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Abstract

This article deals with the institutional aspect of new media art, which is inextricably linked to the socio-cultural and political context of its development. In the article, the author focuses on the results of her preliminary research on the cultural history of new media art institutions in Europe, focusing her attention on the history of the WRO Art and Media Centre, the most important and only independent institution in Poland, which has been co-creating an alternative system of festivals and new media art centres since 1989, still remaining little recognised in the pages of the great history.

Keywords

New media art, institutional definition of art; art world; institutional criticism; cultural policy; WRO Art Center; festivals

1. Introduction

What do the institutions dedicated to media art say about it? What story do they tell, what do they pass over in silence, what do they remember and what do they forget? The cultural history of media art institutions demands a voice and its rightful place on the pages of contemporary art history. Their functioning challenges the hegemonic nature of the artistic mainstream, constructing an alternative narrative that reverberates the language of exclusion and marginalization of the contemporary art world. In this paper, I focus on the institutional aspect of new media art, an aspect that remains inextricably linked to the socio-cultural and political context of its development. For the purposes of my inquiry, I define new media art as an instance of artistic practice which is produced, presented and preserved in a distinct institutional field which, subsequently, directly influences the reception and distribution processes. In this approach, I draw on the concept of "art worlds" introduced by American sociologist Howard S. Becker¹, who argued that a work of art, regardless of the form it takes, is not the product of an individual but of a social system in which the artist is one of the actors. I share the belief of Sarah Thornton, who argues that "the world of contemporary art is a loose network of overlapping subcultures united by a belief in art"². Art practices that combine art and science are one such subculture. The institution is construed here in a particular fashion, drawing on the thought of Antonio Gramsci and Pierre Bourdieu³, whereby it constitutes not only an external, organizational framework for the actions of actors in a specific social field characterized by a defined structure, established power relations, hierarchies or stable procedures of conduct. Institutionality also manifests in the systemic-structural circumstances, normative acts, procedures and defined roles of the social actors—resulting from their positions and functions—as well as in the organizational

cultures, cultural policies, geographies and chronologies of the networks thus created, in production processes and circulations of knowledge, being also evinced in the material surroundings or embodied attitudes, and so on and so forth. It comes to the surface in the dominant discourses and in the underlying ideologies that inform individual actions. The perspective adopted here enables a broader look at new media art, i.e. not only as an artistic but also a socio-cultural phenomenon deriving from historical and geographical factors, which has had a direct impact on the practices of everyday life, as a vital contributor to the shape of the global "network society"⁴ of the 21st century. My paper will focus on the findings from preliminary research into the cultural history of new media art institutions in Europe, concentrating my attention on the case of the WRO Art and Media Centre, the most important and the only institution in Poland, which since 1989 has been co-creating an alternative system of festivals and new media art centres, remaining still not much disseminated in the pages of the great history. In the approach proposed in this article, I am more interested in micro-histories often not easy, complex, full of rifts, gaps embedded in the experiences of people, the memory of places, contained in objects, the local landscape, visible in what is not-only human. In these great stories I look for cracks, fissures recognizing the importance of local narratives that build a heterogeneous picture of the institutional world of new media art. Learning about them gives a better insight into the complexity of the issues raised while revising historically entrenched beliefs.

2. Grand narratives of art science and technology towards little tales

The genealogies of new media art have already been explored in a number of significant studies, which make up a grand narrative on the relationship between science, art and technology⁵. They yield a coherent story that seeks to reflect the turbulent, dynamic history of the alliance between art and science, marked by the experience of two world wars or the Cold War arms race. With the intensive development of technology-based art practice, an institutional environment is taking shape, networks of people, places, spaces that are friendly to new media art, requiring completely new forms of engagement and unconventional partners that do not find understanding in mainstream art institutions.

The case of new media art is part of a broader historical context touching on the problem of the increasing incompatibility of museum institutions with changing art practice over time. This history can be traced back to the avant-garde practices of the early 20th century for which there was no place in the public museum venues that still espoused Enlightenment ideologies and modernist ideals of aesthetic beauty⁶. It is in the tradition of the Bauhaus, Futurism, Constructivism, Dadaism or Expressionism that the historical

alliance of art, science and technology takes its origin. Formulated between the First and the Second World War, the utopian visions of alternative institutional projects created by artists conceived by artists such as Vassily Kandinsky, Kazimir Malevich, El Lissitzky, the artists gathered around the Société Anonyme or the a.r group are examples of actions targeting the existing status quo, paving the way for new, subversive ideas that went against the prevailing standards. The Museums of Art Culture, Kabinett Der Abstrakten, Museum of Modern Art 1920, Museum of Art in Łódź or the International Collection of Modern Art are projects that ushered in further attempts to overcome the dominance of the single valid model of the museum, construed as a temple of art. Although—save for a few exceptions—“they were generally creations that never managed to evolve beyond provisionality”⁷, their contribution to dismantling institutional practices cannot be overestimated. Initiated by the avant-garde, the critique of the museum spanned successive movements and artistic manifestations opposing the institution of art seen as anachronistic, ideologically and politically entangled. Numerous historians cite the 1960s as a crucial decade in this respect, pervaded by a spirit of artistic dissent and political resistance against museum institutions, expressed most robustly in the new neo-avant-garde tendencies. That atmosphere of rebellion sparked the first wave of institutional critique, initiated by artists such as Marcel Broodthaers and Daniel Buren in Europe or Michael Asher and Hans Haacke in the United States. Using various means, those artists undertook a critical analysis of the structures and logic of the museum⁸. The critical discourse was not only directed against artistic practice but, primarily, the institutional mechanisms and the space where they materialized. The indisputable achievement of those first-wave forays is the opening, disruption and desacralization of the museum space, as a result of which artistic practice transcended its hallowed, elitist walls. That spirit of neo-avant-garde dissent, fuelled by cybernetic optimism, gave rise to alternative programmes, cultural institutions, such as EAT Experiments in Art and Technology, artist residencies at the Bell Lab, informal meeting spaces of the Gabeerbocchus Common Room in London—created by Stefan and Franciszka Themerson (1957-1959), the experimental Groundcourse run by Roy Ascott at the Ealing Art College in London (1961-1964), as well as pioneering exhibitions Generative Computergrafik (Studien Galerie, Stuttgart 1965), Computer-generated pictures (Howard Wise Gallery, New York, 1965), Computergrafik (Galerie Wendelin Niedlich, Stuttgart 1965), (Cybernetic Serendipity at Institute of Contemporary art, London 1968), Software (Jewish Museum, New York 1970), Nam June Paik: Exposition of Music – Electronic Television (Galerie Parnass, Wuppertal 1963) dedicated to art, science and technology, which demarcated a new field of artistic endeavour based on the previously impossible scientific and technological alliances. This very brief overview of the most important initiatives indicates not only the scale of the phenomenon itself but also the range of artistic pursuits that largely dominated the artistic practices of the neo-avant-garde of the time. Christiane Paul argues that „new media art has inspired many dreams of our technological future, among them the dream of a more or less radical reconfiguration of museums and art institutions.” And while it would be wrong, in her view, “to assume that new media art intentionally engages in Institutional Critique as a field of artistic practice”, she argues that Digital Art „intersects with Institutional Critique in that it

poses important questions regarding the status and role of the art object, as well as institutional processes”⁹.

Since the 1970s, a progressive institutional autonomisation of new media art has been evident, resulting in the separation of technology-based artistic practice from the contemporary art world, which still has far-reaching consequences today, translating into the still low visibility of this type of artistic practice in the wider field of contemporary art. This fact has become the subject of the critical discourse developed since the 1990s around new media art, which is most fully expressed in the problematization of the very concept of new media art understood as a “historical”¹⁰ category, “transitional”¹¹ or “self-referential”¹², being the direct cause of the aforementioned marginalization¹³. Without resolving the outcome of the ongoing dispute over the definition itself, it is worth looking at the ongoing discussions and critical voices as a manifestation of concern for the heritage of new media art, which in the context of current technological revaluations requires far-reaching rethinking. For the purposes of this text, I turn to the category of new media art, still recognizing the operational utility of the term itself, especially in the context of my reflections on the cultural history of institutions.

From the 1980s onwards, critical museum studies developed within the paradigms of the so-called new art history, whose task was to denaturalize the museum institution, deconstruct ideological and political discourses, revise museum practices that tended to absolutize and objectify historical narratives and artistic values, manifesting most fully in the fetishization of the notion of canon¹⁴. The new museology sought to make the museum a self-critical and sensitive space for all the voices hitherto excluded from the official discourse. Texts by Mieke Bal or Peter Vergo demystified the ideological and universalist narratives stemming from the Enlightenment traditions of the institution, exposing the social hierarchies, exclusionary practices or establishment hegemony hiding behind the institutional façade. The development of critical museum studies coincides with the heyday of new media art initiatives, falls in the 1980s, when, according to Edward Shanken, electronic media left the underground, “shaping the practical, theoretical and institutional basis for what became known as new media art”¹⁵. In the European art field, important exhibitions, symposia, festivals and biennials of new media art are emerging, sometimes becoming the seeds of future institutions: Ars Electronica (Linz Austria 1979-), V2 Organization - Manifestation for Unstable Media (’s-Hertogenbosch Netherlands 1987-1993, after V_2 moved to Rotterdam, the festival was approved from 1994 to 2014 as DEAF - Dutch Electronic Art Festival), ISEA International Symposium of Electronic Art (Utrecht Netherlands 1988, subsequent editions in other countries), International Experimental Audiovisual Festival (Arnhem, Netherlands 1985), European Media Art Festival (Osnabrück Germany 1988), Multimediale (Karlsruhe Germany 1989-1997), Digitart (Budapest Hungary organized only twice, in 1986 and 1990), Mediawave (Győr Hungary 1991). At the same time there was also a real boom of video art festivals: Video Art (Locarno Switzerland 1980), International Video, Film and Performance Festival VIPER (Luzerne Switzerland 1980), after several editions renamed VIPER; World Wide Video Fest (First edition in The Hague 1982 last in Amsterdam 2004), Videonale (Bonn Germany 1984), Semaine internationale de video (Geneva Switzerland 1985), Videofest (Berlin Germany 1988 since 2002 organized under the name

Transmediale) and Biannual International Festival Vidéo (Liège Belgium 1988). Although this list is far from complete it illustrates very well the dynamics of this decade, crucial for the future development of new media art especially in its institutional dimension. The list is completed by the WRO Sound Basis Visual Art Festival (Wrocław Poland 1989), organized since 1989, a festival that I consider an example of the institutionalization of an independent initiative that played a key role in Poland's digital transformation.¹⁶

3. From the WRO Sound Basis Visual Art Festival to WRO Art Center

In December 1989, barely a few weeks after the fall of the Berlin Wall, a group of friends, graduates of the University of Wrocław, organized the WRO Sound Basis Visual Art Festival. Solidarity's victory in the elections on 4 June that year removed the communist government from power, "the wind of history is blowing"¹⁷ and a breath of freedom was already felt in Poland. In this very much Latourian story, an important role belongs to heterogeneous human-non-human networks, formed by specific persons, practices, places, institutions, objects, technologies, which, intertwined, determine its course, negotiating hidden senses and meanings. This first review of media art and interdisciplinary undertakings in this part of Europe is being prepared without the involvement of official cultural institutions and outside censorship by an independent cooperative of artists, researchers and enthusiasts of avant-garde art known as Open Studio WRO, composed of Violetta Kutlubasis-Krajewska, Piotr Krajewski and Zbigniew Kupisz.



Figure 1: Paul Panhausen (NL) "The long String Instruments". WRO 1989 – performance at Jerzy Grotowski's Laboratory Theatre
Photo: Mirosław Emil Koch, courtesy of WRO Art Centre

"These are people from outside the so-called milieu coteries, i.e. groups shaped by years of resistance and conformity, which are characterized by mutual distrust, negative selection and networks of confining dependencies,"¹⁸ Piotr Bikont observed in *Gazeta Wyborcza* at the time. The festival's promoters are part of an alternative movement focused on a quest for new forms of artistic expression, aware of the transformations within art under the influence of technology. Violetta Kutlubasis-Krajewska is a member of the first Organizing Committee of the unprecedented international exhibition *Construction in Process*¹⁹, an event initiated by Ryszard Waśko and organized under the auspices of the Solidarity Trade Union. It opened in Łódź on 26 October 1981, less than two months before martial law was introduced in Poland. Together with Piotr Krajewski, they later collaborated with Józef Robakowski, Ryszard Waśko, Antoni Mikołajczyk, the members of the Film Form Workshop (1970-1977)²⁰, an

important initiative from the standpoint of new media art history. Next to the Experimental Studio of the Polish Radio, the activities of the neo-avant-garde Perfamo or Mona Lisa galleries²¹, they contribute to the Polish tradition of artistic explorations one was able to engage in at the time of the post-Stalinist thaw. They establish relationships with young Łódź artists: Zbigniew Libera or Łódź Kaliska. By the time of the first Festival, they are already well embedded in the independent cultural milieu in Poland, but also well versed in the currents and phenomena within Western art. At that time, Zbigniew Kupisz is significantly involved in the Wrocław music community, whose members defy the official realities and its institutions. He is behind various alternative undertakings, a music producer, the manager of the band Klaus Mitffoch, a member of the Polish Jazz Association and the manager of Rura, one of the foremost jazz clubs in communist Poland—a haven of freedom for the young generation.

Restricted access to technological novelties had a severe and adverse impact on the relationship between art, science and technology in this part of Europe.²² However, a temporary revival in the 1960s and 1970s is followed by a crisis, largely linked to the Chernobyl disaster of 1986, which engenders a dystopian discourse, fuelling technophobic sentiments in Poland. In the 1980s, the previously developed artistic strategies created in the spirit of interdisciplinary dialogue with science and technology lose relevance as greater importance is attached to various forms of social engagement. The anti-communist happening movement *Pomarańczowa Alternatywa* was active in Wrocław, exposing the absurdities of the system through parody and grotesque. The socio-political situation is very tense, while the tightening noose of repressions against artists broadens the scope of influence of grassroots countercultural phenomena that foster independent culture. The spirit of youthful defiance brings forth proto-networks based on strategies of media exchange, the rudiments of informal communication. This simultaneously mediatic and community paradigm would "largely, as Agnieszka Jelevska and Michał Krawczak argue, shape the critical notions of culture among the contemporary generation, for whom art and artistic activity became a form of community experience, by default belonging to the public domain."²³



Figure 2: Preparations for an audiovisual concert by Studio Ch&K (Marek Choloniewski and Krzysztof Knittel). WRO 1990 - the auditorium of Jerzy Grotowski's Laboratory Theatre, in the foreground, in front of the artists, a three-lamp video projector.
Photo: Mirosław Emil Koch, courtesy of WRO Art Centre

This experience is shared by the festival's organizers, who were heavily involved in the rise of Wrocław's alternative scene in the 1980s: "On the one hand, WRO showed this whole network of declarative institutions which were created by the energy of the people supporting each other on a network-type basis, a dispersed network which, however, had a common mission. The feeling of the mission was very strong. We knew that we were participating in changes, we knew that these changes were shaped right there and then also by means of our activity."²⁴



Figure 3: A viewer looking at the WRO 1991 exhibition at the National Museum in Wrocław. The photograph shows a fragment of Zbigniew Libera's video-object 'Mystical Perseveration'.
Photo by courtesy of the WRO Art Centre

The capital accumulated over the course of a decade, the contacts and networks established, are the foundation for their later activities as part of the first edition of the Sound Basis Visual Art Festival. The format adopted by the organisers involved a combination of meetings, presentations of works, exhibitions, workshops and concerts. This hybrid model reflects well the nature of all media events, for which the participatory and educational dimension was extremely important. They do not lack determination, optimism and faith in the success of their own venture. Still, they have to confront numerous organizational problems and, despite a large group of sceptics, push through a project that many find completely incomprehensible. In that troublesome period of political transition, cultural policy is relegated to the background as the country faces "more urgent" financial needs. The newspapers at the time were vocal about tightening the belt, cutting budgets, the disappearance of further festivals and cultural events.²⁵ "The city authorities could not afford such a festival and, indeed, they do not give a penny," Piotr Krajewski admitted in *Gazeta Robotnicza*²⁶. Towards the end of the 1980s, institutions are extremely underfunded, politicized, which translates into inertia in the milieu, who lack motivation and an idea for a course of action in the new post-communist realities. The Sound Basis Visual Art Festival becomes a remedy for the institutional crisis—which only exacerbated after the martial law—and the accompanying boycott of the official centres of culture and art. The grassroots, independent event in Wrocław event fills a major gap as an important venue where novel phenomena in Polish and European art alike may be presented which adapts audiences to technological and civilisational change.

Organizing the event is a grind, hard to imagine and understand today given the capabilities of online communication and human mobility, which is why entire families and personal networks are engaged. One of the protagonists in the story is a pre-war typewriter which belonged to Viola Kutlubasis-Krajewska's grandfather: the only technical means the organizers had to disseminate information about this pioneering initiative. Thousands of handwritten or typed letters addressed to artists around the globe, sponsors, companies, institutions are sent by post or telex. Thousands of kilometres travelled in search of support, hours upon hours of conversations held to convince people that the project itself is worthwhile. „Believing that we are doing an outstanding event, something incredibly important, we tried to convey it to both artists and institutions. And you can see here that we succeeded.”²⁷

The first edition of WRO was co-created by the Open Studio Cooperative and the Polish Jazz Association, Wrocław Branch, in direct co-operation with the Feature Film Studio, local television network Antena 5, OPRF Visual Education Association and the District Film Distribution Institution. The scope of assistance the event receives varies greatly. Wrocław-based institutions provide mainly symbolic support, offering their premises and, occasionally, the equipment needed to present the submitted works. The initiative is also promoted by the unquestionable authority of Urszula Czarторыska and Ryszard Stanisławski from the Museum of Art in Łódź. Special shows are also held by leading international institutions of the regular art world, such as Centre Georges Pompidou, Musée d'Orsay or the California Institute of the Art, entities associated with new media art, whose institutional status was not yet established: Ars Electronica from Linz or the Manifestation Internationale de Vidéo et Télévision de Montbéliard, as well as

corporate associates, which in the first editions included ITI and Berlin-based Softronic. The enthusiasm and willingness of the invited guests to participate in the event is so great that artists and representatives of institutions, jurors and judges come to Wrocław at their own expense.

The chief obstacle to organizing such a large, international event are limited technical possibilities, lack of the required festival equipment, thanks to which one could acquaint themselves with the material submitted by international authors and subsequently present it.²⁸ An anecdote/legend has it that the festival selection was carried out during night-time screenings at the Academy of Medicine, the only Wrocław institution to possess U-matic tape players, whose premises were made available after hours solely courtesy of friendly medics²⁹. Paradoxically, since the 1960s, the Wrocław-based Elwro Electronic Works had been producing successive iterations of the *Odra* computer, but these were inaccessible to individual users and, as the communist central planning would have it, they were intended exclusively for use in industry and science. This situation epitomizes the profound issues resulting from Poland's technological backwardness at the time, the aftermath of its long isolation due to post-war dependence on the Soviet Union. The efforts of the organizers are concentrated on acquiring sponsors and professional equipment to enable the planned events to take place.



Figure 4: Krzysztof Skarbek and Odra River Pearl Divers, intermedia action. WRO 1991 - performance in the foyer of the Contemporary Theatre in Wrocław
photo by Mirosław Emil Koch, courtesy of WRO Art Centre

The festival centre is housed in two small private flats on the outskirts of Wrocław and in the legendary Rura jazz club. Concerts are held in the café of the neo-Baroque Monopol Hotel, and Poland's first video installation, consisting of nine TV sets, is set up in its street-facing window. Initially, the display was to feature footage of the most interestingly captured wedding ceremonies, submitted by amateurs as part of a competition announced before the festival. However, no one responds to the newspaper ad. Archival photographs show people—ordinary passers-by—look with curiosity at the display window of the run-down enterprise, where computer animations would eventually be shown.



Figure 5: Poland's first video installation in public space. Hanno Baethe (Germany) 'Drehmoment'. WRO 1989 shop window of the Monopol Hotel, Wrocław, Poland. Photo by courtesy of the WRO Art Centre

The concert by Kormorany in the abandoned and dilapidated water tower Na Grobli will make history of the first edition of WRO. The venue could hardly be reached by public transport due biting cold conditions. In order to see the legendary *Cucumber Road Opera*, one had to "walk at least a kilometre or two in the cold and on ice", not infrequently falling over on the way.³⁰

Everything has the hallmarks of novelty, not only in view of the state-of-the-art equipment (the first computer printout of the festival poster, made using the now-forgotten linotype technique, Poland's first ever displays using a video projector), but also in terms of exposure to artistic practices which used to be completely inaccessible to a broader audience, dismissed by all museums or public collections that operated in Poland at the time. The organizers still very vividly recollect the long queues of the festival-goers lining up to see a computer live.

The first edition of the Sound Basis Visual Art Festival included video workshops open to the public, computer image processing workshops, and the presentation of more than 200 works from around the world, including interactive installations, performances, video shows, visual-musical actions, computer films, etc.



Figure 6. Open Workshop of Computer Graphics and Animation, classes led by Jakub Tatarakiewicz /SAD Macintosh/ (sits at Apple graphics workstation).

WRO 1990 Small Salon of the BWA Gallery in Wrocław. Photo by courtesy of the WRO Art Centre

The importance of the festival is reflected in the composition of the jury, composed of Isabelle Seigneur (Manifestation Internationale de Vidéo et Télévision de Montbéliard), Erwan Depenanster (Centre Georges Pompidou in Paris), Andrzej Kołodyński (International Short Film Festival in Krakow), Piotr Krajewski (WRO Festival), Anatoly Prokhorov (Studio Pilot in Moscow), Michael Scroggins (California Institute of The Arts in Valencia) and Stefan Szczypka (*Komputer* magazine), awarded two works out of more than 120 in the main competition: Jan Brzuszek's *Where This Road Leads* and Rafał Bogusławski's *0*. In the open competition, it singled out Cecile Babiola for *Menagerie*, Mirosław Koch for *Paradise 69* and Hanno Baethe for *Drehmoment*. The outcome of WRO 89, Krajewski argues, was "to draw attention to the phenomenon of electronic art heralding impending cultural and civilisational transformations."³¹



Figure 7: Installation by Enrique Fontanilles (ES/CH) / author first from left/. WRO 91 exhibition at the National Museum in Wrocław, December 1991 photo: Mirosław Emil Koch, courtesy of WRO Art Centre

The success of the event exceeded the expectations of the promoters themselves. The festival received ongoing coverage in the newspapers, on local and national television or regional and nationwide radio networks. Numerous domestic and international cultural weeklies dedicated to culture wrote about it as well, with the first review published in the Berlin city magazine *Tip*.³² Following the first edition of WRO 89, Tomasz Miarecki noted in *Gazeta Robotnicza*: "Thanks to the Festival, we have entered the international structures of video art, which will make it possible to promote Polish video-vision artists abroad."³³ Thanks to the established contacts, the works of Polish artists shown at WRO toured numerous festivals at home and abroad. Pieces by Józef Robakowski, Piotr Bikont, Mirosław Koch, Barbara Konopka or Jan Brzuszek were presented at the Manifestation Internationale de Vidéo et Télévision de Montbéliard, one of the longest-standing and largest media events in Europe at the time. Artists took part in the Scandinavian Icares festival in Aarhus, or the Brazilian Fotoptica VideoBrazil.³⁴ Through its successive editions, WRO joined a global network of various international communities engaged in artistic experimentation, exploring the possibilities and testing the limits of technology. After organizing the first three editions, Piotr Krajewski stated: "A network of exchange was born. Thanks to being present at WRO, artists started to gain global visibility. They started to travel, have contacts. And it all began to develop in a way that a certain critical mass was reached and we no longer had to animate certain things."³⁵

Consequently, the circle of persons and institutions supporting the initiative expands, reflecting directly in the reputation of the event itself, which is recognized each year by an increasingly broader audience. The success of the idea, however, came at a price of gigantic effort of the entire team. The promoters grow doubtful: "Well, that was the moment when we realized that the annual mode would doom us to compromise, to rush, to some kind of routine of having a festival in December each year. And we thought to ourselves that this is the end of it."³⁶ With the last of their money, they buy a black Panasonic fax machine with a microcassette answering machine and start thinking up the festival anew. The key decision is to change the formula, which is largely dictated by climatic considerations. December festivals caused quite a few production problems: "I remember the last WRO as being Siberian, like. There was no snow, it was just freezing and terribly cold and no club to meet in, because the venues we used before were being refurbished, while the new ones weren't there yet."³⁷ As of 1993, the WRO Sound Basis Visual Art Festival becomes WRO Biennale held in May, with guaranteed funding from the city and its own offices.

4. Conclusions

"Electronics and art have a future. They know it all over the world. On the Wisła and Odra rivers, a few enthusiasts are trying to convince our unbelievers of this. Will they succeed? - asked Tomasz Miarecki in *Gazeta Robotnicza* in 1989³⁸. It has been 35 years since the first, December Sound Basis Visual Art Festival. WRO continues to function, while retaining its status as an independent institution, pursuing the ideas of the past. It undertakes "a wide range of activities, in the original model of the WRO Laboratory, combining competences from innovative, creative, scientific and technological, to educational and organisational, experimenting with tools and ways of disseminating art, creating its own original solutions and

elaborations of exhibitions, artistic objects, educational activities, art documentation, and multimedia publications"³⁹. Historically and retrospectively, the emergence of the WRO Sound Basis Visual Art Festival in 1989 was certainly a symptomatic expression of the 'festivisation' and 'biennialisation' of the international artistic and, above all, media-artistic process that began at the end of the 1980s, significantly influencing the consolidation process of the new media art world community throughout Europe. By recording dynamic processes, it heralded the beginning of a new technological paradigm that poses enormous challenges for new media art institutions. Given the changes taking place in the world in the age of globalization, as well as the dominance of technoscience, late capitalism and climate change, the way we understand the social functions of institutions is subject to far-

reaching revisions. In addition, under the neoliberal socio-economic agendas, new media art institutions confront increasing market pressure and restrictions on public funding, making the need to describe the new media art world, in all its diversity and singularity, all the more urgent.

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The Moon as Subject and Form

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Abstract

This essay surveys a series of unique media artworks spanning a decade, the *Moonwalk* series, that combine technology, science, and art in the exploration of the cultural and material poetics of lunar artifacts. These works investigate humanity's epistemological, ontological, and poetic knowledge of the universe via our relationship with the Moon. They are cinema-installations that take on the Moon as both their subject and the determination of their formal realization, engaging the audience with the poetics of semantic and somatic metaphors.

The works in this series are composed of collected fragments of histories, stories, songs, poems, films, and scientific data assembled into lyrical, immersive films. Realized in formally diverse, spatialized projections, these cinema-installations disrupt the division between image and architectural space. The cinema-installations described here occupy domes, spheres, and skylines. They manifest as peripatetic films using the concept of somatic montage, the expansion of the cinematic experience into a supra-dimensional, architectonic, navigable space. Their formal realizations create multivalent spaces that rely on the viewers' movements and attention to complete their narratives. They merge with architecture and engender psychic associations that echo the Moon's original form and reframe one's perception of our singular satellite back into the sky.

CCS concepts

General and reference •Document types •Surveys and overviews

Keywords

Moon, cinema-installation, spatial projection, fulldome, tangible poetics, somatic montage

CRESCENT: an introduction

In this essay, we survey a series of unique media artworks spanning a decade combining technology, science, and art to investigate the cultural and material poetics of lunar artifacts. These works explore humanity's epistemological, ontological, and poetic knowledge of the universe via the Moon. The Moon in these works is made up of

collected fragments of histories, stories, songs, poems, films, and scientific data, assembled into poetic, immersive films. Each Moon interacts with the architectonics of its cinema-installation using distinct media technological approaches. These works take on the Moon as both their subject and the determination of their formal realization in an exploration of cinema in space. Each film's tangible, formal realization is a poetic extension of its internal narrative.

Somatic perception, proprioception of the body in space-time, is central to the composition of these artworks. The installations described here expand the linear flow of cinematic time by using spatial projection to create immersive, multivalent spaces. These spaces rely on the viewers' movements and attention to complete their narratives. This approach to cinema becomes an entangled synthesis of interaction and composition, a multimodal iteration between perception, structure, and interpretation that is the essential feature of the poetic. The somatic poetics motivate movement and engage memory, merging with the work's architecture to echo the Moon's original form and reframe one's perception of our singular satellite back into the sky.

Realized in formally diverse, spatialized projections, these cinema-installations disrupt the division between image and architectural space. They occupy domes, spheres, and skylines, merging with and engendering psychic ecologies. They manifest as peripatetic films using the concept of somatic montage, the supra-dimensional expansion of the cinematic experience into an architectonic, embodied, navigable space.

GIBBOUS: inviting movement

Film historian Rudolph Arnheim defines film montage as selecting the parts of interest, only those that are relevant, from the time continuum, events, and spatial totality of a scene. Some details are stressed. Others are omitted altogether.

For the ground-breaking montage theorist Sergei Eisenstein, montage is the imaginary path followed by the eye that creates an ordering of phenomena separated in time and space. In the essay *Montage and Architecture*, Eisenstein traces the interplay between film, architecture, and movement in which montage is a peripatetic experience, one created by an architecture that composes our awareness as we move through it. Movement through space creates

shifting juxtapositions of phenomena. The Acropolis provided Eisenstein with a quintessential example of an ordered architectural ensemble that draws one in, guides one's attention, and progressively reveals itself as the visitor traverses the grounds:

[When talking about cinema], the word path is not used by chance. Nowadays it is the imaginary path followed by the eye and the varying perceptions of an object that depend on how it appears to the eye. Nowadays it may also be the path followed by the mind across a multiplicity of phenomena, far apart in time and space, gathered in a certain sequence into a single meaningful concept; and these diverse impressions pass in front of an immobile spectator... In the past, however, the opposite was the case: the spectator moved between [a series of] carefully disposed phenomena that he absorbed sequentially with his visual sense.*

Eisenstein's peripatetic theory of montage anticipates architectonic, interactive cinema experiences such as 3D video games, virtual reality, and our theory of somatic montage for immersive cinema.†

In *Atlas of Emotion*, film historian Giuliana Bruno further describes Eisenstein's montage-architecture as "a dynamic and embodied territory."[‡] The Acropolis buildings construct a phenomenological narrative through a peripatetic montage in space. Bruno writes:

Here, the changing position of a body in space creates both architectural and cinematic grounds. This relation between film and the architectural ensemble involves an embodiment, for it is based on the inscription of an observer in the field. Such an observer is not a static contemplator, a fixed gaze, a disembodied eye/I. She is a physical entity, a moving spectator, a body making journeys in space.§

For Bruno, the body of an active, moving spectator creates a narrative from architectonic space.

APOGEE: the furthest distance

The sky has been observed and interpreted for as long as human history. In 2016, I visited Stonehenge with archaeo-astronomer Lionel Sims as my guide. Sims' spatial analysis of the Stonehenge monument and the rituals enacted within it describes the megaliths as a composed view of the sky. The stones direct our attention to details by the artificial horizons, viewing windows, and shifting blockades they create. Stonehenge forms a framing, or *mise-en-cadre* in cinematic terms, of the sky changing in time (Fig. 1). The megaliths choreographed the attention of the processing supplicants, creating an embodied, cinematic^{***} experience. Sims writes:

Not just the engineering, but also the artistry of the monumental architecture orchestrates participants into

the inner horseshoe from the Heel Stone. ... These dramatic stones draw walkers along the processional avenue into the horseshoe and simultaneously entrain their gaze onto the southwestern sky, then framed by the grand trilithon uprights.††

The cinematic gesture is one of framing space and slicing time. The Stonehenge configuration lures the eye of the moving spectator into position to ritually observe essential astral alignments at a selected moment. The stones establish an interactive montage of the sky. The megalithic architecture echoes the compositional selection process of Arnheim's film editor. Like Eisenstein's Acropolis, Stonehenge was designed as a series of "carefully disposed phenomena absorbed sequentially with one's visual sense." Eisenstein's postulations on an architectural montage experience reverberate in the older structure. Bruno's moving spectator is the performing supplicant's body. The Stonehenge monument functions as a slow montage, directing a cinematic view of the moving sky.



Fig. 1: Stonehenge at sunrise. Photo: Clea T. Waite, 9.15.2016

The peripatetic, immersive proto-cinema illustrated in the examples above demonstrates the theory of somatic montage. Somatic montage addresses the basic principles of cinematic montage in relation to a three-dimensional, architectonic screen(s) as a spatiotemporal experience. An inextricable interdependence of form, content, geometry, and viewer motion are the elements of somatic montage. In a somatic montage, expanding the linear cinematic experience into a navigable space of simultaneous presentations and ambiguous interpretations engages the body and memory in decoding a poetic, immersive, "cinematic" experience. Stonehenge and the Acropolis represent Ur-exemplars of somatic montage.

* [1] Pp.116

† The author first published the theory of somatic montage in [2].

§ [3] Pp. 56

*** Cinematic, deriving from the Ancient Greek κίνημα, kinēma, meaning motion.

FIRST QUARTER: the poetics of artifacts

Contemporary visual culture moves seamlessly between the observed and the generated image. The field of data visualization presents a manifestation of both simultaneously. Fact and fiction have become so intertwined that the phenomenon of deep fakes is rapidly becoming a propaganda tool and an existential threat to many creative industries. The notion of the deep fake is not new. Conspiracy theories questioning whether the Apollo astronauts landed on the Moon or whether filmmaker Stanley Kubrick created the entire event in a film studio still circulate today, fifty years hence. From the moment that astronomer Galileo tried unsuccessfully, in 1610, to convince his benefactor that the empirical Moon viewed through his crude telescope represented factual reality, thereby superseding all the canonical knowledge of the universe to date, the mediated image has repeatedly failed the Aristotelian truth test of direct observation in popular culture. In this atmosphere, how can art serve to navigate the boundary between the expression of cultural angst and a truly amalgamated practice that combines the fusion of science and art?

Found footage, or appropriation, is a genre of filmmaking dating back to the Avant Garde filmmakers of the 1920s and 30s[5] that creates compositions from segments of motion picture footage previously made for another purpose (Fig. 2). Found footage is used in pop-culture remixes, AI data mining, and documentary and experimental filmmaking. As an artistic practice, the footage is a found object, an *objet trouvé* in the sense of the Marcel Duchamp “readymade.” The found footage film is an ongoing strategy for reflecting on media where visual culture as a whole becomes a readymade object for investigation.

~~Found Footage~~ Found Data

Art of any era reflects the way in which its science and technology influence the contemporary culture’s view of reality. In the 21st century, the artifacts of scientific research^{§§} have become the new source of found footage, the components of collage, providing material metaphors for a new poetic language. This general phenomenon has become explicit in the contemporary practice of science-art.

Curator, teacher, and critic Itsuo Sakane has played a central role in defining the interdisciplinary area of “Science-Art” since the 1980s. Sakane focused in the 1990s on what he calls “Phenomenal Art,” material media artworks that operate with tangible, scientific phenomena and incorporate interactivity as “... cognitive psychological phenomena ...”^{§§}. Sakane has focused on science-art works such as *Fragments from Jericho* (1993)[7] by artist Paul DeMarinis, a replica ancient clay sound cylinder “played” with repurposed CD technology laser beams. Our notion of the somatic cinema-installation stems from a similar, phenomenal impulse, a desire for a tangible, embodied experience of the artwork in an inseparable convergence with the immaterial machinic/electronic data-poetics of media.

^{§§} For example, images and sounds deriving from experimental apparatuses range from particle accelerators to extraterrestrial cameras, radiation detectors, data visualizations

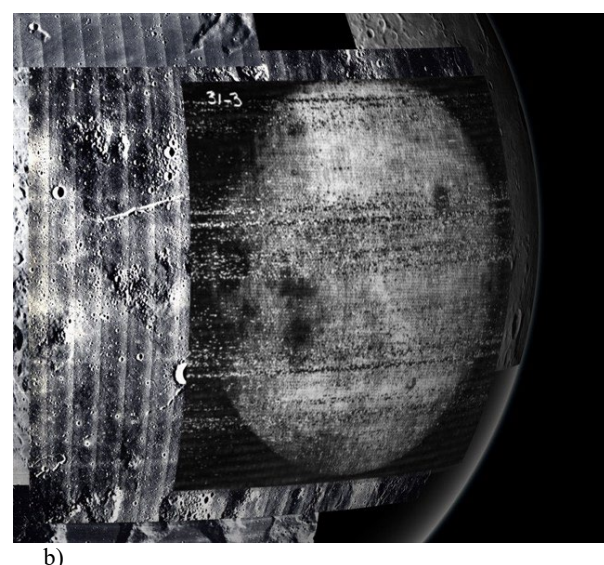


Fig. 2: The poetics of artifacts. *Moonwalk* details of technology-specific noise artifacts: a) original image NASA with video transmission static amplified. b) original Soviet Luna 3 probe slow-scan image. © Clea T. Waite 2010.

Moonwalk

Moonwalk (2010)[8] is an immersive, experimental film whose screen occupies an entire hemisphere, the first feature-length experimental fulldome film. It was conceived for projection in a planetarium dome, an architecture that echoes the form of the Moon itself. The planetarium dome architecture originated in the classical cupola, which has always been associated with the sky. Philosopher Peter Sloterdijk reminds us of the dome’s immersive celestial origins:

^{§§} [6] Pp. 42

The classic cupola ... forced the sky to enter the house. The function of the traditional cupola was precisely this: We wanted to interiorize heaven, and we transformed it into an umbrella so that we could walk under its protection.***

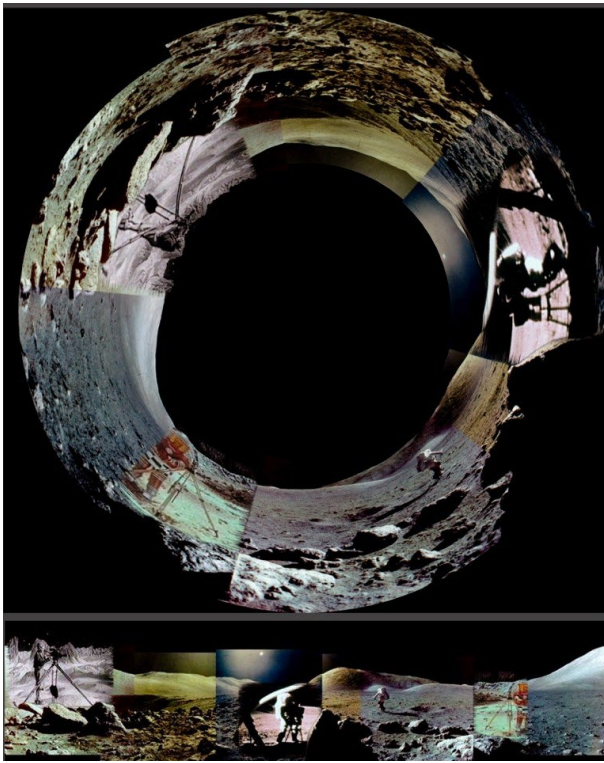


Fig. 3] Parallel histories spatially coexist in *Moonwalk*. Still- frame from *Moonwalk*, fulldome experimental film, domemaster and panorama views. Running time 22 min. Soundtrack by Helga Pogatschar. © Clea T. Waite, 2010.

Moonwalk signifies a formal expansion of the virtual cinematic space into an immersive, three-dimensional, architectonic space in which film form and content unify.

The *Moonwalk* series emerges from collages of artifacts. In *Moonwalk*, the mythic, the enigmatic, and the genuine Moon coexist in parallel poetic narratives formed from collected fragments of cultural and scientific data. Built on maps composed of lunar atlases, panoramas photographed by the Apollo astronauts, and the Moon itself, *Moonwalk* composes space from the artifacts of humanity's scientific and allegorical relationship with the Moon. The film remixes history with pop culture and scientific exploration

with literature and myth. In one scene, a jittering lunar atlas looms overhead, opening windows onto Georges Méliès' *Voyage à la Lune* (1901), collaged together with NASA archival footage of a LEM docking (1969) and a 1964 film from Ranger 7 approaching the Moon's surface. Bowie sings of astronaut "Major Tom"[10], and Van Morrison croons "a marvelous night for a moondance"[11] (Fig. 4). Meta-lunar journeys coalesce in time and space.

Revisiting the film archives of the later Apollo missions during research for the film, the tininess, the utter solitude of the astronauts in the vast and barren lunar landscape was striking. Overwhelmed by the poignancy of these documents, in *Moonwalk*, I invited those astronauts to dance, now side-by-side with cosmonauts, real and fictional. Fritz Lang's *Frau im Mond* (1929)[12] looks onto the scene (Fig. 3), and the Russian space dog Laika, the first mammal in space, dreams of her fantasy of a safe landing, strolling in her spacesuit on some strange and beautiful planet to watch another sun set. Congruous histories coexist in *Moonwalk*, occupying both space and time in the immersive dome. *Moonwalk* invites the audience to draw their own imaginary path with their eyes, to assemble their unique narrative by traversing its story across the dome.



Fig. 4] A lunar atlas[13] serves as a backdrop for lunar cultural film fragments. Domemaster still-frame from *Moonwalk*, fulldome experimental film. Running time 22 min. Soundtrack by Helga Pogatschar. © Clea T. Waite, 2010.

FULL: the poetics of space

The concept of montage does more than, in the words of Arnheim, "...separate things that are spatially continuous and join together things that have no inherent space-time continuity..."[14] The art of montage exceeds directing our attention through the linear flow

*** [9] pp. 230

of reality. Montage is also about making spatial connections, forming associations by proximity. It creates a space-time continuity of its own, refiguring the relationships between dimensions in the process.

Cinema operates in a manner similar to poetry, conveying via coded suggestion, intimation, music, and image. Umberto Eco describes the poetic function as one in which the audience finds themselves in the role of a cryptographer who must decode a message whose code is unknown. The form of the code is an inseparable aspect of creating the poetic function – of making meaning. The audience must resort to their own sensibility and intelligence to determine and decode the chiffrés woven into the artwork.

Like a somatic montage film, the genre of concrete poetry amplifies meaning by engaging a supra-dimensional spatiality. Concrete poetry uses a two-dimensional visual mode of spatial perception in addition to the one-dimensional, linear mode of language. This supra-dimensionality of the concrete poem allows for multiple juxtapositions and associations. This notion is beautifully demonstrated by the revolutionary example of Stéphane Mallarmé's 1914 poem *Un coup de dés jamais n'abolira le hasard*[15]. Mallarmé's poem wanders down and across the pages, defying the linearity of the text. The poem invites the reader to construct meaning with the same peripatetic eye that Eisenstein used to navigate the Acropolis and *Moonwalk*'s immersive form elicits from its viewers.

MetaBook: The Book of Luna

MetaBook: The Book of Luna [2014][16] is an expanded cinema installation, an electronic Wunderkammer that narrates a poetic essay about the Moon's place within the historical imagination. The *MetaBook* assemblage is a hybrid object that combines text, sculpture, interactive media, and cinema in a technological reconsideration of the Cornell Box assemblage. In *The Poetics of Space*, philosopher Gaston Bachelard describes how the comprehension of space as a poetic text necessitates motion, a textual somatic montage by a peripatetic mind as it navigates signifiers and codes. Within the *MetaBook*'s enclosing cabinet, the somatic traversal of an immersive film is transposed and miniaturized into an intimate, personal space of navigation. It merges 19th-century illusion effects with contemporary technology and poetics with scientific observations. *The Book of Luna* follows the tendrils of lunar influences in a lyrical narrative that unfolds across a series of projections and nested spaces.

Encased within the assemblage, an interactive spherical projection operated by a joystick replicates a miniature Moon. The projection combines realistic computer data of the lunar surface with authentic film recordings made from orbit by the Apollo astronauts and the 2007-09 Kaguya/Selene probe mission by JAXA. A joystick controlling the rotation of the Moon evokes the Apollo mission spacecraft landing controls (Fig. 5). The result is a navigable narrative on a luminous, three-dimensional lunar orb.

Spectral films of cosmonauts and animated fantasy characters from lunar stories appear to float around the globe using a Victorian illusion effect called "Pepper's Ghost." (Fig. 6) An interactive text scroll influences the globe and the stories, sending animated characters of lunar tales across the assemblage to their locations on the globe. Evocative objects occupy compartments within the object, inviting the eye to roam through the narrative as if through miniature rooms. The mind unfolds the narrative into the spatial dimension. The cognitive oscillation between the text, the globe, the "ghosts," and the sculptural assemblage of the cabinet enacts the larger metaphor of the lunar narrative and the poetics of space. *MetaBook: The Book of Luna* presents a supra-dimensional, medialized "book" that again functions as a formal, spatial extension of the film's poetic logic, inviting readers to encounter the tales of the Moon's great philosophers and scientists in a selenological history of lunar poetics.

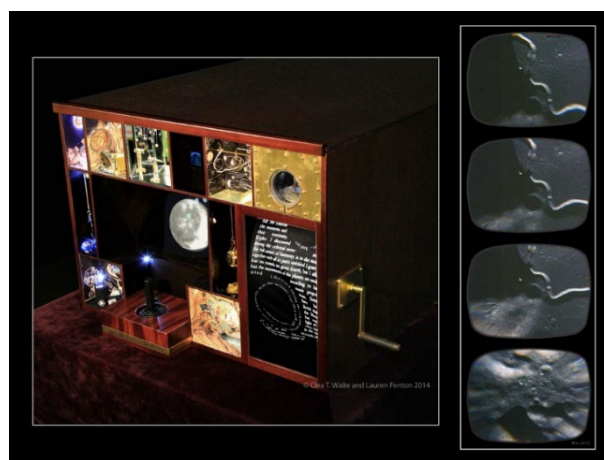


Fig. 5] *MetaBook: The Book of Luna*, interactive cinema object. © Clea T. Waite and Lauren Fenton, 2014.

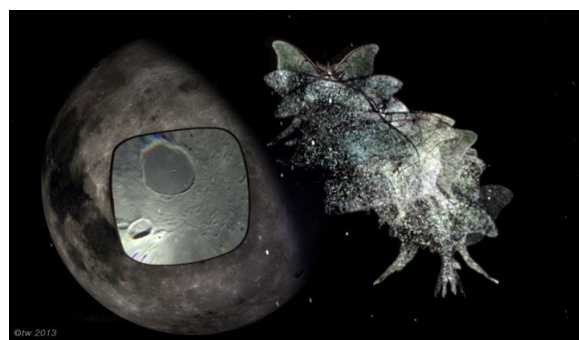


Fig. 6] *MetaBook: The Book of Luna*, pre-production still: lunar globe and Pepper's ghost. © Clea T. Waite, 2014.

WANING: potential and anticipation

The cinema-installation architecture as a concrete metaphor, like the concrete poem, is a composition in which the subject is inextricable from the form of the artwork. The concrete in art applies the supra-dimensional to its original format and makes it tangible. Within the genre of science-art and in the *Moonwalk* series presented here, this notion of the concrete occurs when the mediums, the materials, and the content become the proxies between the literal and the figurative. The choice of medium, with its accompanying number of dimensions, already invokes a field of possibilities before the work has even begun. The medium, the technology, and the form are the products of an intention. Materiality forms a vocabulary of the poetic.

who knows if the moon's a balloon?

The video installation *who knows if the moon's a balloon?* (2014)[17] represents an essential example of a concrete metaphor. An intrinsic union of form and content in a poetic adaptation of artist Ingo Günther's *Worldprocessor* series (2000-2023)[18], *who knows if the moon's a balloon?* is a poem unfolding as the presence of a huge and luminous lunar sphere. A giant suspended globe, a balloon, is projected with the ever-changing phases of the Moon in a simple juxtaposition of film and form (Fig. 7).



Fig. 7] *who knows if the moon's a balloon?* Video installation. © Clea T. Waite 2014

The endless and continuous cycle of the changing Moon imparts the audience a sense of anticipation and participation, building up an interaction between the object and their memory. Time is rendered palpable. The slight movements of the balloon in the air currents cause the projection to drift temporarily out of alignment so that a crescent of moonlight is occasionally cast upon the wall beyond, as if the virtual Moon is trying to enter our material space, disrupting the division between image space and

architectural space, as well as digital precision and the atmospheric chaos of a breeze.

PERIGEE: the closest pass

Every imaging technology imparts its unique fingerprint, its particular noise, on the images it records. These artifacts impart a distinct aura to the image – the floating grain of film, the magnetic dropouts of video, and the pixelation of the digital image. Despite their designation as “errors,” these artifacts convey a beauty bound up closely with nostalgia.

Early in the space program, NASA's first lunar orbiter images were transmitted back to Earth as monochrome strips of information. These were printed, sliced, and hand-taped together by scientists on the ground. The resulting, highly detailed images have an extraordinary texture – the artifacts of this mix of electronic, mechanical, and handmade assembly. The lunar images from the Russian probes of the same period were transmitted back as ghostly, slow-scan video stills of fragmented shadows.

Pericyynthion

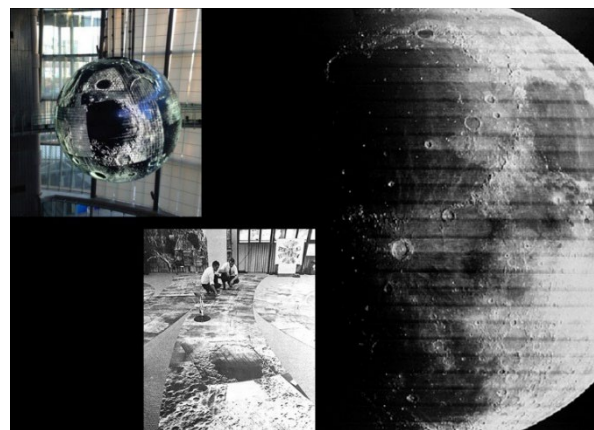


Fig. 8] Lunar orbiter images used in *Pericynthion*, a 360° video installation for the *GeoCosmos* video sphere. © Clea T. Waite, 2014. Image reproduced with the kind permission of Miraikan.

In 2014, we had the opportunity to compose a short, 360-degree animation for the *GeoCosmos* video globe at the Miraikan Museum of Science and Technology in Tokyo (now retired), a haiku for a spherical video screen. The resulting film, *Pericynthion*(2014)[19], takes its title from the point at which a spacecraft launched from Earth into orbit flies nearest to the Moon.

Pericynthion re-enacts the transmission of these first close-ups of the Moon, unraveling the completed images to reconstruct their original transmission over time while resituating them on the Moon's sphere (Fig. 8). A patchwork Moon assembles itself from these close-pass fragments of first lunar vision.

LAST QUARTER: bringing down the moon

Scientific inspirations for the *Moonwalk* series range from Galileo's discoveries to early space exploration, while cultural inspirations span Western history. One of the many inspirations for this series of cinematic moons comes from Federico Fellini's final film, *La voce della luna*[20], from 1990. Fellini's film culminates with the capture of the Moon. The Moon is tethered to the ground in an archway of a town square as a crowd of mesmerized viewers watch it on a giant video screen or cautiously approach it in genuflection (Fig. 9). Fellini's moon is shabby and banal in its shackles; nonetheless, it inspires awe in the townspeople simply because of its proximity.

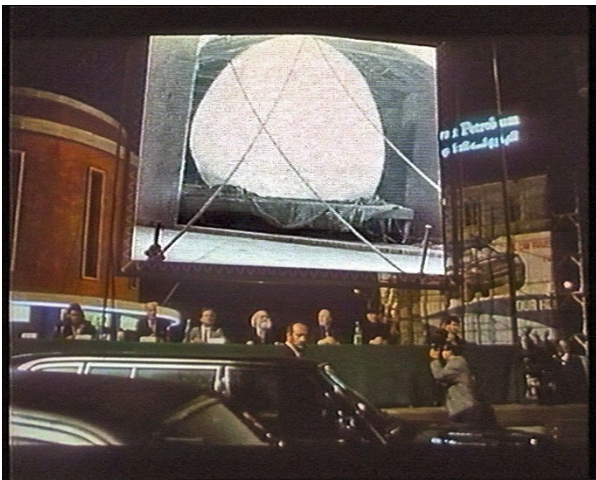


Fig. 9] Still frame of the captured Moon from *La voce della luna*, directed by Federico Fellini. 1990[20]

The poetics of the film's singular image of the Moon descended to Earth and its mediation is reminiscent of Aristophanes' Thessalian witch in *The Clouds*, drawing down the Moon:

Tell me, if I purchased a Thessalian witch, I could make the moon descend during the night and shut it, like a mirror, into a round box and there keep it carefully [21]

Big Moon Hong Kong

The next work in this lunar series is *Big Moon Hong Kong* (2016)[22], a site-specific, environmental artwork created for the ICC tower façade in the city of Hong Kong and commissioned by the Open Sky Gallery.

The ICC is the tallest building in Hong Kong, and at 77,000 square meters of pixels and 490 meters high, it was the world's largest video screen in 2016. The building is located prominently on the Hong Kong skyline. Kowloon Bay functions as a reflecting pool for the illuminated building. With its unique form and situation, the tower provided the ideal opportunity to bring down the Moon.

Big Moon Hong Kong was created from animated, highly detailed lunar photographs, and the soundtrack was composed of the archival space chatter of various missions. The entire ICC façade is covered in programmable, white LED lights that create a monochrome video screen. The architecture is the film, and the

entire city waterfront is its space of interaction as the Moon descends into the heart of Hong Kong's skyline (Fig. 10). The audio played from an accompanying app on individuals' cell phones. The artwork performs historical astronomical data as a video poem, a gigantic Moon occupying the entire building façade.



Fig. 10] *Big Moon Hong Kong*, site-specific video installation on the ICC Tower, Hong Kong. © Clea T. Waite, 2016

Like the Stonehenge monoliths, the tower directs our attention and composes our view as we move through the city. In this sense, the environmental artwork mediates a virtual sky consisting of the twinkling lights and neon of Hong Kong's skyline while simultaneously conjuring the real sky above. The virtual and the actual sky intersect, transforming each other and vying for our attention.

NEW: conclusion

The cinematic gesture frames space and demarcates time. The notion of a peripatetic film, developed by Eisenstein, has been broadened here to establish the concept of somatic montage, the expansion of the cinematic experience to include embodied participation in architectonic, navigable space at varying scales. With a camera operated by a human or a probe, we can photograph the sky to frame and capture a sign in a moment of time and space. With architecture, we can guide our bodies and eyes, framing our somatic awareness of the space and moment we occupy. Montage creates a space-time continuity of its own, refiguring the relationships between dimensions of image, space, and time in the process.

The artworks presented here expand beyond the customary division between image and architectural space. They engender psychic associations between science, Nature, and culture that echo the Moon's original form and reframe one's perception of our singular satellite back into the sky. The cinema-installations are poetic compositions in which the subject's code is inextricable from the form of the artwork and whose decryption necessitates an embodied intelligence. The artworks are multivalent spaces, dynamic and embodied territories that rely on the viewers' movements and attention to complete their narratives. The materiality of form and data artifacts establishes a sensate vocabulary, expressions of tangible poetics in which the medial representation merges with the real. The Moon, with its unique epistemological, ontological, and poetic position in the human imagination, is itself a complex montage, a ubiquitous concrete poem in subject and form.

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ABSTRACTS

INDIVIDUATION PROCESSES IN HYBRID ECOLOGIES: ON THE RELATIONSHIP BETWEEN ART, MACHINES AND NATURAL SYSTEMS

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Abstract

The critique proposed in this research will respond to how artificial agents (machines, algorithms) manifest themselves irreducibly with nature, forming open dynamic systems, from a perspective of individuation raised by Gilbert Simondon. This perspective complements Bernard Stiegler's (2017) notion of organology, as a condition of human and technological constitution. To address it, the art-machine-nature relationship is traced, considering its processes of ontogenesis (Simondon, 2015) and epiphylogenesis in this evolution (Stiegler, 2002). In this spirit, addressing the notion of hybrid ecology hopes to provide a philosophical foundation for a new understanding of natural and artificial creativity based on a notion of relational individuation that encompasses both human and non-human creativity through concepts of cultural techniques (scriptural, figurative, and computational) integrated with a self-representative potential, in an attempt to show how these material relationships contribute to generating a more substantial insight into some of the fundamental issues between natural and artificial systems. The objective of this text is, above all, to provide a theoretical framework that, in some way, seeks to distinguish between the issue of mediation and the issue of communication and information in media arts. This distinction is mainly heuristic, that is, tentative and pragmatic, and the purpose of separating mediation from the media will be to clarify the relationship between them. Finally, understanding the scope, limits and possibilities of this type of technological crossover as a complex and still unresolved challenge that carries an urgency marked by the disruptive effect they have on artistic, social and political life.

Keywords: Ontogenesis, machines, new materialisms, ecology, digital art.

*Speaker

How the practice-based research methodology ”exhibition lab” helps build sonic laboratories.

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Abstract

Through my research, I have reviewed the laboratory definition, including the overview of different types of labs. In addition, I have extensively researched case studies of artists working in laboratories and current examples of sonic laboratories in the academic environment. All this investigation has given me a chance to understand how laboratories behave in society and how they build society, too. Moreover, I found that hegemony is central to my research as establishing a scientific view of the lab turns the lab into a scientific place. Despite that, I can demonstrate there is a hybrid lab that represents a counter-hegemony. I have investigated creative methodologies in laboratories through practices such as Do It Yourself, workshops, curating, and archiving, which turn labs into creative places. This paper will present duality in laboratories centred on hegemony vs hybridity. Finally, to overcome some issues encountered through my research, I will explain a future outcome for the sonic laboratory based on the concept of the exhibition lab – a practice-based research methodology for curatorial practices.

Through this research, I have investigated the possibilities of sonic laboratories. Based on the literature review, case studies, and different lab methodologies’ analysis, I have been exploring whether sonic laboratories could represent counter-hegemonic practices when studying laboratories. The research indicates that the possibilities of the sonic laboratories are creative and artistic in front of a dominant scientific laboratory. The research has worked on multiple definitions of the laboratory, and I will also overview and highlight concepts such as hegemony and counter-laboratory. This research follows an inquiry that intends to show the hierarchies and constructions of the lab as a hegemonic place.

The research considers the sonic laboratory as another typology of a lab that principally works with sound. I have investigated widely the notion of different labs: academic, industrial, scientific, or those labs ruled by artists, and I have documented on more than one occasion that hegemonic powers help identify and construct other hegemonic notions of labs through a view and perspective based on the technoscientific use of labs. But, contrary to the hegemonic lab, there are also counter-hegemonic practices. And counter-hegemony displaces laboratories and imaginaries of the Global North toward their everyday reinventions and appropriations taking place everywhere through activists, artists, communities, indigenous, anti-racists, and feminists’ practices of resistance reshaping planetary and challenging colonialism and extractivism.

This research raises the question of hybrid labs as counter-hegemonic laboratories. But through the research, I have faced some limitations. While studying laboratories’ limits and

*Speaker

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impositions, I have realized that a new approach to the laboratory concept through a more counter-hegemonic position is required. A counter-hegemonic view of the laboratory could include hybridity and a more practical approach through the idea of the exhibition lab. The exhibition lab is a practice-based research methodology that will contribute to understanding the overview of the laboratory from a curatorial approach.

Keywords: exhibition, laboratory, science, curating, hybrid

CHIMERA. Expanded bodies and identities between art, design and technoscience

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Abstract

Technoscience is today perceived as a vast field of research and development among super-intelligent computers, bio-technologies and body-hacking-medical techniques. It promises to have an increasing impact on human beings, expanding their mechanical, genetic, sense and intellectual boundaries in a context of physical reality intertwined with widespread networks and virtual worlds. Technological development and scientific research are "diffracted" disciplines of the same contemporary cultural horizon; particularly, for their mutual interest towards human bodies, the non-hierarchical relationship with organic and inorganic surroundings and the formalization of a more-than-human perspective of the world. Too often considered still as separated elements by digital culture and contemporary art & design, these basic disciplines of human creativity and thinking are still missing a proper thought on the ethical, political and social implications that emerge from a compelling reflection on new ways of dialogue between our "expanded bodies" and other "entangled elements", that questions "correlationism" and the nature of the "agency" itself. An ontologically constituted environment of organic and inorganic subjects and objects, interspecies solidarities, other living-non-living beings, humans and otherwise. This lecture aims to highlight the original investigation carried out by a courageous bunch of artists and designers in the early years of the new millennium. In their hallucinated dialogue with algorithms and in the wet embrace with biology, they have been speculating and developing new narratives, aesthetics and designing our bodies of tomorrow. Taking care of studies and experiences in the XX century post-industrial revolution era, what their practice suggests is to definitively overcome the limits of anthropocentric culture, widen the boundaries of posthuman philosophy with theories like ATN, New Materialism, Agential Realism, Speculative Realism and Object Oriented Ontology, integrating Cyberfeminism and STS studies with an anti-disciplinary method between art and design, to formalize an ethical reconfiguration of conformity to its contamination with diversity. Fluid like the "expanded bodies" they study, queer in a very nature in constant transformation, their artworks and projects are opposed to binarism nature-culture, technology-science, real-virtual, sex-gender, art-design; through them this lecture tells dreams and nightmares, utopias and dystopias, constraints and freedom of new human beings in this reconfiguring contemporary era.

Keywords: expanded bodies, digital cultures, media art, posthuman philosophy, entanglements, agency

*Speaker

Doom Cloud

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Abstract

I propose to offer a PowerPoint presentation called *Toxic Implication* on my practice-based research as an installation artist.

Doom Cloud engages American spectacle at the crossroads of waste culture and the surveillance state. The material substrate of the exhibition will be salvaged from the local area. Gathering e-waste, billboards, styrofoam, neon, and scrap metal, I assemble salvage into a suspended network of material rigged top-down from the ceiling. I weave surveillance equipment within that material network to capture people as they approach the work. The live surveillance video feeds are combined algorithmically with test patterns and re-deployed through a multichannel array to submerge the installation in projection. By illuminating the installation via the "calibrated" image of the spectator, the work calibrates the viewer in terms of the salvaged substrate upon which it is projected.

"Pollution is in fashion today, exactly in the same way as revolution: it dominates the whole life of society, and it is represented in illusory form in the spectacle."

Guy Debord, *A Sick Planet*

Keywords: dystopia, climate change, installation art, interactive media, media ontology, waste culture, surveillance

*Speaker

György Kepes's unfinished "Light Book," an encyclopedic survey on new media art

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Abstract

My paper is focusing on an unfinished book manuscript written by György Kepes, a Hungarian–American painter, photographer, designer, university professor, curator, and media theoretician, between the 1930s into the 1980s. Kepes's work consists of a palimpsest of visual and textual materials he collected, produced, and wrote over his lifetime. It meant to be published as a gargantuan enterprise to extend and re-evaluate the ideas he first came up with in his 1944 *Language of Vision* and a handful of other publications he edited in the field of art, science, and technology, including the historic "picture book" on the bioromantic approach of cybernetic art, *The New Landscape* (1956) as well as *The Visual Arts Today* (1960) where Kepes used the term "visual culture" the first time in history. György Kepes was the founding figure of the Chicago New Bauhaus Light Department in 1937 and in the 1950s he was awarded two Rockefeller Fellowships at the Massachusetts Institute of Technology (MIT) specifically to complete his research on light as a creative tool in art and architecture. Kepes's unfinished and unpublished book manuscript that he started to write as a volume in Walter Gropius's Bauhausbücher series, together with his compatriot and colleague László Moholy-Nagy in the early 1930s in Berlin, draws from these scholarships to situate kinetic art in a broader art historical framework and to present the medium as an autonomous discipline with its own language and vocabulary, involving both technical lore and artistic sensibility. The reconstruction of the results of Kepes's findings that based on the texts, pictures, and many statements he was collecting, archiving, and contextualizing over almost 50 years, their assessment and juxtaposition with the developments of contemporary media art is inseparable from the historical inspection of the early instruments of scientific image production, the intersection between art and industry as well as the exploration of the human's place in the world, social environment and the relationship of the man-made world with nature.

Keywords: Gyorgy Kepes, MIT, Light Art, kinetic art, media art

*Speaker

Oppositional Operators: Media Art and Community Action in Chicago, 1970-1980

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Abstract

A tactical misuse, a neighborly alliance, a local intervention: in moments of chronic crisis, much like the one we currently inhabit, these phrases do not lend themselves to a universalizing search for solutions. Technological interventions, performed at the scale of the neighborhood, may not aim to tackle issues at the global scale, yet they contain in their multivalence a unique cross-cultural relevance and poignant efficacy. It is in minor actions and the making of coalitions—often ephemeral, sometimes informal—that striving toward freedom emerges as creative praxis.

This paper explores the community media landscape in 1970s Chicago, focusing on the ways that artists, teachers, and community organizers creatively (mis)used technologies emerging from corporate industries in projects of self-representation and political activism. I examine two interrelated projects: first, a 1978 mural by Malú Ortega commemorating the hard-fought opening of a high school in Pilsen, a predominantly Chicano neighborhood in Chicago; and second, the Community Television Network (CTVN), an educational organization founded in 1974 by Denise Zaccardi to teach Black and Chicano teens to use video and cable television to produce media that centered their lived experiences. One of the teens' videos, *A La Esperanza* (1979), documented the painting of the mural on their high school. This video was then circulated amongst neighborhood peers in order to incite political involvement by youth in advocating for increased rights for Chicago's Latin American residents. The mural, designed via Ortega's experiments with then-new technology of xerography, married images of the Chicano power movement with representations of new technology's potential for historically underserved communities.

In this paper, I use feminist, queer, and performance theories to explore how Zaccardi, Ortega, and their students intervened in an exclusionary political terrain, shaping new publics and counterpublics through public art complemented by videos exchanged between peers. I follow Jose Esteban Munoz in naming these artists' and students' video-based interventions "disidentificatory," insofar as they index survival strategies oriented toward asserting agency within systems of racial and gender-based. Supported by previously unexamined archival material and interviews with teachers, students, and artists, I argue that Ortega's mural and its documentation by CTVN students present a history of new media not merely as communication technologies bound up with corporate interest, but also as opportunities for affinity, collectivity, and political intervention.

Keywords: Activism, New Media, Intermedia, Multimedia, Community, Pedagogy

*Speaker

Recorded human spoken voice and heritage: Study of the experimental project "The voice of Hammadi Ben Saad by LK" (Tunis 2022 - Porto 2023)

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Abstract

This paper will provide an original model of processing and performing the recorded spoken voice to convey it to an audience as a vivid heritage of cultural significance. This new approach to human sound is based on the experimental project "The voice of HBS by LK", which the first phase was implemented in Tunis in 2022. During a performative collective listening session, the audience engaged with the encapsulated recorded voice of the internationally acclaimed Tunisian painter Hammadi Ben Saad. The research focused on the listeners' experience.

The project had two purposes: 1. capture the embodied self-narration of a national figure; 2. test new aesthetics to share this voice and speculatively generate a movement of revoicing by the participants. Transmission and constant renewal of orality are mentioned in Article 2 of the UNESCO Convention for Safeguarding of Intangible Heritage, but to date are notably forgotten.

This proposal intersects with Track 1 of Re:Source 2023 as it embeds the whole chain of sound production, to reach the continuity of human memories through time. Curated collective listening sessions seem to work as a transfer of heritage mediated by sound technology. The second phase of the project will unfold during the first part of 2023. It is a reenactment of the listening session in Europe (Porto), far from the place where the voice was recorded (Tunis, Africa), within a language-sharing community. As the geographical and cultural distance grows between the voice and the audience, the relationship between voice and heritage might vary. This phase intersects with Track 4 of the 2023 MAH Conference.

Keywords: voice, heritage, collective, listening, emotion

*Speaker

Home viewing: cinema on the television monitor and video art in Brazil in the 1990s

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Abstract

This communication is about video art in Brazil in the 1990s. It indicates relevant factors for understanding the production conditions in that period, such as: the absence of permanent institutional support for production and exhibition of video art; the limited ability of most artists to acquire their own equipment; the equipment import restrictions, taxes and fees. In the 1990s, video art in Brazil still had limited presence in museums and art galleries, and was also insignificantly broadcast on open available television channels. It was the art biennials and large exhibitions that showed a greater number of works characterized as video art, especially those held in major cities. In this context, video art was less physically accessible, as a direct experience, than the contents broadcast by television stations at the time. Normally, such contents were associated with the video tape recorder (VCR) and placed in a domestic environment, which centralized the audiovisual form composed of films, soap operas, television news, variety shows, etc. Amid this miscellany, the cinema on the cathode ray tube (CRT) monitors particularly informed video art production, which was in the process of existing as a field in Brazil. Thus, making an audiovisual piece that could be called video art had more to do with confronting something known, constantly seen in cinema and television, than with the affirmation of something unknown, namely "video art", rarely in the collections of contemporary art museums. In the 1990s, going to a video rental store (returning home, turning on the television set and playing the video) was the first option to bring together the field of art and video - "author" and "activist cinema", for example, were placed in video rental stores under the category "art cinema". As an artist who started making video art in that period, I believe it's worth questioning, therefore, whether there really was a popularization of video art in Brazil, considering the material limitations of production at the time. Objective questions can help us find an answer: how much did a professional video camera cost? What was the price of a computer capable of processing video and audio? What was the minimum wage at the time? Whose responsibility was it to provide the equipment for the exhibition? Given this scenario, wouldn't the idea of popularizing video art in the 1990s be an object of theory? More a wish that Brazil was in tune with other international contexts than a concrete fact?

Keywords: Video art, Brazil, nineteen ninety, VCR, Cinema

*Speaker

Coral Lives, Coral Media

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Abstract

For most of the twentieth century, the US military occupied Culebra and Vieques, Puerto Rico, blanketing the islands with incessant noise from bombing practice and rendering them aurally toxic. This had profound implications for the health of animal, human, marine and plant life. Post-occupation, residents and artists have used sound to restore and reclaim contaminated and disfigured spaces. This paper is part of a larger project, entitled *Remediated Islands*, that traces the production of expendable lives and spaces as well as the remediation of these spaces through public creative expression. In particular, this presentation centers on coral reefs off the coast of Vieques, Puerto Rico. The bombing interfered with coral's echolocation, which it uses to grow. The paper begins with the question of whether and how it is possible to understand militarized violence from the perspective of coral. Is there an archive? Does a post-humanist perspective require that we at least ask? Photography and sound recording have mediated coral lives and rendered them accessible to humans, yoking them to climate change campaigns as particularly photogenic threatened species. The paper then turns on itself to consider the critiques of media practices (photography and audio recording) as extractive and potentially damaging to the very entities they are claiming to save. The work of remediation, I argue, necessitates an exploration of the ethics of media production.

Keywords: coral, violence, submarine photography, hydrophone

^{*}Speaker

Museums, new technologies and circular economies

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Abstract

In times of environmental crisis, the cultural sector embraces critical ecological discourses, with numerous artistic and curatorial practices contributing to interdisciplinary debates on multispecies care and kinship, the destruction of the biosphere, and a wider ecological thinking. In the field of new media arts specifically, gravitation towards engaging with ecological entanglements of non-human, human and material indicates an ongoing shift from the ‘techno- scientific’ to a ‘techno-ecological’ paradigm. Whilst new understandings, relationships, and accountabilities are identified, museums and art centres’ operations remain entangled in neoliberal processes and conditions of production. As a response to this contradiction the paper will discuss two case studies introducing models of circular economies as methodologies of alter-institutionality in media art institutions. It will consider fundamental ideas concerning ecosystems, sustainability, renewable energy, new technologies and material conditions of media production.

The first is the E-WERK Luckenwalde art centre operating in the renovated, former brown coal power station 65km south of Berlin. With carbon-neutral electricity produced via its activities particularly the commissioned art projects, the centre intends to power its own building and sell the surplus back to the national grid. The art centre is led by Performance Electrics, a not-for-profit art collective whose ambition is to produce Kunststrom (art electricity) through artworks or artistic methods. Kunststrom is an electricity supplier, substantially funded through the proliferation and production of its own energy; all client profit is redirected into the development of Kunststrom technology and the financing of E-WERK Luckenwalde.

The second project titled *Notes Towards a Permacircular Museum* by artist Stéphane Verlet-Bottéro was materialised at ZKM — Center for Art and Media. The project questioned the ZKM’s institutional operations through mapping the exhibition’s own materiality and ecological footprint followed by a collective effort to restore an abandoned fruit orchard near ZKM which then became part of the museum’s maintenance plan. Both E-WERK Luckenwalde and the *Permacircular Museum* at ZKM are a synthesis of collaborative energies and synergies between art, technology and ecology providing sustainable strategies for the future of art institutions.

Keywords: alter, institutionality, Environmental media, techno, ecological, circular economy

*Speaker

Environmental Art and the Social. From expanded concept of art to expanded concept of life, science and the political

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Abstract

UN documents (e.g. the 2030 Agenda for Sustainable Development) not only promote sustainable development in terms of the introduction of environmentally friendly energies and waste management, but also place emphasis on social inclusion, solidarity and quality of life. Also, the Anthropocene is not only a geological and cultural paradigm, but a concept critical of anthropocentrism, with which we refer to the expanded concept of life that considers plants, animals, smart machines and artificial intelligence as co-evolutionary entities alongside humans. The challenge of the post-anthropocentric world, in which the human is threatened by environmental disasters, pandemics and wars, is responded by environmental art (including climate fiction) and the art of the Anthropocene with projects in which distinctly social themes come to the fore. This paper aims to explore four examples of environmental art in which social topics are expressed, which means that they reactivate Beuys' notion on expanded concept of art and apply it to life, science and politics. With the introduction of a more-than-human methodology, Museo Aero Solar (2007-2023), Global Water Dances (2011-2023), Maja Smrekar's K-9_topology /2014-2017) and Špela Petrič PL'AI (2020) are explored. These projects at the intersection of (citizen) science, social theory, artificial life and AI, destabilize the concept of a work of art and replace it with the goal-oriented artistic service as a cognitive and research activity that generates the knowledge complementary to that contributed by the sciences. As counter-anthropocentric, they introduce us to alternative communities of humans, animals, plants and AI, among which there is by no means only a post-political symbiosis, but also antagonisms, say between AI and animals, which challenge a new ethics and politics. The philosophical theory of the Anthropocene redefines the concept of life-as-we-know-it, introduces the concepts of hyper-object and hyposubject (Morton and Boyer, 2021), foregrounds the sym-poiesis (Haraway) and points to the horizon of a world-without-us, which can be discussed with the help of literary and artistic horrors (Thacker, 2011).

Keywords: expanded concept of art and politics, social inclusion, Anthropocene, sympoiesis, alternative communities, world, without, us, environmental art

*Speaker

The Issues of Space and Embodiment: Marko Peljhan and Dragan Živadinov

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Abstract

By its essence, the media artwork corresponds with social, political, environmental and technological aspects of a society, into which it is embedded. We are dealing with the distinctly relational model where different disciplines and fields of knowledge (cp. the notion of "third culture" by Victoria Vesna, C. P. Snow) fruitfully intertwine.

As two examples of pioneering approaches in media art, I analyze the function and the role of space and body in the work of Slovenian artists Dragan Živadinov and Marko Peljhan. I am primarily focusing on two major art projects: the first is the post-gravity performance *Noordung:: 1995-2045* (from 1995) by Živadinov, and the second is Peljhan's *Makrolab* (1997–2007), a pioneering platform for other art projects. In both, a particular importance has been attributed to the notion of space, which – especially in the case of Peljhan – is also data space, since *Makrolab*, as a complex and autopoietical system environment, tries to intercept and analyze data from various systems – i.e. communication, climate, migration. In Živadinov's case, by launching his art project into outer space, we encounter a "fall upwards" and therefore a "complete reorganization of vision" (P. Virilio). The attitude towards technology is characteristic in both works, too, since it has been changing over time.

While both projects have been in certain ways extended into the sky and outer space (conceived as data space as well), the same features can be noticed regarding the issue of corporeality. We cannot experience the space by naked eye and without mediation: special aids, prostheses, extensions are needed, raising questions about redefinition of the body and embodiment in digital era. We encounter here the revised notions of technology, changing over the duration of both art projects, as well as the vision of its development in the future.

CV

Maja Murnik holds Ph.D. in philosophy and theory of visual culture at the University of Primorska, Slovenia. She graduated in comparative literature and in theatre studies. She is currently employed as the researcher at the Faculty of Computer and Information Science (University of Ljubljana), working at the national project on the sustainable digital preservation of Slovenian new media art (2021–2024). She is also a co-founder and the researcher at the Institute of New Media Art and Electronic Literature (www.inm.si) and a freelance art reviewer.

Keywords: postgravity art, outer space, space, embodiment, Marko Peljhan, Dragan Živadinov

*Speaker

We might have seen it coming: Newsreels of the 1950s and 1960s represent the past, and mirror the present and environmental future?

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Abstract

Before television was established as a mass medium in Germany, the cinema newsreel was an important medium and the only way to convey news and ideas to a wide audience through impressive moving images. An edition contained 8 to 15 reports on a vast variety of topics: politics, economics, disasters, fashion, news from foreign countries, art exhibitions, trade fairs, animal stories, city scapes, and sports. Each report was underscored by music, sound, and commentary text.

For the design of a report, material from different sources was edited: photographs, newspaper headlines, animation film and staged scenes. Archival film and even pieces of feature film were inserted in annual reviews and flashbacks to the ‘good old times’ of the 1920s or to the horrifying Second World War. Besides looking back, the reports reveal topical problems, which are still common for us today, e.g. environmental problems, traffic collapse, air pollution, care crisis, and use of plastic packaging. They addressed also visions of the future. In the mid-1960s, the West German newsreel *Zeitlupe* contained a section, titled *Die Welt von morgen*” (The World of Tomorrow”) with reports on concrete architecture, new energy sources (e.g. nuclear power) and technological developments, such as automation and robotics. The films conveyed the ‘space race’ of the power blocks to normal people and criticized the design of uniform cities. Pictures and Hammond organ sound supported the futuristic touch of a report. Comparing today’s news media to newsreels, we can recognize that the cold war has not ended – moreover, it even seems that the history repeats.

Today, parts of newsreels are used in documentaries to shape an image of ‘yesterday’, which was once the present and future. But in the sense of public history we should do more. In my talk, I would like to outline a concept for an exhibition on newsreel’s production and reporting on environmental problems of the 1950s and 1960s in comparison with short documentaries or reports on the same subject 60 or 70 years later. What has changed and which ethical and aestatical similarities are recognizable? Testimonies of contemporary witnesses on the environmental issues of the time will be included in the exhibition in order to draw conclusions for today. Then and now a lot of topics remain unmentioned. The concept suggest also possibilities for getting people involved and interact such as creating their own digital news on environmental and social problems.

Keywords: Newsreels, Germany, Environment, Reporting, 1950s, 1960s

^{*}Speaker

Mario Acha and the Early Explorations of Expanded Cinema in Latin America

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Abstract

Iniciación al Cinematógrafo was a photographic/cinematic installation by Peruvian filmmaker Mario Acha. It was held in 1970 at the Instituto de Arte Contemporáneo (now the Museo de Arte Italiano) and at the Casa de la Cultura on Jirón Ancash in Lima's downtown. The exhibition consisted of a set of unconventional apparatuses, images and experiments of a kinematic nature in the exhibition space. The project pursued a didactic-visual objective of encouraging the audience to reflect on the possibilities of the cinematographic medium. The interaction with the public through various forms and techniques created the illusion of a moving image. The objects in the exhibition questioned the otherwise passive relationship between the public and the media. The public was invited to identify visual elements that usually remain unnoticed, for example, matrices that fragment an image to emphasize techniques of zooming in and out, as well as the deconstruction of images of the face to decipher the nature of certain facial expressions. Some experiments also comprised footage of human arms and legs at different speeds using the technique of chronophotography.

The paper locates Acha's work in the context of a history of exhibitions dealing with the moving image and, more specifically, those disassembling the cinematic apparatus and interrogating the cinematic experience (Bovier & Mey, Elwes). In the case of Acha's exhibition, these explorations were not far removed from kineticism's interest in diverse forms of movement (including the cinematic) as well as in the spectator's participation and theories of visual perception (Popper, Schuler). *Iniciación al cinematógrafo* gains to be examined in light of kinetic constructions of the late 1960', histories of expanded cinema and also a history of how communications processes have been analyzed in the arts (see, for example, the work of another Peruvian artist, Teresa Burga: Arca & Mariategui, 2020).

Iniciación al Cinematógrafo has a well-documented archive, which opens interesting research possibilities: its production process was documented in parallel by Fernando La Rosa in black and white photographs; there are Super 8 recordings used for social communication as well as to document the exhibition. The detailed drafts of the exhibition (sketches but also a scene breakdown, as in filmmaking practice), talk about a project halfway between cinema, sculpture, installation and photography. The latter has been used to "think" cinema or to put it into perspective (Fatorell, Bellour). Our presentation also examines the tensions between photography as a tool to "initiate" (as the exhibition title suggests) the viewer/participant

*Speaker

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to cinematic language, and photography's peculiar attachment to the human form in the exhibition.

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Keywords: Latin America, Expanded Cinema, Kinetic Art, Moving Image, Photography

The Place of Les Immatériaux in the Exhibition History of Media Art, Science and Technology

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Abstract

The exhibition *Les Immatériaux*, on view in spring 1985 at the Centre Pompidou in Paris, is generally considered as a crucial moment in the history of the conjunction between media, art, science, and technology in the second half of the twentieth century. Its curatorial programme brought together exhibits from the visual arts and architecture, from the natural sciences and biotechnologies, as well as from interactive media and the fledgling network and computer-based arts.

Attempts at positioning *Les Immatériaux* in the history of exhibitions have previously emphasised its solitary significance either without any direct reference to other shows (Altshuler 2013), or with reference to other historical media art-related exhibitions like *Cybernetic Serendipity* (London, 1968), *Electra* (Paris, 1983), and the 42nd Venice Biennial (1986) (Gallo 2008). Others have hinted at relationships to the scenographies of exhibitions by Pontus Hultén, and to André Malraux's concept of the *musée imaginaire* (Hudek 2019).

The proposed paper will offer a conceptual and methodological framework for evaluating the "place" of an exhibition like *Les Immatériaux* in the diverse and complex history of art, media and technology, and its institutional, biographical, aesthetical, performative, etc., dimensions. What are the historical "fields of forces" from which an exhibition like this emerges, and in which it then exerts its different forms of efficacy? Focusing on the aspect of the history of exhibitions, the presentation will outline a series of criteria that make it possible to draw a genealogical diagram in which the similarities and the differences of exhibitions like Philip Johnson and Alfred Barr's *Machine Art* (1934), the Independent Group's *Man Machine and Motion* (1955), E.A.T.'s *9 Evenings* (1966), Pontus Hultén's *The Machine as Seen at the End of the Mechanical Age* (1968), Jasia Reichardt's *Cybernetic Serendipity* (1968), Maurice Tuchman's *Art and Technology* (1970), Harald Szeemann's *documenta 5* (1972), and Frank Popper's *Electra* (Paris, 1983) can be articulated. Such a diagram will include as categories, for instance, the interdisciplinary organisation of curatorial networks, the importance of artistic experimentation, and the status ascribed to the exhibits from diverse cultural and scientific contexts.

The ambition of this paper is not to find a definitive answer to an overly complex question. But it seeks to show that it is possible to tackle such large questions by a synoptic approach, and that it is worth making such attempts with the aim of understanding both the genealogy and the singularity of events that make up the entangled histories of art, media, science, and technology.

*Speaker

Keywords: exhibition history, twentieth century, Les Immatériaux, curatorial networks, exhibits, epistemology of things, artistic experimentation

Digital Art in Croatia 1968 – 1985

Darko Fritz*¹

¹author, curator – Croatia

Abstract

The independent curator and researcher Darko Fritz project is realized by Nikola Tesla Technical Museum from Zagreb 2020 - 2023. The project consists of the 224-page hardcover book in both Croatian and English editions, a multilingual website and the exhibition. The criterion according to which works were selected from all the pieces of early digital art featured in this project is that in at least one part of the working process, in pieces created up to 1984, digital technology was employed. Since no text or any other kind of document on the topic was available, the research had to start from zero, collecting information and correlating the findings. The author notes that his project is an attempt to map the application of digital technologies in art in Croatia from 1968 to 1984. The year 1968 is not only that in which the first works of digital art in Croatia were made and shown in public but also a year that became the signifier of a turning point in the creation of a new discourse in politics, society and art that occurred all over the world in the previous and the next few years. Through this discourse, it is possible to establish coordinates that will define the extension of the digital art concept, its creation and practice. That Zagreb was important in those initial days is evidenced by the fact that just one day after curator Jasia Reichardt opened the Cybernetic Serendipity exhibition in London (August 2, 1968), the Tendencies 4 exhibition opened in Zagreb, thematically determined by the title Computers and Visual Research. The second of the years mentioned in the title (1984) is not only the one to which the writer George Orwell gave special meaning but also the year in which the new Apple Macintosh personal computer was promoted. 1984 was the year when in Yugoslavia, and so in Croatia, citizens were allowed to import very modest and restricted amounts of computer equipment for personal use, in the face of swingeing customs duties at that. Through the exhibitions of the international art movement New Tendencies, which was launched in Zagreb in 1961, all the features of digital art are affirmed in the best way, but also form leading artistic figures, such as Vladimir Bonačić, Vilko Žiljak, Tomislav Mikulić, Miljenko Horvat, Vlatko Čerić, all the way to the architects Andrija Mutnjaković and Velimir Neidhardt, the scientist Nikola Šerman and the famous film author Nikola Tanhofer, who in one period of his versatile interests reached for the tools inherent in digital art. By mentioning the names of the protagonists of digital art in Croatia the main textual part of the book is followed by individual portraits of the mentioned authors who worked in the field of digital art, and whose artworks were presented at the exhibition as well.

Keywords: digital art pioneers, Croatia, New tendencies, 1968, 1984, history, mapping

*Speaker

N Dimensional Space in a one-dimensional world: The art of holograms in 1970.

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Abstract

When the hologram first emerged as a creative medium in the late 1960s, it was met by an initial burst of enthusiasm in North America before rapidly being marginalized from mainstream artistic practice. Despite a recent resurgence of important exhibitions featuring artists' holograms, they remain largely neglected in art historical scholarship. This paper helps restore holograms to the narratives of art and technology circa 1970 by investigating one of the first exhibitions of holograms as art in the United States, *N Dimensional Space*, at the Finch College Museum of Art Contemporary Wing, New York. Relying on archival records to illuminate the elusive virtual aesthetics of artists' early engagement with holograms, this paper uses the exhibition to contend the hologram evoked both a counterculture dream of expanding consciousness and a Marcusian fear of attenuating freedom in advanced industrial societies. Ultimately, it suggests these historical attitudes retrospectively offer an analogy through which to attend to certain fantasies and anxieties circulating recent digital culture.

Keywords: hologram, art, virtual

*Speaker

Ephemeral Ontologies: The artist archive as a space for *flânerie*

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¹Luc Courchesne – Canada

Abstract

What if the design of the spaces we visit or inhabit was the work of algorithms? In computer and information science, the definition of categories, properties, and relations between elements of a database form an ontology. When displayed in immersive experience apparatuses (full domes, projection mapping spaces, XR headsets, mobile screens), ontologies expose explorable architectures of information.

Ephemeral Ontologies is a framework for the construction of algorithmically generated explorable worlds. It allows for the creation of datasets and of algorithms interpreting metadata to construct explorable architectures in real time.

To demonstrate the potential of the ephemeral ontology framework, I have assembled a collection of more than a thousand assets (images, videos, texts, 3D objects, sound clips...) documenting my life and work. If each element has its own significance and interest, together, they reveal a global trajectory spanning over 70 years, from my birth to now. More interestingly, the different ways to organize and reorganize these assets, in real time from within to form explorable spaces, offer a variety of readings and points of views on the same material. Some of these architectural algorithms have been programmed to create familiar orders (objects organized along a timeline, by categories, etc.), others are self-generated (random constructions, by keywords from visitors, creative meta-objects, etc.) to reveal different geographies from the same assets. More importantly, the experience ambitions to invite a sort of *flânerie*, this relaxed state of curiosity and flow where one can take pleasure in getting lost.

This paper presents the development process of the *Ephemeral Ontology* framework over 19 years since its first implementation for *Where are you?* (2004). It also outlines the ongoing developments such as automatic captioning and semantic analysis of assets, IEML translation (Information Economy MetaLanguage), generative algorithms (to re-architect the explorable database), scripted or automatic generation of stories/guided tours, voice input, automatic translation (voices, texts), etc.

In its current implementation, The *Ephemeral Ontology* experience runs as a Unity3D build on standard VR headsets (Oculus 2/PRO) attached to a VR ready computer. Ideally, visitors sit on a rotating chair next to a large screen casting their view for nearby onlookers. The operating instructions for the exhibition ready version of Ephemeral Ontologies are as follows:

Sitting on the rotating chair with the headset on, and the controller in hand...

*Speaker

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- Look all around
 - Use the joystick to move in the space (front, back, sideways). The front trigger lifts you up. The side button lowers you down.
 - Click and hold the B button to shows the menu. Point and pause the cursor to activate your selection: Timeline, Radial or Gallery re-arranges the explorable space. The house icon brings you home.
 - Images with a grey frame are portals into other spaces. Pass through them to go back and forth.
 - Double tap on the right or left side of the headset to see where you are in the room, or to re-enter the *Ephemeral Ontologies* experience.
- Note: remember that you are moving in the space, not that the space moves around you

Keywords: media arts, digital arts, immersive experience, interactive art, algorithmic architecture, explorable database, ontologies, explorable archives, installation art

Bioart: Reflections of the Anthropocene

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Abstract

Bioart is a recent emergence within contemporary art and is a practice that uses living biological materials as its media. Complicating ideas of living/non-living, artificial/natural, subject/object and art/science, bioart intentionally draws attention to the practices of contemporary bioengineering and invites critical reflection on them. This research reflects the many questions bioart raises about the ethical positioning of uses of living matter in the context of pervasive contemporary bioengineering technologies; and reflects how this is achieved by purposefully using them in the new/removed context of contemporary art to highlight the humancentric hierarchies of the Anthropocene.

Furthermore, this research explores significant new connections between bioart and materiality through the theoretical lenses of posthumanism and new materialism. These aid understanding of the viewing experiences and how this can contribute to important social commentary and critique surrounding bioengineering and its wide-ranging sociocultural impacts. Through close attention to materiality, this research posits new understandings of the affectivity of media. Specifically, it demonstrates how living media and actualisations of biotechnologies can evoke strong emotive responses in ways that representation cannot, achieved through direct, space-sharing encounters.

This paper examines how living works of bioart can incite critical, direct engagements with the confronting moral technologies of the Anthropocene. It also examines how bioart can help develop our understanding of the environment, technology, and our relationships with other life forms, both existing and those being created.

Keywords: bioart, anthropocene

*Speaker

Reconstructions. Unfinished images on the Grand Canal in 1985

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Abstract

When the 3rd International Architecture Exhibition in Venice was established in 1985, design issues were introduced to be developed on punctual interventions throughout the city. Among the competition themes, the Accademia Bridge and Ca' Venier dei Leoni constituted pivotal points of urban texture and visuality of Venice rethinking. On the one hand, the temporary condition of a bridge designed to be replaced with a permanent one; on the other, the incompleted facade confronted with the double water dimension. The article deepens some of the proposals collected in "Progetto Venezia", showing the architectural possibilities explored for the Accademia Bridge and Ca' Venier dei Leoni that fired the debate on methods, operations, and techniques who laid the foundation for a new communication motif between the present and the past in architecture.

Starting from the documentary apparatus provided by Archivio Progetti Iuav, graphic interpretations and digital reconstructions of the projects presented by Polesello and Fein are shown, which summarize the cultural ferment in Venice, also by virtue of the heterogeneous cultural and geographic background of the protagonists providing opportunities on possible images of the city.

Reconstructing memory through images implies operating a critical reading on the relationship between temporality and spatiality that, in archival drawing, translates into sketches, annotations and schematic studies, latent with design intentions.

The reflection around which the design fields of the proposals received move is aimed at the intervention on the architectural monument in its quality as a process of adaptation or addition/integration in relation to the quality of the work. Both in the case of the bridge and that of Ca' Venier, the architectural volumes, articulations, and relationships with the context shaped the formal and expressive choices of the competition intervention. In many cases these choices responded to theoretical inquiries into the role of contemporary architecture in the historical context, geometries, abstractions, interpretative readings of form, concurred to characterize the final configuration; in others, the need to resolve urban issues that best suited contemporary needs set the new directions of contemporary design.

On the identification of these theoretical trajectories, digital explorations provided by the interpretation of archival drawings return images of an unbuilt and little-known city, finding formal meaning in the design boards and study drawings, in those archival drawings that not only divulge the work of architecture, but also manage to provide additional information

*Speaker

about its aesthetic, functional and technical conditions.

It is therefore a matter of recognizing, to the archival drawing, an autonomy with respect to the built work, a condition of self-representation, a witness *in absentia* of architecture that intervenes in the design value of the unfinished or unbuilt, returning a path that, from the initial reflections, breaks down and examines the architectural object by means of the graphic communication of its most significant parts.

The reconstructed images trace the definition of the new architectural organism, evoking compositional values and urban issues providing a further program of visualities along the Grand Canal suggesting future intentions on the processes of rethinking the architecture of the past.

Keywords: Digital representation, graphic interpretation, Accademia bridge, Ca' Venier dei Leoni

Institutionalizing media art: the experience of MediaArtLab

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Abstract

The intervention proposes an analysis of the pioneering role of MediaArtLab in spreading through Russia the knowledge (both theoretical and practical) of the artistic practices that use new technologies. Its foundation dates to 2000 in Moscow on the initiative of the couple composed by the artist Alexey Isaev (1960-2006) and the curator and art critic Olga Shishko (b. 1967).

Starting from the period of Gorbachev's reforms, and after the collapse of the Soviet Union, artists have experienced greater freedom in the use of new materials and the development of their own artistic identity. We should consider the delay with which new technologies started to be available in the latest period of the Soviet Union – and, of course, the general political limitations – to understand the exclusion from the international debate and the experimentation with new technologies in the artistic field. In 1992 the George Soros Center for Contemporary Art was founded in Moscow to support and develop the arts using new technologies, by providing technical and economic support to young artists. The founders of MediaArtLab started their work there, where they understood the need for institutionalizing media art.

MediaArtLab was the first case of institutionalization of media art in Russia. It is an example of an autonomous organization that helps to promote technological art, thus establishing a theoretical discussion that can result in further research to be included in the international debate. Of fundamental importance is the commitment to the realization of educational programs as well as exhibition projects, creating an international network, and introducing new themes and critical discourse in the field in the national territory. Indeed, a problem that concerns artistic practice on a global scale is that the assimilation of new media art in the institutional organizations of contemporary art, although they allow recognition in the artistic field (historiographical and linguistic), also represents a limit to its development in the strict sense.

We will reconstruct its history from a historiographical point of view. We will verify if the initiatives we will consider are in line with the needs imposed by the artistic practice in question at the international level. Finally, as Olga Shishko left the country as soon as Russia invaded Ukraine, we will try to figure out the possible future of the organization.

Keywords: mediaartlab, media art, video art, new technologies, pioneers of media art

*Speaker

As we may remember. The future of remembering from the perspective of documentary archives.

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Abstract

Can we already discern the structures of future memory cultures? From this fundamental question, I will examine the mediated forms of current memory culture, with a particular focus on documentary films. Digital technologies are currently leading to significant changes in our knowledge culture, which will inevitably impact the shaping of memory cultures and the structures of media memory in the near future. These changes manifest in two opposing processes: on the one hand, in the archival situation, characterized by non-accessibility, poor archiving, or even the physical decay of documentary material (such as analog video), and on the other hand, attempts at digital preservation or even reconstitution of archives through various media transformation processes - particularly re-mediatizations, which are shaped by new forms of media expression (i-docs, VR/AR-technologies etc.). The latter is not only a challenge for media historiography, but opens up new possibilities for the memory work of GLAM and memorial sites. In this contribution, I will explore the tension between disappearing archive material, using the example of the archival situation of German documentary films, and selected new digital forms of re-mediatization, focusing on themes such as the Holocaust and the Nazi era.

Keywords: memory, documentary, archive, new media technologies

*Speaker

Videogames as pioneering media art behind Human-Computer Interaction

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Abstract

In traditional historical analyses of the emergence of personal computers (Smith & Alexander, 1999; Freiburger and Swaine, 2000), there is a tendency to focus the analysis and define the invention within groups of inventors working on so-called utility software (OS, Word Processors, etc.). It completely ignores the fact that the media art of video games preceded many such developments, as with the development of games for consoles, such as the Magnavox Odyssey in 1966 (Baer, 2005). Even in the realm of computing machines itself, references are made to IBM or Apple, totally ignoring pioneering systems that dominated the whole landscape of personal computing such as Sinclair's ZX Spectrum or Commodore's C64 (Zagalo, 2013). Systems that, because they could connect to a simple television, managed to penetrate people's homes long before any of these very expensive machines.

In this article, I intend to focus specifically on the Human-Computer Interaction (HCI) domain (Myers, 1998), more particularly the issues of User Interfaces and Interaction Design (Sharp et al, 2007) that were at the basis of the more recently defined domain, the UX, the User Experience (Norman, 1988, 2013). These areas of HCI have been over the last 50 years primarily responsible for the development of the perceptual access, input and output, to computers, with much of the attention centred on the audiovisual and tangible dimensions.

Traditionally the focus of historical analyses of these processes has focused on two key players: Xerox and Apple, seen as the engines of creation and introduction of graphics in computer interfaces (Moggridge, 2007; Cooper, 2007). However, in doing so, they completely ignore all the contributions made by Atari, but essentially by all the artistic creation around the first video games, from Pong to Pac-Man, which were fundamental in creating and sustaining the imaginary for the emergence of new computer interfaces to operating systems and office tools.

So, long before we could think about manipulation and navigation, essential elements of interaction design, with desktop metaphors, video game designers had already been struggling with those same questions, about how to make players feel that they were participating in the representation happening on the screen. While the computer pioneers tried to understand how to simulate the office graphically, the videogame pioneers simulated real actions on the screen, from tennis (Pong, 1972) to invasions by aliens (Space Invaders, 1976), thus building a whole new language of the relationship between humans and machines.

This pioneering design process was not something merely parallel to the design of UI, as appears in the literature (Katz, 2015). In fact, several of the pioneers of the Interaction

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Design domain (Brenda Laurel, Alan Kay or Steve Jobs) worked at Atari, where they developed Game Design skills. In this way, I intend to discuss and demonstrate, with some cases, how the art of video games was central in the emergence of graphic relationships, in how it drove a whole new way of thinking about the relationship between humans and machines, producing imaginaries as created in works like "Tron" (1982).

Keywords: media art, games, HCI, history, pioneers

Mobile Image: Utopian Techno-Politics and New Urban Bodies

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Abstract

This paper concerns the work of the visionary art group Mobile Image and its critical-utopian refunctioning of art and technology. Among the most prescient artists in postwar history, the collective creatively redeployed futuristic communication devices, unleashing their latent potentials to construct new corporealities, modes of knowledge, and social formations. Based in Los Angeles in the 1970s and 80s, they worked amid urban crisis, a techno-boom, consolidating media power, and ascendant neoliberal politics. In the wake of the long feminist and civil rights movements, the group was part of an intensifying struggle over the mediation of bodies, identities, and communities. Mobile Image intervened in the political economy of tools and networks to provide new forms of agency for the making of concretely utopian urban subjects and spaces, drastically transforming existing eco-logics and dynamics. This paper argues not only for the historical importance of Mobile Image, but for a critical process that is at once analytic and transformative, that challenges fundamental conventions of the public sphere, democracy, communication, and political participation, and that seeks to reframe, and thus change, relations of power, representation, and identity. Employing a variety of space-age devices, from satellites and databases to electronic message systems and digital drawing tablets, Mobile Image's projects constitute a unique body of work in which these emerging telecommunication tools were put in the hands of people typically marginalized by conventional techno-social arrangements, enabling participants to critically assess those arrangements in terms of race, gender, and class, local concerns and global trends, while imagining a future based on their own needs and those of their communities. Re-/mapping and transforming the urban environment into inter-layered material and immaterial networks, Mobile Image's projects present a critical-practical anticipation of Saskia Sassen's "Hybrid City" and Benjamin Bratton's "Stack."

Keywords: telecommunications, utopia, embodiment, urbanism, mediation, public

*Speaker

Visual correspondence of image -memories in the postcards” from Hungarian emigration (1890-1921).

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Abstract

Drawing comparisons with Jacques Derrida’s findings on the postcard the proposal aims to reconsider the Hungarian migration both on the ship and on the land between 1890-1921 to the United States in the found footage movie *Hunky Blues. An American Dream* (2011) by Peter Forgacs. Considering the vicissitudes of immigrants moving from Hungary to the new territory the paper retraces the difficulties of assimilation new incomers to Detroit, Chicago, New York, Chicago, New Brunswick raising questions on their distant relationship with home. Using the interviews with the survivors found-footage documentary confronts the memories with the historical images to provide an insightful look into the private testimony of past generations. Drawing parallels with Derrida’s findings on the postcard from abroad the paper analyses fragmentary elements of the visual correspondence of so-called Hunkies” with their families in Hungary. Shedding new light on the particular stories our primary concern is to reinvestigate an epistolary form of language in a communicative act of cinematic writing (*cine-écriture*) to build peculiar visual experience enriched by statistics with a great detail to reconstruct the living and working conditions of *émigrés* in United States. Seeking new formulations of migratory aesthetics this study aims at discussing the diversity of transcultural dilemmas inscribed in diasporic imagery which are marked by the theory of uprooting, alienation and psychological distance between individual groups, on one hand, and fantasies (or nightmares) with affinity on the other. These shifting configurations among different orders offer a rich field of investigation for formal analysis to redefine the understanding of mnemonic practice conceived as image-memory in Bergsonian sense.

Keywords: migration, found footage, homesickness, transcultural perspective, Jacques Derrida, postcard, diaspora, interviews, private testimony, United States, Hunkies

*Speaker

An Attempt to Extend Archival Research Using the Bergson-inspired Multi-TimeScale Model

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Abstract

We propose a new method to extend archival research, based on Bergson's theory of time.

Pickering argued in *The Cybernetic Brain* (2010) that works in the 1950s, such as "Musicolour," could present ontological questions. Because people become part of the world through working with machines, instead of staying observers. Furthermore, their consciousness is transformed through repeated experiences with physical movement. At "Cybernetic Serendipity," an exhibition in 1968, considered the origin of media art, many interactive works were exhibited and experienced by many people. If this ontological exploration had been pursued and developed further, the realm of media art would have undergone a significant expansion.

However, as Manovich pointed out in 1996, "Duchamp-land" and "Turing-land" never converged, and today media art is marginalized and coming to an end. In particular, interactive works have yet to be appropriately recognized. Often the technology that makes up the work is treated as background and evaluated only from the conventional perspective of art observation. However, as the technology, which facilitates a more interactive and engaged mode of appreciation, invokes important ontological inquiries, it should be regarded as the fundamental aspect of the work.

We focus on Bergson's theory of time to deal with this issue legitimately and open up discussions. It is well-known that in his book, *Cybernetics* (1948), Wiener referred to Bergson's theory of time, wherein *duration* is the core concept. Analyzing viewer experience using this concept could reveal the meaning of duration in the viewer's consciousness concerning the artwork.

For example, let us take "Light on the Net" by Fujihata (1996). In "Light on the Net," participants, using a web browser, remotely operated a matrix of light bulbs installed in a building. There was a latency of more than a dozen seconds before the participant could see the result of their operation. This problem could be dismissed as a limitation of the technology used to construct the work: slow Internet communication speed, no real-time capabilities for web browsers, and slow response time of the light bulbs. However, this latency was an essential component of the work. In this work, waiting for an operation's result is under an imperfective aspect, which constitutes a defining characteristic of Bergsonian duration. When multiple participants accessed the work simultaneously, that caused interference

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between these imperfective aspects, creating a more complex temporal effect. To further refine this question of duration, we considered the Multi-TimeScale (MTS) model proposed by Hirai, one of the leading proponents of *Expanded Bergsonism*, developed in his work *Made Out of Time* (2022). The MTS model proposes that time is not a monolithic dimension, but divided into multiple layers, each consisting of a different time scale, interactions among which give rise to the phenomenality of our experience such as qualia, flow of time and episodic memory. We present principles for constructing a new design theory based on this Bergson-inspired MTS model. The principles will lead to constructing a foundation for new creations and contribute to the further development of archival research.

Keywords: Bergson, media art, interactive

PLANT LIGHTS

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Abstract

Collaborating with plants: In my arts-based presentation, I will introduce the 16mm film *Plant Lights* (2022) that I have made by using the internal chemistry of plants. The cameraless analog film is an attempt to collaborate with plants, illuminating a non-human perspective.

Drawing on Karel Doing's phytograms, a method in which the filmmaker and researcher questions the notion of plant sensations and perceptions, I will describe my own photochemical practice of interacting with the vegetal world. For *Plant Lights* I worked together with the following plants: Eyebright, dandelion, occidental tree of life, horsemint, common yarrow, rose, prunella vulgaris, white spruce, loosestrife, cherry plum, aster, field scabious, pigeon catchfly, grass of parnassus, real toadflax, wild strawberry, meadow clover, male fern, common clematis, common columbine, jasmine-flowered nightshade, garden hydrangea, alpine aster. The basic ingredients of the process are a 16mm black and white negative film, elements of plants, washing soda, ascorbic acid, photographic fixer, sunlight, water, and a lot of time of exposure.

The film was exposed in the little village Friedenstein (stone of freedom) in the Austrian pre-Alps, six kilometers away from Mariazell, one of the most important European centers of pilgrimage. My mother lives in the hamlet. I partly grew up there. The property is tended together by an agricultural community. Farmers and my family jointly cultivate the ground. This is a perfect location to conduct fieldwork, learning from the farmers' skills and collaboratively explore the seasonal rhythms of the vegetal and animal world. On the first sight, the landscape seems to be entirely intact. However, the rising temperatures caused by climate change, bark beetle infestation and storms, increasingly destroy large areas of the (predominantly spruce) forest, trees which my grandfather has planted.

In my artistic research I combine sensory ethnography methods and photochemical processes. I work with ecological practices which allow me to actively collaborate with nonhuman materials and creatures. Making film by hand in collaboration with more than human agents requires a certain level of letting go on the side of the artist. I use photographic material in order to illuminate the permeability of human and more than human bodies. The film emulsion is a sensitive substance that enables me to think with the elements.

Plant Lights (2022)

<https://vimeo.com/723272301>

Password: corporealities

*Speaker

Keywords: Plants, Landscape, Phytogram, 16mm film, Communication, Touch

Translations Across the Human/AI Divide: Two Israeli Artists in Dialogue with GANs

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Abstract

This paper will address two art projects based on elaborate exchanges with AI image-generating systems. These projects in progress, by artists Oren Eliav and Michel Platnic, respectively, involve image evolution through GANs (Generative Adversarial Networks), combined with generated speech. Both artists experiment with training the AI on their own works, including oil paintings, drawings, and video. Eliav, in his turn, adds poetry written by himself, evolved through AI and then recited by a TTS (text-to speech) program, against the backdrop of sampled music. Both projects are highly poetic, and sophisticatedly coded. I will present a close look at the projects' underlying processes of translation, between human language and human vision, on the one hand, and the "blind," non-human understanding of the world reflected in the images produced by GANs. Poised on the cutting edge of technological interventions into art, these projects probe the anxiety induced by what appears to be a quantum leap toward posthuman subjectivity. At the same time, however, they tap into the potential of AI to change the human creative process in ways yet not fully predictable. Through these compelling test cases, I will interrogate some of the pivotal issues that have come up in the discourse around Neural Networks and their involvement in the production of art, drawing on the relevant critical discourse on authorship, intentionality, and human agency. In particular, I will consider Eliav and Platnic's projects in relation to some experiments in AI-art production, such as Ahmed Elgammal's AICAN (2016); The Next Rembrandt project (2016); or the widely discussed AI-generated *Portrait of Edmond Belamy* (2018), by the artist group Obvious, which famously sold at Christies for \$432,500. Framing current anxieties about the end of human authorship within a wider art historical perspective, I will draw on Andreas Broeckmann's (2019) contextualization of the concerns around AI-based art within what he calls the "myth of the machine" and its persistence throughout the history of art. This paper will thus offer a broadly contextualized, yet locally specific, view on current exchanges and translations across the divide between human and "artificial" creative processes.

Keywords: Artificial Intelligence, GANs (Generative Adversarial Networks), machine art, posthuman

*Speaker

New Media Arts: Autonomy and Exploitation

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Abstract

This paper examines the specificity of New Media Art based on extensive interviews conducted for the second volume of the forthcoming *Encyclopedia of New Media Art*, entitled Artists and Practice, especially the challenges posed by emerging technologies for the development of New Media artists.

Emerging from surrealism and in parallel with Fluxus and Conceptual Art, early computer arts embraced automatism and serendipity, only to be rejected by the art world while the expanding digital media industries absorbed their techniques for entertainment and software development. As borders between fine art, design and popular culture began to blur, artists were forced to act as engineers, curators and archivists, publicists, theorists and activists, within and beyond the art world.

Despite offering an ever-changing palette of possibilities for creativity, the duplicitous role of technology as enabler and exploiter of invention and innovation paralleled the initial reluctance of the art world to accept New Media artists and movements, unless they could be assimilated and exhibited as exemplars of other tendencies. The resultant marginalisation encouraged the autonomous evolution of institutions, publications, festivals and archives until, in the 21st century, new media art began appearing in biennials and national galleries. This paper examines the struggles over new media art's autonomy from and/or assimilation into industry, popular culture and the art world, how it has impacted canon-formation, archive policy, curation and publications, and what, in 2023, is the purpose of a discrete New Media Arts sector and its historiography.

Keywords: New Media Art, Aesthetics, Technology

^{*}Speaker

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Media arts, memory representation and re-enactment processes in audio-visual performances

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Abstract

The work of memory has been the object of inquiry by scholars who seek to understand how we process our experience and how we perceive its role in the configuration of individual and collective identities. Concepts of collective memory (Halbwachs, 1925), memory theatres (Banu, 1987), memory-habit (Connerton, 1989), places of memory (Nora, 1984-1994), incorporated memory (Taylor, 2003), post-memory (Hirsh, 2008), memory linked to places (Taylor, 2011,) and memory re-enactment (Agnew et al., 2019) have helped to describe complex relations between past and present, and to explore the phenomenon of memory representation.

This paper explores audio-visual practices and memory relationship that confronts a sense of place with a "repertoire in intermedial mode" (Bénichou, 2020). One of our deepest needs is for a sense of place and belonging. A common denominator in this is human attachment to place and how we find identity in it. Therefore, place, is not simply what we see, but a way of seeing: we see it with our eyes but interpret it with our minds and ascribe values to place for intangible or spiritual reasons. The place can, consequently, be seen as a cultural construct in which our sense of place and memories inhere.

Assuming also that memory is a continuous performative act (Schneider, 2011), the role of memory is examined through the audio-visual context by discussing: (i) the process of re-enactment and its relationship with the memory work, and (ii) the new intermediate forms of memory representation as a resource for media arts research-creation.

This paper also relates these possibilities of re-signification of audio-visual performances through a dual path of reflection and artistic representation that resulted from a previous project developed under an art-based research regime (Dinis, 2021) developed throughout several processes of re-enactments in Portugal.

In one of these audio-visual re-enactment practices, a process of de-industrialization (Kaldor, 1979) of Pevideém (Portugal) was analysed, through a practice-as-research project entitled "embodied reminiscences" (2022). In this re-enactment, the past was not rescued as an explanation for the present or the opposite, but as a sense of a temporal relativisation through a process of the embodiment of an important social issue.

Keywords: memory, media arts, representation, embodiment, site, specific.

*Speaker

Typing as an artistic operation

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Abstract

Keyboards have been fascinating artists as means for creation at least since their implementation into writing machines such as typewriters. Typewriting art, as well as its successors Teletype and ASCII art, stemmed from print typography and the even longer tradition of text-art, as reorganizations of graphic signs on a page. Characters and symbols initially meant to serve in linguistic signification became aesthetic elements, reassigned to patterns, decorations, or mosaic images. Reappropriating typography revealed the decomposition and reassembling of typographic elements, shedding a new light on the design of type letters, numbers, symbols as well as spaces. At the same time, these artistic operations foregrounded the aesthetics of words and linguistic signification. They were a step towards a post-typographic era, reusing the typographic elements.

Continuing this line of thought, but shifting the focus from the end-product of typing to its processual techniques, we suggest (re)considering typing as an artistic operation and the keyboard as a creative tool. Experimenting with typing as a body-machine collaboration was part and parcel of artistic movements, such as Dada, Bauhaus or Concrete poetry. With these artistic schools in the background, we propose a combination of a paper presentation and a participatory art installation that reexamine the body techniques and technological apparatus of typing. Their purpose is to recontextualize typing mechanisms as artistic tools for exploring the link between typography, body operations and collaborative behavior.

The paper presentation delves into the history of keyboards as infrastructure for artistic creativity. It ties between the haptics of typing and the graphic presentation of the typed signs. Understanding typing as more than merely tactile, haptics in this context includes the movement of the fingers on a keyboard, the ‘feel’ of the button, its resistance and the noise it makes, the hitting of the keys in fixed patterns and the ‘kinesthetic memory’ of the fingers moving in these patterns. Typing is a haptic technique performed by a human-machine continuum. As an artistic expression, it requires careful calculation of spaces on the page or screen, the imagination of these surfaces as composed of grids, as well as meticulously planning the position of each typed sign in accordance with its surrounding. In a post-typographic era, we wonder: can these aspects of typing be reexamined through the reappropriation of the keyboard?

As an artistic experiment we like to present the possibility of collaborative typing and writing and thinking. Each participant is assigned with one letter or function, which nature is revealed only when pushed and the sign appears on a screen. We believe that in order to create meaningful graphic presentations, for example of words, the participants must collaborate. This will create social cybernetic behavioral loops that involve the hapticity of being mindful

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to the machine's apparatus, to other participants and their typing options and choices. The shared keyboard estranges the act of typing by foregrounding the role of haptics in meaning making body operations. Typing becomes a shared experience of awareness to others, the machine and their collaborative text.

Keywords: Keyboard, typography, typing, haptics, experiment

Telematic re:sources to counter the climate emergency: come hill or high water!

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Abstract

This paper discusses the conceptual implications of Paul Sermon's telematic art practice in relation to our global climate crisis, charting the history of his work from gallery installation to Internet performance during the COVID-19 pandemic and the environmental applications it now signals.

Whilst Sermon's telematic art installations, such as *Telematic Dreaming* (1992), *The Tables Turned* (1997), *HEADROOM* (2006) and *Telematic Touched* (2017) have consistently presented a phenomenological encounter with the self as other; from a practical perspective, the *tele* (the distant or far-away) aspects of his artworks have always addressed the climate emergency. Since the early 1990s these telepresence encounters between remote gallery locations, across cities, countries and continents, have brought distant audience participants together in a third space of mutual coexistence. Often played out in social, political or domestic contexts, accessed via sofas, tables and bed installation interfaces, they have assimilated an unrivalled sense of intimacy and closeness through telepresent affection, touch and empathy. This phenomenological encounter has always been at the core of Sermon's work, but the practical fact that the participants are physically located many miles apart has become increasingly important as an urgent solution to reduce our need to travel and our carbon footprint as a consequence.

Since the outbreak of COVID-19 at the start of 2020 Sermon's telematic installations have migrated online. The pandemic highlighted the necessity for more meaningful telepresent encounters as galleries and theatres closed; whilst wildlife encroached on our cities and vapour trails disappeared from the sky. The first such attempt occurred in May 2020 with *Pandemic Encounters* in collaboration with the Third Space Network. This was followed by *Telematic Quarantine* for the International Limestone Coast Video Art Festival: Video Art during and after the pandemic in November 2020. *Telematic Quarantine* brought international performers into Sermon's telepresent home in Brighton, UK, for an uncanny COVID-themed encounter. Together, in a heavily layered video environment where participants moved through painterly-rendered 3D simulations of the rooms in Sermon's actual house, they played, improvised, and shared their stories of self-isolation. These performance works led to Sermon's recently completed UK Arts and Humanities Research Council (AHRC) Covid-Response project *Collaborative Solutions for the Performing Arts: A Telepresence Stage* (December 2020 to May 2022), directly supporting the UK performing arts sector with resources and solutions to overcome the closure of theatre venues. It enabled actors, dancers and other performing arts professionals to rehearse and interact together in shared online spaces and to produce collaborative live performances from their separate homes and studios.

*Speaker

Since October 2022 Sermon has been developing the online telepresent encounter *COME HILL OR HIGH WATER*. A dystopian post-brexite Britain that presents two online telepresent participants trying to carry on as normal, waking up in flood water, distilling their own fuel and driving into the hills to escape with no real plan, only to find themselves back where they started, but worse. The work is a dark absurd satire on ecological ignorance told through a symbiosis of storytelling and telepresence using a technology to directly counter it.

Keywords: Telematic, Telepresence, Phenomenology, Performance, Environment, Climate, Pandemic, Interaction, Networked, Intimacy, Touch

Vorticella: Sonic feedback loop of the ecosystem as a listening relationship

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Abstract

The connection between the human and the non-human, however distant and even adversarial it may appear, exists in a delicate equilibrium that must be reviewed from an artistic standpoint. One may consider this close linking that, while being tracked by individuality, also exists and is understood as a whole, all at once, in natural, organic, and beautiful chaos, starting with the concept that an ecosystem consists of a variety of interactions between various agents that are frequently reliant on one another.

From this one can question how can we develop communication systems that go beyond the human through active listening? How does sound fit into the most varied ecosystems? Can, on the other hand, all dependency connections be converted into sound exercises?

The process of developing a Sonic Feedback Loop is explored in this communication as it is based in the ecosystem that generates the sound and then to that responds to it. By doing so, it develops a sharing system that, like so many others, is more akin to an activity in active listening than speaking. Even further away from considering listening as merely a physical action and more toward it as a posture.

Keywords: Bio, Art, Ecosystem Living, Sound Art, Feedback Loop, Interdependence, Symbiotic Relationships

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The Nostalgia Algorithm: Examining the Interplay of Hauntology, Technology, and Collective Memory in the Anthropocene

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Abstract

At the peak of the mass commercialisation of Artificial Intelligence, the further spatial and temporal expansion systemised by the pandemic, and the worsening climate crisis, our society is once again faced with a deadening cultural stagnancy that's inseparable from a general sense of social and technological ennui. This paper aims to dissect the spectres haunting our bankrupt culture of what Mark Fisher (Capitalist Realism: Is There No Alternative? John Hunt Publishing, 2009) refers to as retro-fetishism and malaise, specifically in relation to our cultural failure to develop newness. This research will further examine the influence that the capitalist economy still has on the commodification of nostalgia into pop culture, and its further exacerbation by digital content consumption. As humanity encounters a more wired world where data can be amassed more easily than ever, we're left with a plethora of pop culture relics discarded throughout cyberspace while requiring significant energy resources to store and process. Has memory been commodified into a cultural currency, defined as an extension of cultural expression and manipulated through various commercial ventures, and whose overwhelming saturation requires archival efforts that could be costly to our environment?

Through this paper; we will explore multiple case studies from the Caretaker to William Basinski who have tackled the theme of nostalgia and memory in their art, reminding the world of the weight of its past. Additionally, we will revisit Philip Dick's "Do Androids Dream of Electric Sheep" and its film adaptations as a commentary on the realities of our future, as a post-cybernetic culture repurposing its history and identity, and highlighting the futility of humanity in striving for historical relevance in our future. Furthermore, the research will follow nostalgic and carbon trails of the second millennium's "new" digital economy by surveying digital content generated and consumed between 2000 and 2022 under the context of an increasing homogenisation of global culture and the rise of the Internet. Fundamentally, through this analysis, Norbert Wiener's theory of cybernetics (Cybernetics: or Control and Communication in the Animal and the Machine (MIT Press, 1948)) could be regarded as a framework for understanding the recursive nature of consumable digital media, and its curators.

Ultimately, this paper creatively explores various case studies all dealing with cultural artifacts and their digital and carbon traces, while pivoting on three disciplines: nostalgia,

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hauntology, and the climate crisis as the neglected ghost. Eventually, in this everchanging living museum of future pasts, the obsolescence of these cultural artifacts can be used both as a metaphor for the tiresome echo of our past, and an analogy for our self-referential nature as human beings. By analyzing an extrapolation for the future of digital content consumption and cultural production, we can see that technological progress is no longer only a matter of new inventions - it's also a question of how we decide what to do with our old ones.

Keywords: Hauntology, Cybernetics, New Media Art, Culture Theory, Pop Culture, Memory, Nostalgia, Climate Crisis

Exploring a Digital Art Archive in Mixed-Reality

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Abstract

In the present information age, natively digital archives may hold the advantage in terms of accessibility and researchability. Future-facing technologies and the processes they facilitate can empower curators and archivists, as well as researchers who want to peruse archived materials. Within the last decade museums have provided apps for visitors, often resembling games and occasionally augmented reality (AR) experiences, in a bid to attract younger audiences. Exhibitions have also been held in virtual spaces such as online games and other virtual sandboxes, in some cases as a response to pandemic-mandated lockdowns.

Given the increasing interest in augmented and mixed-reality (AR/MR) applications, the near future may come to see wearable mixed-reality displays or "smart glasses" steadily taking over - and perhaps eventually superseding - the role of nowadays' smartphones as nearly indispensable and deeply personal tools for communication, information access and entertainment. In the design of user experiences for mixed-reality the body plays an important role, as does our intuitive understanding of a three-dimensional world of objects and people and possibilities for action within. Beyond a window into a hyperspace of flat, scrollable clickable media, a mixed-reality application is inherently empowered to be more akin to a museum or exhibition - albeit one where visitors are encouraged to touch the artifacts.

We present our work on the mixed-reality tool AR(t)chive, as well as the archival process which supports its features, sharing our approach and findings. This work takes place within the context of a larger partnership project between universities, centered on the modernization of the Archive of Digital Art (ADA for short). The focus of our small team has been twofold: the research, development and public exhibition of an experimental mixed-reality tool for exploring a digital art archive; and the archival of existing materials and creation new ones, focusing on interactive artworks by duo Christa Sommerer and Laurent Mignonneau. AR(t)chive allows visitors at an exhibition to experience the archive in an intuitive way, facilitating play, exploration and research. By means of a Hololens 2 headset, archived materials are displayed in animated collections populating the space around the visitor. Initially arranged as a galaxy of sorts, items can be grabbed and expanded into collections of related data: swirls of media related to a work and three-dimensional word clouds. Media items such as images, videos and relevant keywords can be grabbed and repositioned, attached to real surfaces and connected with lines, to create mind-maps or virtual exhibitions.

Existing materials are being archived and organized for inclusion in ADA and for use AR(t)chive. New materials are being produced to complement more dated ones, especially video documentation of interactive artworks; but also using newer formats, such as 3D models of interactive installations. Three-dimensional models and scans can already be found

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within digital archives, and are especially fit for viewing in tracked stereoscopic displays.

Keywords: digital art, digital archive, archival, mixed reality, augmented reality, interface, human, computer interaction, interaction design, embodiment, play

The Museum and the Internet - Revisiting Lincoln 3D Scans

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Abstract

This paper will consider the work of Austrian-born contemporary artist, Oliver Laric, within the collection of The Collection and Usher Gallery, Lincoln, UK. Through in-depth analysis of this project, the paper will examine its wider implications within art history, curatorial practice and the artist's practice. Commissioned by the museum in 2012, Laric's Lincoln 3D Scans project, made 3D scans of items from the collection, including neo-classical sculptures and Roman artefacts, available to the public free of charge and copyright-free. The work now exists online as part of The Collection and Usher Gallery's digital presence, linked to their main website. Here, 3D scans of sculptures and other key items from the museum's collection are made available, online, free of charge and copyright free. A physical piece, *The Hunter and His Dog Relief*, printed by the artist in resin in 2014, is also part of the collection. This resin print is based on the neo-classical sculpture *Hunter and His Dog* by John Gibson (1790-1866). As part of the project, the museum hosted an exhibition of Laric's work, including the new sculpt, previous internet-based art work created by the artist and various versions of the 2014 printed 3D scans. Following on from this project, Laric continued to explore this sculptural theme through further international commissions from museum collections. The scanned results are available on a central 3D Scans website, crediting Laric for originating the concept but copyright-free. The website also states that the project was inspired by the sculptural work of John Gibson and his advocacy of the process of casting in plaster.

As a curator at The Collection and Usher Gallery, I inherited the maintenance and interpretation of the Lincoln 3D Scans project. Considering the project 10 years after the original commission, I am curious to explore how this project is now viewed by the artist and curators who originally worked on it. How might the museum revisit a historic media project, and what lessons might be learnt and how might it inform future projects? This paper will utilise interviews conducted with project curator, Ashley Gallant, gallerists at Seventeen, Laric's former gallery, and the artist, Oliver Laric.

This conference and its Track 4 strand offer a significant opportunity to reflect on a specific project that blurs the boundaries of outside and inside the museum space. This paper responds to the dominating art historical narrative of internet-based artists facing compromises when working with institutions and offers a reanalysis of the relationship between internet-based artist and museum spaces and collections. As Venice is the location of the world's largest and earliest international contemporary art biennial, this paper will also reflect on real-world tensions between internet-based artists and larger, institutional powerhouses such as biennales and museums; in 2016 Laric brought this project to the UK's largest contemporary art biennial, Liverpool Biennial.

*Speaker

Keywords: 3D scans, museums, internet

Virtual Reality for a Burning World

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Abstract

This paper draws on two works-Australian artist and filmmaker Lynette Wallworth's 2016 *Collisions*, a virtual reality documentary film that dramatizes contact between Australian Aboriginals and British nuclear testing in South Australia, and documentarian and filmmaker Jacob Hurwitz-Goodman's video essay *Syzygy*, which describes the relation between virtual reality and the financial use of leveraged buyouts-to theorize the intertwining of virtual reality and dystopian imaginings of a future world as burned and unlivable through the effects of climate change and technological "progress." At the same time, the juxtaposition of these two works and particular themes developed in each-indigenous cultural practices, such as "cultural burning" in Australia, compared to the rapacious practices of financial firms which conflate human life with corporate existence-suggest the potential of either contradictions or ambivalences in the relation of technology to environment and human life.

Syzygy is inspired by the 2022 Meta advertisement, "Old Friends, New Fun," which follows the journey of a large, animatronic dog once "employed" as an entertainer in a children's pizza restaurant. Following the closing of the restaurant, the dog is discarded, eventually placed in a museum and outfitted with a Meta Quest, one of Meta's VR headsets. With the Quest attached to its head, the dog finds itself in Horizon Worlds, Meta's social VR platform, having "fun" with the other animatronic figures who also were once entertainment in the pizza restaurant. *Syzygy* outlines how this ad depicts a "corporate unconscious" that relates technological solutionism, the disposability of human life, and the corporate dismantling of firms in the name of shareholder value. Drawing on the overt resemblances between the animatronic figures in Meta's ad and the actual history of the pizza restaurant Chuck E. Cheese and its founder Nolan Bushnell, who also founded Atari, Hurwitz-Goodman intertwines various threads of the financial logic behind many Silicon Valley business decisions, culminating in a representation of VR as a future for wealth and luxury when material abundance is foreclosed to all but the ultra-wealthy. Meta and *Syzygy* indicate how VR is a "solution" to a future in which human bodies are immobile and wasted, as the world burns and as material existence is undermined.

Collisions, on the other hand, dramatizes the story of Nyarri Morgan, his life as a member of the indigenous Martu tribe, and his observation of a British nuclear bomb test in the 1950s, drawing out the continued influence of colonial power and nuclear energy today, such as the contemporary struggle over uranium mining on Martu land. VR, in *Collisions*, becomes a technology for accessing and witnessing environmental destruction and the wasting of lives, a technology that could potentially act as a tool for environmental activism and change. In discussing these works, we seek to ask questions about the relation of VR, as a technology increasingly in the service of platform capitalism, complicit with the ecological destruction of digital media, with the potential of witnessing, archiving, and representing the legacy of environmental destruction.

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Keywords: virtual reality, financial capitalism, nuclear power, video essays, climate change, dystopia

Green Planet XR to Change Minds About Our Planet

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Abstract

As immersive experiences, such as augmented reality (AR) or virtual reality (VR), are becoming more and more popular, it is important to understand their impact on our society. The impact of media on public opinion is well documented (e.g. Kosho, 2016), however, emerging immersive media is less understood (Spangenberg et al., 2022).

This session focuses on research conducted with The BBC Earth & Factory 42 Green Planet Augmented Reality Experience, investigating its impact on visitors' sustainability-related values and behaviours. Visitors were invited to complete a short exit survey at the experience venue. The survey measured their sustainability knowledge, attitudes, and behaviours before and after attending the experience. Visitors' preference for conservation of species featured in the experience was also investigated. Survey participants were approached to participate in a follow-up survey a month later. Additionally, twenty participants were randomly selected to take part in an individual in-depth interview.

Our results suggest that attending The Green Planet Augmented Reality Experience can have a positive impact on one's sustainability attitudes and behaviours. However, the interviews revealed a self-selection bias as most visitors were Green Planet and Sir David Attenborough fans. Therefore, many visitors were already highly educated on the issues around sustainability. Potential of immersive experiences in social change will be discussed.

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Keywords: mixed reality, augmented reality, environmental sustainability, behaviour change, social impact, AR, XR

*Speaker

Nervous Extensions for Planetary Balance in Nina Sobell's Web Seances

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Abstract

Wary that language can reinforce inhibitions and social norms, pioneer media artist Nina Sobell has favored bodily and mental communication in her multifaceted art practice. Both her installations from the 1970s involving closed-circuit television and EEG recordings and her Internet based artworks from the 1990s betray her commitment to fostering uncontrived interpersonal relations between art participants. At the turn of the millennium, Sobell organized a series of web seances which drew affective connections between participants situated in different locations. Taking place both online and in situ, these performative events initiated creative exchanges between pairs of performers wearing brainwave sensors. Their dialogue via drawings and brainwave synchronization favored intimate forms of communication which sharply contrasted with the prevailing text-based modes of web interaction at the time. Closely aligned with the ethos of telematic art, Sobell's web seances elicited a heightened sense of presence through multisensory engagement. They made room for the manifestation of the unconscious and for affective ties intensified by performers' awareness of a collective audience in cyberspace. The seances were pioneering through the way they emphasized both the physical impact of web connections and the power of collective acts of imagination. In Sobell's works, electronic media have served as potentializing structures for expanding and intensifying ties between people and their environment. Repeatedly identifying alternative uses for them, she has enhanced awareness of the broad scope of invisible connections which shape not only one's self-consciousness but also one's surroundings. In this presentation, I will analyze Sobell's *Memory, Dream, Fantasy* seance which took place between Banff and New York and *Solar Wind Weaving Sun and Moon*, a performance which linked Chateau de Sacy with the Channel Islands as participants in each location connected mentally in anticipation of the sun eclipse of 1999. I explore how the artist's shift from video to the Internet as a connecting medium impacted her staging of performances fostering mental attunements. In view of these changes in technological interfaces in her works, I note her addition of creative tasks such as improvised drawings to the aesthetics of communication through biological signals such as the heartbeat and the brainwaves. Building on the notion of "flow" from the writings of Mihaly Csikszentmihalyi, I suggest that Sobell enacts absorbing creative processes as a means of directing attention to ongoing transformations both within and outside participants' embodied minds. Her web seances tie in with her ongoing preoccupation with sensing the interdependence of planetary and human rhythms of change. Visual references to moss growth in *Memory, Dream, Fantasy* and mental preparations for witnessing an eclipse in *Solar Wind* create a sense of togetherness which extends beyond the human realm. Sobell's interest in the interconnections between the ecology of the earth and the ecology of the embodied mind continues to manifest itself in recent works such as *Unseen, Unheard*, a video which poetically renders the phenomenon of contagion, and a digital series of hybrid portraits of humans and animals.

*Speaker

Keywords: telematic art, performance art, embodied mind, consciousness

Telidon Regained: Emulating 1980s Canadian Videotex Art

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Abstract

Launched in 1978, Telidon began as a project of the Canadian Federal Department of Communications to deliver interactive consumer-oriented information services over computer networks. Although other similar videotex services were being developed elsewhere (most notably Minitel in France), Telidon's compact vector encoding format was capable of delivering more sophisticated graphics than its competitors and by the mid-1980s had become the dominant North American videotex standard.

Telidon drew interest across the cultural sector, and attracted the attention of numerous artists interested in exploring its graphic and interactive capabilities. Telidon art hubs arose in several cities in Canada and the US, providing access to content creation and display systems for their communities. Most notably the artist run centre Toronto Community Videotex (later InterAccess) focussed solely on Telidon art production in its early years. Telidon artworks were shown in multiple venues, including early Bell Vista Telidon field trials, Digicon '83, the 1983 Bienal de São Paulo, the 1986 Venice Biennale, and Expo '86 in Vancouver.

Ultimately however Telidon failed to gain widespread adoption in North America and by the late 1980s videotex had come to be seen as a dead end, supplanted by more promising computing technologies then entering the consumer mainstream. The specialized hardware required to display Telidon graphics ceased to be manufactured and as the years went by was increasingly hard to obtain. By the late 1990s Telidon art was observed to be "dead as a doornail," the files still extant on floppy disks but unable to be viewed except for a few non-interactive stills and videorecordings. This became the general consensus, so much so that it was echoed in "The Lost Art of Canada's Doomed Pre-Internet Web," a Motherboard documentary on Telidon art, some 15 years later.

This paper describes a successful collaboration between InterAccess and the University of Victoria Libraries and Archives to recover and restore historic Telidon artworks, a selection of which will be showcased in gallery and web exhibitions opening September 2023. Spanning several years, our project has encompassed data recovery from obsolete media, use of period hardware, format migration, software reconstruction, and emulation. This paper will focus on the affordances and limitations of emulations developed for web display and gallery presentation, and how well the restored artworks capture the experience of the original presentation.

Keywords: Telidon, videotex, telematics, archives, restoration, emulation

*Speaker

A brief history of the signature in art and media culture. NFTs are not a medium of art but a signing system used to attribute works to an author.

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Abstract

All major platforms offering NFT technology use the energy-efficient proof-of-stake algorithms for security. NFT technology can further help reduce the use of resources, since it helps to develop digital-only production environments for artists. The use of resources for storage and preservation of these works is at a small percentage compared to physical artworks.

I want to clarify a common misconception in the discourse of NFT technology. In my view, this technology is not a medium of art but a signing system. The argument will be developed along a comparison of different ways to sign art.

First, I offer a definition of the term ‘medium of art’. For this I follow the approach laid out by Ranciere in his text *What Medium Can Mean*. A medium of art is neither a specific substance nor channel but a specific configuration which Ranciere calls the milieu in which the performances of a determined artistic arrangement come to be inscribed, but also the milieu that these performances themselves contribute to configuring.” This helps to describe the relation of signature and signed artwork.

Argument 1)

There is a difference between a medium of art used to contain the artwork and a signing system which is used to attribute works to an author. This difference is blurry in everyday language. Whereas the notion to mint” a piece seems to make this distinction, even if not explicitly, there are phrases like making an NFT”, which blurs the difference completely. Do I make NFTs? Actually, I do not. My art is making JPGs or MP4s which I sign via NFT technology. The NFT technology (in most cases) does not contain the artwork, but attributes it to its author.

Argument 2)

Uniqueness is commonly attributed to physical presence. Hence people compare NFTs to the Mona Lisa. This comparison does not offer much insight. Furthermore, it ignores the fact that there are a lot of genres in 20th and 21st century art practice, which do not offer artworks with singular physical presence. All these art forms bear similarities to NFTs, hence could be used in a comparison to understand NFT technology.

^{*}Speaker

Argument 3)

Is it true that NFTs are easily reproduced?

We mentioned before that a digitally signed artwork consists of elements minted together. The medium of art and the digital token come together in a contract. This entity finally is more than the sum of its parts. It is a bundle of functions, and this is what NFTs are.

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Keywords: signature, digital_art, media_art, medium, nft, blockchain, history

Divergent, Collective and Creative Practices for Virtualization of Cultural Heritage

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Abstract

In recent years, we have seen growing a myriad of three-dimensional digital-twins of our cultural heritage. Several institutions have turned to the virtualization of part of their collections, with the aim to facilitate its dissemination, as pedagogical tools, or for the purpose of their study and preservation. Our digital online and offline landscapes have been filled up with accurate models and sophisticated reconstructions which, despite being highly developed in technical terms, they do not always achieve their primary goals. In many cases, such reconstructions end up losing the connection with the assets from where they departed, and which they aimed to distributed, activate or document.

In this digital material context, where the bridges, bonds and continuities between actual and virtual worlds are not fully achieved yet, some artistic creative projects have raised showing divergent paths to follow. Through this study, we will analyse three of them: 1) *Material Speculation: ISIS* (2015 – 2016) by Morehshin Allahyari, a project of 3D modeling and 3D printing of twelve destroyed works from the Mosul Museum in Iraq; 2) the collective project *Antes del Olvido* (2019) which documents through photogrammetry techniques civil interventions in monuments and public spaces during the knowns as Chileans Spring; and 3) *Itinerario Virtual* (2021) by Mario Santamaria, which virtualized the hidden infrastructures of Barcelona's Arts Santa Mònica institution, generating a navigable map through inaccessible pipes and ceilings.

These projects are quite different in terms of recognition, scope, political dimensions, place of birth and future perspectives. Nonetheless, all three allow us to glimpse concrete ways to address the tridimensional digitalization of heritage in unusual ways.

In dialogue with the well-known Allahyari's project and the exhibition *Distributed Monuments* we introduce the idea of persistence through digitization and distribution, and the notion of "digital colonialism" as an unwanted flip side of these practices. *Antes del Olvido*, together with other Latin American initiatives, allow us to discuss the collective way of doing that is necessary to rethink what should be preserved, what counts as heritage in a determined situation and for a certain group, and which techniques can be developed in order to achieve a digital multi-layer record of the present. This initiative connects with the notion of anti-monuments that it is unfold together with its analysis. The commissioned-artwork *Itinerario Virtual* shows the infrastructures that support Arts Santa Mònica building in all

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its dimensions and that generally are taken for granted. Infrastructures that usually become visible only when they fail; but as long as maintenance and repairs are efficient, there are no cracks that allow us to guess the amount of resources and materials involved in making things work.

Through the inputs of these cases-studies, we aim to reflect reflect on heritage longevity and visibility, opening ourselves to the tension between lasting and perishing in analog and digital worlds; reflecting on those things that born to be perennial, but circumstances make them ephemeral; and, on the contrary, those that have a temporary or invisible vocations but, within digital culture, they make it to persist.

Keywords: Cultural Heritage, 3D, Anti, Monuments, Collective Practices, Infrastructures, Digital Longevity

Copy Art Histories: The forgotten historical media art artists who transgressed the photocopy machine as a creative tool.

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Abstract

The photocopy machine was created for copying documents so using it for artistic purposes is a transgression of its functional proposal. Since the sixties, groups of artists around the world had been drawn to this technology in offices, universities or copy shops. They became attracted to the instantaneous nature of its reproduction and printing process. These artists gave rise to the international Copy Art movement, which used the media specificity of the photocopy machine, its features and limits, as creative possibilities and graphic language, even if one of the attitudes was to transgress its rules to a greater knowledge of the device. Copy Art was an artistic movement that germinated in different places with distinctive possibilities and trends, but always interrelated. There are mainly three generations of artists who made this movement evolve with specific geographical distinctions, focusing on the contribution by Italy, Spain, France, Germany and the United Kingdom. Thanks to its flexibility, the artistic trends and the heterogeneity in the movement discourses depended on, firstly, the country where it was developed, not only because of the social, cultural and artistic baggage, but also because of its economy and its policies regarding graphic reproduction. Secondly, on the type of chosen machine, most commercialized or allowed in each country. Thirdly, on the cultural baggage or the artistic background of artists; and on the intention of the artistic discourse, in relation or not with the problems that mainstream and institutionalized currents were dealing with. Therefore, the xerographic images carry each country's hallmark, revealing typical geographic conditions.

In Europe there was a greater development of exhibitions, activities, workshops or publications since the end of the seventies, when this technology fully reached this continent. The European preponderance went even further, since the first electrography group exhibition was held at the Biennale Internazionale d'Arte di Venezia in 1970. In this regard, it can be noted that the Europeans exploited the aspects of the "medium specificity" and the technique, the possibilities in terms of variation-repetition process. They explored aspects of the creative process, but also investigated the use of the photocopier. Especially in Italy, there was a predilection to find the specificity of the low fidelity due to the use of a poor technology, which connects with the "poor image" by Hito Steyerl (2009), as the Internet image.

The goal is to light the Copy Art movement and connect it within Media Art. For that purpose, this work is based, on the one hand, on the original documentary, materials and artistic collections held by MIDECIANT (Cuenca, Spain); Fondazione Vodoz-Danese (Milan,

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Italy), MUSINF (Senigallia, Italy); Museum für Fotokopie (Mülheim, Germany), Karin und Uwe Hollweg Museum (Bremen, Germany), Archiv-Black Kit by Boris Nieslony (Cologne, Germany); the Brixton Art Gallery at Tate Britain (London, UK), the private collection by Jean-Claude Baudot (Paris, France) and others artists' collections. And, on the other hand, on the interviews with the main artists, which are the most important sources to learn about these practices, their protagonists and the main geographical contacts.

Keywords: Media Art Histories, Media Archaeology, Copy Art, photocopy machine, xerography

Shared Thinking Space - AI, Digital Archives, and Knowledge Discovery

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Abstract

The digital archive of the future will be an interactive and participatory experience. The online archive platform *Netzspannung.org**, developed more than 20 years ago, is an example of this approach and features AI-based knowledge discovery interfaces. These interfaces include the Semantic Map, which uses semantic text analysis and a semi-automated artificial neural network to reveal relationships between documents, and the Matrix Magnifier, allowing viewers to explore the archive in a way that is like a jukebox or a walk-through exhibition. The Media Flow Browser creates the impression of an all-encompassing immersive media space. Channels such as the Hypermedia Tele-Lecture use two different databases to provide additional images, video, and text for more in-depth information, creating a shared thinking space. I2TV Interactive Internet Television is a web-based 3D environment that connects online and on-site participants to actively influence a live TV broadcast. The Virtual Book is a real-time application that visualizes PDF documents as 3D virtual books, combining the linear structure of a traditional book with the interactive possibilities of hypertext and networked information, creating a library of personal compendiums in which these books can talk to each other, as in Marvin Minsky's vision of the 1980s. The aim of all these interfaces is to create a participatory experience that encourages the reader to become a data performer in a walk-in thinking space. The archive becomes an exhibition space for thought.

The authors argue that the *netzspannung.org* platform is an example of this approach, providing knowledge discovery tools that allow people to engage with the archive in a performative way, becoming active participants and co-creators of the content. This aspect is similar to Aby Warburg's *Denkraum* (Thinking Space) of 1925, a method for exploring art and culture through visual associations and connections. All these new interfaces, developed between 1992 and 2012, are based on the idea of knowledge discovery and performative mediation for the digital archive. However, they still receive little attention.

The authors describe the Knowledge Discovery Interfaces used on the *Netzspannung.org* platform and how they facilitate knowledge discovery and engagement with the archive in a performative way. They predict a future symbiotic integration of controllable Artificial Intelligence (AI) and Intelligence Augmentation (IA) methods through interactivity and

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knowledge linking.

* For technical reasons, not all netzspannung.org data, in particular video documents, are currently accessible. An update for full access is planned for 2023/24.

Keywords: data performer, knowledge discovery, living data, performative interface, semantic mapping, thinking space, visual interface, walk, through

Dreaming The Cities: Shifting Social Landscapes through Collaborative Media Art

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Abstract

In 2021, Lahore Digital Arts Festival received a grant from the British Council DICE Fund for an experimental project entitled Dreaming the Cities, which paired diverse artists from Sao Paolo Brazil and Lahore Pakistan to develop collaborative, socially relevant artistic works. The project, a monumental effort in logistics across language, culture, and time zone barriers is examined here as a case study in how media art, when approached in this way, can provide a strong basis for addressing urgent social topics and furthering a deep connection beyond cultural stereotypes.

In the first section, we describe the project and particularly focus on one artwork that arose from it, where the artists developed a video montage of feminist icons from Brazil and Pakistan and projected it in a large-scale format on a building in Sao Paolo at night. We examine how initial stereotypes/confusions across the pairs grew into a deep artistic connection and how the process of collaboration through media art led not only to a greater understanding within the partnerships but on a broader scale. We share how the project led to initiating dialogues around minority rights and led to respectful, productive conversations through these collaborative artworks. In the second section, we speculate on how the format of Dreaming the Cities can be expanded and matured to become a powerful tool to address damaging cultural stereotypes and urgent social topics including minority rights and climate change, and offer some learnings from the project around media art that can become a model for other artists and institutions.

Keywords: collaborative art, social inclusion, discourse

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"Info/Eco: The Nature of Information. Towards an Ecological Understanding of the Information Environment."

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Abstract

"Info/Eco", my primary current body of creative works, consists of a book (MIT Press) now in preparation for 2024, and a proposed arts installation/exhibition. The latter is to present works created over 50 years, plus a new installation, "Interferences & Resonances", demonstrating photonic, laser interferometry eco-sensing, processing and display. "Info/Eco" has relevance to all four RE:SOURCE Tracks, however it may most appropriately be included in Track 2. If selected for the September program in Venice, organizing a panel, serving on a panel or doing individual presentations are possible. An ecologically inclusive understanding of the information environment is evermore critical to realizing our initiatives to address climate, economics, governance, health, other emergent and convergent aspects of intended local-global, regenerative and sustainable paths forward. Much is currently and increasingly being written about information, the science and the social. Much is also being written and widely published on ecology, on new economics and on the way. Information Ecology has also been written about, but in most cases used primarily as a metaphor. What is information? If information is as fundamental a part of our macro-micro universe as energy and matter, then shouldn't we be attempting to understand it ecologically, especially at Earth-human-social scale? Do the laws of physics, thermodynamics and negentropy apply at the scale of all living things sensing and communicating, and at the scale of human mind-body interactions with information? Is information the relational determinant of life? Is there a scaled, evolutionary descriptive charting of information from the fundamental relationships between information at universe-scale physics, to information at the scale of biology, of technology and of human social processes? That we do not yet fully comprehend what information is, is however, not critically important. What is important to understand is why information, as a fundamental constituent of all reality, along with matter and energy, is not yet included in most whole-systems ecological thinking, in our sense of 'nature' or in our ecologically intended actions. How may our economic processes and practices, along with technology developments and political structuring, be stewarded towards whole-systems ecological understandings inclusive of intangible information processes, valuations, social implications and humane aspirations? We may hopefully be on the verge of a transitional time, a period of re-setting and renewal, for working to understand and address the troubling trajectory of our seemingly out-of-control eco-social state. An eco-minded and more informed social movement has the potential to take steps to reformulate deeply entrenched and corrupted misunderstandings of the way the world works, and would give needed wholeness and detail to proposed Green agendas. How do we get from here to there? How may Information Ecology, integrated in whole systems ecological ways, be applied in education and life-long

*Speaker

learning, healthcare and social wellbeing, business and commerce, telecommunications policies, economics and governance, arts and culture, war and peace? Proposed "Info/Eco" presentation: on an ecological understanding of information, and on differences that may make a difference, from fundamental physics, biology and neuroscience, to evolving social processes and richly diverse, artful, eco-minded ways forward.

Keywords: information, ecology, economy, arts, sciences

Art humanities to promote Climate adaptation for coastal populations: old tools for new traditions

Soffietti F., Carella F., El Hage H., De Martino P., Musco F.

Abstract

The third chapter of the IPCC report (2022) lists many ecosystem aspects that climate change affects and compromises. The impacts that coastal populations suffer are therefore direct, in terms of sea level rise, floodings, heat waves, extreme events but also indirect in terms of jeopardy of economic activities because of loss of biodiversity and risks for several sectors, including the ones contemplating recreational activities.

When one thinks of climate change one of the first images that crosses the mind of any world citizen is a photograph of flooded Venice. It is not graphs, diagrams, or complex technicalities, but it is a photograph. Arts (including, of course, photography) play a crucial role in raising awareness and promoting action to mitigate and adapt to climate change.

As indicated by the IOC State of the Ocean Report (2022) accurate forecast and early warning system mitigates impact due to coastal hazards but public awareness and preparedness play an equally important role.

There is, therefore, an urgent need to build resilience of coastal communities via cultural approaches that complement existing engineered and nature-based solutions. . And this in terms of knowing how to deal with extreme events but also in developing long-term solutions. The sense of belonging to a community is the driver for resilience and since culture structures the identity of a society, the efforts and solutions for adaptation are to be found primarily in it.

But how can past rituals and artistic practices help/teach to improve resilience today and adapt to changing climate conditions?

The objective of the document is to explore if social practices¹ used to reinforce the sense of community could be re-interpreted and applied by communication and/or public art, especially installation, exhibitions and performance to promote education and resilience. Using the above mentioned elements as methods to investigate and topics that are shaping the world today: climate crisis, social and environmental justice, space equity through various media.

Building on a set of studies dealing with art and communication in climate change and role of collective rituals in building community cohesion (Benz, J. (2020), Gorse, A. (2016), (Watson-Jones, R.E., Legare, C. H.), considerations are made to be linked to art experiences and the ongoing EU efforts in building a carbon neutral Union, by means of the European Green Deal, and gaps in terms of cultural approach to achieve these ambitious goals.

Introduction

The issues related to climate change (IPCC, 2023) have generated a context of increasing need to rethink social and behavioral models. With the knowledge of human impacts on the natural environment came also a novel issue of eco-anxiety (Bourban, 2023) that is, to this day, not answered by theoretical framework enabling citizens to solve the contradictions of post-capitalists societies (Beattie et Al., 2016).

¹ "Social practices, rituals and festive events" are cited in the UNESCO's 2003 Convention for the Safeguarding of the Intangible Cultural Heritage. Their role is expanded in the UNESCO's dedicated webpage.

The ecological transition is being driven in the EU by a set of policies that fall under the umbrella of the European Green Deal. They face some of the issues linked to consumption, raising the issues of Greenwashing and the need for reliable labeling (European Union 2019, 2022). The EU citizen is, therefore, assimilated to a consumer, and it could hardly be otherwise considering that the EU originated from a common market (as highlighted by some of the research carried out in the MSP-GREEN project). However the EU countries are united also in reason of shared history and culture and with the aim of promoting cooperation between neighboring populations, especially in shared sea basins.

Moreover, a general concern for environmental issues is expanding the concept of ecological citizenships. A concept that needs to be fully studied and promoted in the European Green Deal contest.

There is therefore room for exploring the social role of culture and art in supporting the adaptation to climate change, the shifting in behaviours towards sustainability (Soini and Dessein, 2016) and the endorsement of ecological citizenship. This paper wishes to argue that resilience and adaptivity in coastal contexts facing climate change threats can be reinforced by social design in the form of art and cultural apport.

The current paper is focused on coastal populations, as being at the forefront of climate change (sea level rise, ocean acidification, etc.). and being at the same time object of dedicated outreach, in the form of Ocean Literacy (UNESCO, 2018) and studies dedicated to marine citizenship (Buchan et Al. 2023). The paper is developed combining results and ongoing research from the EU projects MSP-GREEN² (Communication and culture towards sustainability of maritime sectors in the framework of Maritime Spatial Planning), REGINA-MSP³ (Ocean Literacy for Maritime Spatial Planning at regional level) and POSEIDONE⁴ (Perception of local population for marine protection and marine citizenship).

Need for social experimentation

Starting from the assumption that we live in times of high technological development. The threats we face, as major as they are, can then be compared to the challenges our ancestors had to tackle with sensible less aid. It can be argued, therefore, that their occupation of less than optimal areas, in terms of climate and resources, has been determined by several factors that counter the recurrent choice of migration.

Among those factors the attachment to personal roots and comfort in being inserted in one's original culture has to be taken into consideration.

This paper wishes therefore to suggest that community cohesion and community resilience in the face of changement can be supported by art and culture, just as cultural production in the past has made easier, if not possible, overcome difficult issues; for instance hymns have contributed to the building of nations by inspiring patriotism, music participates in generating identity, and propaganda posters have fueled industrial and war efforts in the past century.

In particular media art and cultural production (imagery, songs, poetry, literature, theatre production, etc.) may reinforce marine-ecological citizenship, proposing positive behavioural models.

Media art will be especially relevant because of its relatively easier dissemination through mobile dispositives. It may be a contemporary alternative (for instance in Tik Tok videos and alike) to what songs and poems have been in the past of our civilization.

Likewise positive models can play a role in reinforcing knowledge and its means of dissemination, in this case Ocean Literacy, proposing attractive formats.

It is only reasonable to expect that said community cohesion can also work in informing bottom-up and endorsing management frameworks for the optimization of resources and ecological transition of activities, such as Maritime Spatial Planning.

The opportunity for experimentation would be, therefore, offered by two coastal populations, similar in numbers, history, resources and geographical position.

² European MARitime and Fisheries and Aquaculture Fund

³ Ibid.

⁴ Interreg italia-Slovenia

The research to be designed would need to respect ethical standards and consider the following steps:

- Identify the two communities.
- Provide a preliminary study highlighting similarities and differences.
- Assess perception on marine and climate issues and citizenship, including marine protection, as per practice developed by the POSEIDONE project
- Provide one of the two with strong ecological storytelling, reinforcing the sense of community. belonging with dedicated media art and cultural production (better if co-created with local artists).
- Submit the two communities (samples) with a survey proposing different behavioural answers in the case of worst climate scenarios.
- Evaluate discrepancies between the two experimental groups.

Endnotes

This paper, by considering available literature and highlighting connections between ecological policies, social design, ecological citizenship and art production proposes a set of steps to consider the effects of cultures in allowing communities to be climate change responsive. Positive outcomes of a line of research may be the basis for new sustainable traditions able to transfer into populations' cultures virtuous behaviours.

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The illusion of separation: Marshmallow Laser Feast's immersive technologies for interconnected ecosystems.

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Abstract

This paper aims to highlight the role of VR technology in raising awareness on climate consciousness and on the interconnectedness of human and non-human relationships. The advance of technological progress and the development of immersive technologies has led to an unprecedented level of un-framingness (Conte, 2020), allowing the image to overflow the boundaries of representation and, on a double-sided mechanism, enabling the spectator to get into the environmental image. Virtual reality has inherited the long debate on immersion (Nechvatal, 2009), leading to reconsider the role of emotional impact in aesthetic experience, already observed in traditional visual arts (Freedberg, 1993) and moving images (Gallese, Guerra, 2015).

The experiential dimension of immersive technologies provides the foundations for arguing that virtual reality is an effective medium for creating connections among the experiencer and otherness. This happens because VR can simulate alternative perceptions – as non-human ones – and embodiment in different bodies, providing the spectator suggestions of what is like to be another. Additionally, virtual simulations are able to visualize alternative environments, other possible worlds, and physically put the spectator in a virtually constructed context that shows the invisible connections that otherwise would remain hidden.

The red thread for this research will be the work of collective Marshmallow Laser Feast (MLF), a creative studio based in London and specialized in VR experiences. Three VR installations will be considered here, which ideally constitute a trilogy. All the installations are experienced collectively and in connection with the natural environment, so they are collective and site-specific experiences. First, *In The Eyes Of The Animal* (2015) simulates animal sensory perception; an exemplary case of how art and new technologies are contributing to the deconstruction of anthropocentrism and the hierarchy between species, bringing man closer to animal perception. The second chapter of the trilogy, *Treehugger: Wawona* (2016), reconstructs one of the oldest redwoods in the world (fallen in 1969), in an attempt to explore, after interspecies empathy, empathy for organic and microbial life. The collective makes visible the network of exchanges between the ground and the tree, through the mycelia, showing the perfect mechanism of interdependence of nature.

The trilogy culminates with *We Live in an Ocean of Air* (2018), a VR experience that displays the interconnectedness between man and the unity of the living. Thanks to sensors and through the VR headset, the viewer's breath is detected and then displayed in air particles synchronized with the heartbeat and the pulse of blood vessels. The viewer begins to

*Speaker

exist in complete synchrony with the tree, which breathes with him in a reciprocal exchange. Through the point of contact of the breath, MLF shows the interconnectedness of life with the whole, its incessant flow in every form, from vegetable to animal.

In conclusion, this paper tries to demonstrate the potential of immersive technologies for building new realities that can make the invisible visible. Therefore, visualizing interconnections among human and non-human agents of "reality", allows us to re-evaluate the role of interdependence and deconstruct anthropocentric exceptionalism.

Keywords: immersive technologies, VR art, ecosystems, interconnectedness, non, human agency.

Enduring Rain

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Abstract

Rain is restless, permeating, and as a watery state of matter ‘flexible in form and embracing in scope’, it combines the ‘extreme power for self-transformation and transformation of its resistant opponents.’(1) How does rain invoke and dispose spheres of meaning? Rain - as weather altogether - is a ‘highly affective phenomenon that can evoke a strong sense of wonder, delight, or terror, as well as a myriad of minor perceptions every moment.’(2) Memories of certain rain events are often nostalgically framed, they haunt and persist.(3) Rain shapes the perception of the environment, it carries sensations, creates spaces of experience, triggers pain, influences mental states, orchestrates reactions like abandonment and control as well as processes of wearing away. Despite the impressive number of art works in past decades that involve rain as substantial weather element, hardly any art-historical research has dealt with this phenomenon more closely.(4) Lately, a new category called weather art has appeared. Works that are classified under this rather broad term, consist of or include meteorological elements or engage with climate change and its consequences besides stretch from land art to recent eco-critical art forms. As of rain installations, some like *Living Dog Among Dead Lions* by Chachkhiani – involve the viewer in mere spectacles for distant observation, others, building on the traditions of interactive art, create a situation into which one enters and moves amidst. Like *Rain room*, an immersive art work by Koch and Ortkrass where visitors ‘(...) are simultaneously exposed to and protected’ from the heavy downpour; they sense a kind of control as the falling rain stops once a human body is detected.(5) Another example is *Symphony in D Minor*, a set of interactive sculptures by Gallagher and Klapper, which works in a similar direction, ‘the hanging cylinders respond to movement, intensifying the effects of heavy rain, lightning, and thunder as the audience leaps and flails beneath.’(6) This talk suggests to investigate rain as artistic medium and ‘catalyst for vital ecocritical conversations’.(7)

(1) Cheng, Chung-ying. ”Chinese philosophy and symbolic reference.” *Philosophy East and West*, 27, No 3 (1 July 1977), 307-322, p. 317.

(2) Janine Randerson, *Weather as Medium. Toward a Meteorological Art*, Cambridge, Massachusetts London, England, MIT, 2018, p. xvi and xiv.

(3) Georgina Endfield, Simon Naylor, *Climate and Cultural Heritage: An Experiment with the ‘Weather Memory Bank’*, 2015, p. 72.

(4) Instead more art related research was done on fluids, fog and blur, *State of Flux: Aesthetics of Fluid Materials*, ed. by Marcel Finke and Friedrich Weltzien, (Berlin, Reimer, 2017);

*Speaker

Markus Finke *Im Nebel. Fluide Materialien und die Kunst der Zerstreuung* (2018); *Einfluss, Strömung, Quelle: Aquatische Metaphern der Kunstgeschichte*, ed. by Ulrich Pfisterer and Christine Tauber, (Bielefeld, transcript, 2018).

(5) The first exhibit took place at Barbican, London, in 2012, <https://www.random-international.com/rain-room-2012>

(6) Matthew Bower, 'A Storm in a Jar. 10 Very Cool Art Installations That Imitate Weather', in *The Atlantic*, (9 November 2012), <https://www.theatlantic.com/entertainment/archive/2012/11/a-storm-in-a-jar-10-very-cool-art-installations-that-imitate-weather/265017/>, (accessed 20 December 2019).

(7) Janine Randerson, *Weather as Medium. Toward a Meteorological Art*, Cambridge, Massachusetts London, England, MIT, 2018, p. xiv.

Keywords: rain as weather element and artistic medium, rain installations, ecocritical art

Media Narcissus from Ovid and Caravaggio to Liquid Views and today's Selfies

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Abstract

This article describes the interactive media artwork *Liquid Views* (1992) and how it uses Artificial Intelligence to create a virtual water-based reality. It also discusses the performative aspect of the artwork, the technical aspects of its operation, and its relationship to various theories in the field of media and technology. The later article will include related work.

Liquid Views invites viewers to encounter their "second selves," as described by Sherry Turkle, and recalls Ovid's story of Narcissus. Accompanied by the sound of the water, the installation shows a shimmering simulation of a water surface on a horizontal screen. As viewers approach, they see themselves reflected. They can interact with their image by touching the touch-sensitive glass, creating waves and blurring the image as if it were morphing in real time. The surface of the water is also projected onto the wall behind the installation, allowing viewers to observe themselves through a magnifying glass. This intimate introspection is transformed into a public display of the self, anticipating the future selfie culture.

The performative aspect of *Liquid Views* is evident in the process of approaching, exploring, and transforming the virtual water. The recipient's experience becomes a component of the artwork, revealing the phenomena of mixed reality. What distinguishes *Liquid Views* from today's smartphone selfies is differentiation.

Technically, *Liquid Views* simulates water waves based on physical algorithms for computer vision. The current moment - captured in the image - is perceived as "now". The transition between the two worlds becomes visible only in a captured image of a frozen moment. The viewer may not immediately recognize themselves. The principle of "first think, then act" changes the interactive process in favour of immediate perception, which could be described as "perceiving in action". The viewer interacts with the artwork and can perceive and respond to their surroundings in real time.

The sociologist Zygmunt Bauman describes the concept of transition with the term "Liquid Modernity", a metaphorical term that says goodbye to the known and is unaware of the new. Mark B.N. Hansen (2006), a literary scholar, observes that the image is scattering, but far from ending engagement, in fact, catalyzes a transition to another realm – to the realm of the disintegrated image."

The writer, Michael Joyce (2000), sees *Liquid Views* as both embedded in cinema and verbal narratives. Art historian Daniel Becker points to timeless hybridity when he says: "It is

*Speaker

precisely at the moment of touching two worlds meet each other, an "external" one, to which the technical setup, the exhibition space or even the audience belongs, and an "internal" one, which takes place between the user and its virtual counterpart. In this moment so many levels meet, which constitute the aesthetic attraction." And Becker goes on: "However, animation in the form of "lifeness" (synchronous, immersive, augmented reality) is a special feature that hardly appears in any other work in this way." The artists write: "The mirror becomes the actor."

Keywords: Keywords: AI, artificial intelligence, interactive, Narcissus, neural network, real, time morphing, simulation, water mirror, wave algorithm

50 years of Montage (the French term for film editing) Editing in Media Art, From film to digital editing, including interactive projects on CD-ROMs and VR from 1980s on.

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Abstract

The research would be based on my personal experience as well as those artists and film-makers with whom I either worked with or who were my professors, mentors, collaborations or friends. This includes my beginning of studying film editing at the Academy of Film and Theater (today the Academy of Dramatic Arts) in Zagreb in 1973, many years of working on mainstream films and TV productions, studying video and interactive technologies in the mid-1980s at Harvard University and MIT Media Lab, independent work on media art projects in which multiple editing timeline, synchronized screens and other editing systems from the 1990s until today were experimented, and as a professor at many universities, as curator of many exhibitions and manifestations of media art until establishing the Center for Innovative Media of the Academy of Applied Arts, University of Rijeka in 2017 of which I am a leader until recent days.

Faced and personally experienced with the development of technologies from film to analog and later digital technologies, I noticed that in those half of the century, there is a lack of documentations in the field of Montage in artistic media works.

In the beginning of 2023, I started a series of video interviews with pioneers of media art whom I personally know or have had the opportunity to meet during these 50 years. The name of the project would be based on the book which is in the German edition entitled "Mr. Hitchcock, wie haben Sie das gemacht" (the original title was *Le Cinéma selon Hitchcock*) by François Truffaut, which means, my interview question would be Mr. artist (name), how did you do it?"

My interest is especially in the works of artists who were using editing machines in their times, showing how it could be more complicated for manipulation as those of today, but at the same time they achieved extraordinary artistic quality.

In addition to traditional meaning to film editing, in my experience and opinion, interactive media projects include some specificity of editing: programming interactively images and sounds. This part of my presentation would be, because of its idiosyncratic specificity, open for the discussion.

On the panel, I would like to present the development phase of my research, which I started

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in January 2023. I am sure that on this occasion, I would have the opportunity to meet experts who could enrich my further research project.

Here I will mention some names with which I started the documentation, as well as some I am planning to ask:

Antal Lux, Michael Saup, Akiko Hadda, Gavin Hodge. In preparation are to ask Monika Fleischmann & Wolfgang Strauss, Malcolm Le Grice, David Larcher, Maurice Benayoun, pioneers of Croatian video art Dalibor Martinis and Sanja Iveković and younger generations Ivan Marušić KLIF, Vladislav Knežević, Dan Oki, Darko Fritz and others. I am also planning to visit the USA again and talk to those artists who are still living there.

Keywords: Montage / Editing, History, Media Art, Documentation, Interviews

In search of a format. The strange case of IFSEF (International Festival of Scientific-Educational Film 1956 – 1975, a collaboration between the University of Padua and the Venice Film Festival)

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Abstract

The paper analyses the case of the *Rassegna Internazionale del film Scientifico-didattico*, (*The International Festival of Scientific and Educational Film*, hence IFSEF) – a pioneering non-theatrical science film festival event held at the University of Padova from 1956 to 1975 with the collaboration of the Venice International Film Festival – as a multiform space to question the permeable boundaries between scientific contents and their aesthetical dimension, research and education, scientific work and science communication. Film festivals continue to receive scholarly attention (Dalla Gassa et al. 2022; de Valck, Kredell and Lois, 2016; Iordanova 2013, to name just a few recent studies) also from a media-archaeological perspective (Harbord 2016). The interaction of science, cinema and society has also been discussed through the critical approaches of a wide range of disciplines such as film studies, history of science, and public communication of science (Boon, 2008; Canadelli and Casonato, 2019, Curtis 2018, 2015; Gouyon 2016; Landecker 2012 and 2006; Lefebvre, 2004 and 2003; Olszynko-Gryn 2021; Wellmann 2011). Scholarly literature, nevertheless, has relatively neglected the distinctive *format* of science film festivals.

This paper demonstrates how issues of form(at) and spectatorship are deeply intertwined. Often screened in prominent film festivals such as Venice, Cannes, and Bruxelles, science films could stimulate a unique form of spectatorship in conjunction with the aesthetic, immersive approach fostered by the feature-film sections of those famous festivals. The case of IFSEF is unique, in this respect. IFSEF was innovative not simply because it showcased the work of pioneers of scientific cinema (Eric Duvivier, Eric Lucey, Jean Dallet among others), but much more because, thanks to its peculiar format (the birthing from a collateral section of the Venice Film Festival and the presence in IFSEF of a section on art films), it tested the boundaries between scientific content and aesthetic form, research and education, public academic institutions and private companies producing the films. IFSEF afterlife is rich, consisting of 16 and 35mm film documentaries, U-Matic tapes, digital files, projectors, paper-based material scattered across various archives. Supported by an empirical analysis of the existing archival records in need to be preserved and made publicly accessible, this paper demonstrates how IFSEF, with its distinctive format, did and still could stimulate an active form of spectatorship - *audiencing* to use Gouyon's term (2016: 27).

Keywords: Pioneering format, Spectatorship, Science Film Festival, Archive afterlife

*Speaker

Sonic Environments in Mediation: Studying Ambient Sounds in Film and Media Arts

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Abstract

In the early 90s, worldwide communities began waking up from their slumber to slowly face the realities of climate change and its devastating effects. In November 1992 around 1,700 leading thinkers across globe, issued an ardent appeal. Twenty-five years later an updated letter was published in the journal ‘BioScience’. The letter underscored the gravity of the situation, noting how environments have continued to be exploited at great risk. If broadened, the *environment* in this urgent and cautionary discourse can be understood as both the remote and immediate physical surroundings that humans inhabit, transform, (mis)use, mediate, and manipulate for their own entertainment and consumption. This is the habitual environment – not only natural but also built environments such as rural, urban, suburban, indoor and outdoor sites – that humans occupy and live in. These environments stem from myriad physical places. They are often perceived as the *settings* that provides specific atmosphere or ambience when describing, depicting, narrating, producing, and reproducing increasingly mediatized worlds. Such mediated settings also essentially include the aural domain. The sonic environment, as explained by ecologist Bernie Krause (1987, 2012), has deteriorated rapidly in the last hundred years through accelerated human-made intervention in environments that are inhabited for industrialization and urbanization, entertainment and tourism. Environments consumed, (re)produced and mediated through technology are under pressure. An investigation of processes that are used to mediate environments for their aesthetic consumption – in other words, human agency in expending the environment – is required to gain an understanding of the complex relationship between humans and the environment, which humans are not outside of, yet are purposefully exploiting. Therefore, one of the fundamental entries in this discourse is the study of the (re)production and mediation of environmental sounds from particular places or sites for making sonic environments in film, media arts and other audiovisual media and technology-based arts that are consumed for both entertainment and aesthetic engagement. Through this knowledge, aspects of the impact humans have had on environments can be measured in relation to current environmental and ecological crises in the prevailing Anthropocene. The proposed paper investigates how the sonic environment is reconstructed in films and audiovisual media through the recording and mediation of site-specific environmental or ambient sounds. Although the mediated setting acts as the sonic backdrop where a story or event can take place, there has been little academic study of the transformation of ecological relationality through sound recording and design by the process of mediation of the environment and production of space in film and audiovisual media. Drawing on theories of narrative, diegesis, mimesis, rendering (Chion 1994, Morton 2009), and presence, and following a varied number of relevant films and audiovisual media artworks, the paper aims to explore the human agency and affordances in producing sonic reality and presence through recording and technological mediation of environmental sounds, and acoustic ecology on audiovisual media for human consumption.

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Keywords: Environment, climate action, sound studies, film and media studies, audiovisual media, sound arts, mediation, rendering, presence, diegesis

Collecting and Preserving New Media Art in Portugal

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Abstract

The current investigation aims to focus on how New Media Art is collected and preserved in Portugal, a pioneer research on a country where this artistic practice is well established but there's no studies regarding it's preservation. The research is orientated by both general and more specific goals. Regarding the first ones, we search to compile the disperse information related to New Media Art collections in Portugal and contribute for the history of collections, since there's only a few studies on that field (Duarte, 2016), related to the recent popularity of this artistic practice. The more specific goals are related with conservation issues, in order to understand the conditions in which the existing New Media Art collections are found, and with that information we are going to do a risk assessment and calculate what will be lost within a period of five years. At last, despite the specificities of all artistic objects and institutions, we propose a general emergency conservation plan in order to sensitize not only those same institutions, but also the public. The sample focuses on public and private collections that are exhibited to the public.

New Media Art can be defined as an interdisciplinary category combining techno-scientific development with artistic creation, and also creating a link between contemporary socio-cultural background, digital methods and art history (Grau, 2016). Considering that New Media Art is mainly conceptual, it has deep connecting roots with some early twentieth century artistic movements such as Dadaism and Pop Art, in response to the revolution of the technology of information and gradual digitalization of cultural forms (Tribe, 2010). In the last decade of the twentieth century, after the crash of Wall Street in 1987 that unsettled the art market globally, New Media Art emerged from that shattered artistic, economic and political panorama leading several museums, institutions and biennales to start collecting and exhibiting, giving it more disclose.

We define New Media Art as an omnibus category, since the works of art can be digital or analogue, interactive or non-interactive, be material or immaterial, and because of that, proposals for preserving and restoring it are non-consensual and case specific. Even though this problem presses and the main goal is transmitting the artistic production from this field to future generations in the most authentic form, at the moment there are several institutions and museums that focus on the preservation and restoration of this matter, whereas none are based in Portugal.

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With the ever growing digital artistic creation, it's even more necessary attending to the preservation challenges that New Media Art gives to the institutions who collect it, being upfront the technological obsolescence and the lack of human and financial resources the main problems related to the preservation of this category.

Duarte, A. (2016). *O Coleccionismo Privado de Arte Moderna e Contemporânea em Portugal*. Caleidoscópio;

Grau, O. (2016). *New Media Art*. Oxford Bibliographies. Retrieved January 13, 2022, from <https://www.oxfordbibliographies.com/view/document/obo-9780199920105/obo-9780199920105-0082.xml>;

Tribe, M., & Jana, R. (2010). *New Media Art*. Taschen.

Keywords: New Media Art Conservation, New Media Art Preservation, Portuguese Art Collections

Expanded Algorithms: On a new algorithmic consciousness in art

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Abstract

The account of so-called ‘algorithmic art’ has primarily referred to the algorithm as a tool used for generating visual aesthetics (Verostko 1999, Edmonds 2018, Parker 2019). Rather, we wish to qualify how ‘algorithms’ as socio-technical assemblage (Kitchin) are saturating an expanded algorithmic consciousness in art practices in Scandinavia.

We suggest untying the concept of algorithm from its mostly scientific iterations and concepts in our account of it as a boundary object (Star and Griesemer 1989) and what that may tell us about what Alexander Galloway called ‘algorithmic culture’ (2006). Descriptive of the age that we live in, denoting culture as marked by the omnipresence of algorithmic processes, Galloway’s model of thinking expands the algorithmic concept from its conceptualization in terms of technicality and mathematical function to being culturally and politically performative. In short, we are interested in everything non-algorithmic about the influence of algorithms on artistic practices and cultures in art.

We propose the concept of *expanded algorithms* as an epistemological tool to examine art’s entwinement with algorithmic culture as a framing and setting for art practices that create de novo re-imaginings in art and about art. The concept is inspired by Gene Youngblood’s concept of expanded cinema, with which he describes the functioning of the intermedia network of cinema and television as the nervous system of mankind. Expanded cinema did not refer to new forms of media but entailed a vision for an ‘expanded cinematic language’ to grasp a new consciousness emerging with (new) media art in 1970 (Youngblood 1970, 59). Our concept of *expanded algorithm* extends on Youngblood’s ideas as an epistemological tool to understand art as impeded with a new mode of consciousness with algorithmic culture based on the socio-technical assemblage.

We ask: What does art tell us about a new mode of consciousness in algorithmic culture, and how does this consciousness manifest in re-imaginings in and about art? By tracing an emerging ‘algorithmic language’ permeating current art practices in Scandinavia we seek to unpack the manifestations of algorithmic culture in art to draw the contours of what we propose as a new algorithmic (un)consciousness in art.

One example of this is *GAME Engine (Orange Bulletproof Kids)* by Søren Thilo Funder, which takes the visitors into what appears to be a press conference announcing a new GAME engine. Surrounding the visitors and the screens from where the Game engine is launched

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are sculptural elements (or fragments) from the first-shooter game Counter Strike. The whole scene carries the semblance of something in-between dream and nightmare, between fiction and reality. Søren Thilo Funder portrays algorithms as cultural footprints, or as 'ontological shifters' (Kittler): mediators of the non-algorithmic about algorithms. Behind the algorithms in GAME Engine is a dystopic, structurally dominating and seemingly dangerous world looms. Behind the medium as message, an expanded algorithmic perspective on the art reveals the re-imagination of 'gamified' cultural practices co-evolving with omnipresent algorithmic code, and the re-imagination about art as blending with new cultural realities becoming a part of its material and practiced consciousness.

Keywords: Algorithms, art, culture, consciousness, language, memory

Situationist Ethics and Contemporary Curatorial Practice - abstract paper submission

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Abstract

The Situationist International's (SI) conventional historiography typically presents in a form of a binary opposition of the movement's two disparate periods, wherein the later 'political' phase is ideologically counterposed to the former 'aesthetic' one. The article establishes the reconciliation of the two periods, re-examined through the prism of the movement's spectacular appropriation in the culture industry, as well as infers a feedback loop, anticipatorily devised by the SI before its imminent recuperation by the spectacle. Although conceptually, the spectacular critique (detournement) and its re-appropriation (recuperation) are polar types, they do not form a dichotomy, but rather an aesthetic continuum, in which both concepts alternate ad infinitum, while the recuperation of the movement merely further reinforces its ideas. Continuing this line of argumentation, the critical analysis of the spectacle transcends the strictly Situationist context, applicable to contemporary times and forms within the culture industry. The article thus presents an academic study of detournement and recuperation in present-day media, arts and politics, manifesting in the recurrent dichotomy of the two opposing concepts - recuperation and detournement - within the contemporary curatorial practice. The main question of the paper explores whether radically aligned art can retain its subversive value once placed in an exhibition setting; subsequently, examining the ethics of curatorship when exhibiting such art, instantiated by the experience of Situationist-themed (pro-situ) exhibitions and the role of new media within this, as well as the question of the possibility to ethically curate such art without immobilising and recuperating it or infringing on its radical value.

One of the first and most prominent pro-situ exhibitions was the 1989-1990 travelling retrospective 'On the Passage of a Few People Through a Brief Period of Time' presented at the Pompidou Centre, the London and Boston ICA, manifesting an overview of Situationist documents and included several art pieces, namely from Asger Jorn and Giuseppe Pinot-Gallizio - both eminently radical in their methods. This exhibition marks the apex point of the SI's recuperation by the spectacle, and if prior to this the movement's ideological immobilisation was conducted by relegating it to somewhat of a delinquent subculture rather than placing it in a political context, now the art institutions do so by reclaiming the Situationists in their exhibitions. This signifies only one example of the curatorial modus used as a front for spectacular recuperation.

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Keywords: spectacle, curating, situationism, détournement

Push Play: Chicago's Groundbreaking Video and Computer Art

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Abstract

During the 1970s, Chicago emerged as a center for image-processing work. In 1969, Dan Sandin joined the faculty of the University of Illinois at Chicago (UIC), and Phil Morton began teaching at the School of the Art Institute of Chicago (SAIC). Sandin and Morton, alongside some of their frequent collaborators would form what critic Christine Tamblyn has referred to as the "first generation" of Chicago video artists. During the course of the following decade, both artists would play an instrumental role in cultivating the emergence of Chicago's radical media-arts community. In 1973, Sandin finished designing his own Image Processor, a patch programmable analog computer which allowed for real-time manipulation of video inputs, which Morton helped distribute in his manual, *Distribution Religion* while advocating his open source ethic of COPY-IT-RIGHT. Under Sandin and Morton's tutelage, the radical media-arts community in Chicago envisioned the image-processor as a real-time performance instrument which enabled its users to grow and connect psychically. This ethos emerges in the first two Electronic Visualization Events (EVE) held in 1975 and 1976 at UIC. These events mimic jam-sessions, with coding and image manipulation taking place live, directly in front of the audience. There is an almost orchestral quality to the environment, with the artist as the conductor guiding the different instruments in a symphonic performance. Producing visual phenomena often associated with the effects of psychedelic drugs featuring densely layered images in highly saturated colors undergoing geometrical permutations, these electronic manipulations transform the environment into a psychic plane of connectivity and interconnection. This paper examines the second-generation of image-processing artists in Chicago, with a specific focus on women's work including Barbara Sykes, Jane Veeder, and Copper Giloth. Drawn to Chicago by the energy of this scene, these artists turned to a new set of tools: The Bally home computer / arcade system, one of the first affordable home computers and video game platforms to be released in the United States and the ZGRASS programming language, a powerful computer graphics language developed by Tom DeFanti, Jamie Fenton, and Nola Donato. Examining their projects, this paper argues that even with the shift towards graphic animation work at an individual level on a personal computer, the idea of technological play and interactive connection, such a vital tenet of the Electronic Visualization Events, remained central. From Veeder's *Warpitout*, an interactive menu-driven self-portrait game, to Giloth's playful take on media histories in her *Ballyoid* video project, these artists' works reveal a new ear in which "push play" becomes not just a directive but also an ethical imperative to connect in and through the screen.

Keywords: Image Processor, Bally home computer, arcade, Barbara Sykes, Jane Veeder, Copper Giloth, Chicago, computer art, computer animation, video art

*Speaker

Transformation of media in emerging forms: Heritage Art Practices in Mexico

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Abstract

In this paper we trace the history of electronic and digital arts that flourished since the mid sixties, with the work of artists like Loraine Pinto whose electromechanical installation titled *The Fifth Dimension* (1968) was exhibited for the Olympic celebrations in Mexico City. The decade following saw the use of computers in the artistic installations of Manuel Felguerez and more importantly, his radical project, *The Aesthetic Machine* (1975). Many other artists contributed to the development of a *niche* ethic of art in Mexico as much as in Latin America as a whole. The important proponents of this *niche* phenomenon in the art world included legendary artists like Andrea Di Castro, Pola Weiss or Humberto Jardon, who gave birth to a new cultural expression for a global media. During this epoch of transformations there was an explosion, not only of devices and techniques, but also of the aesthetic-sensorial consciousness, achieved through robotics and AI. Gilberto Esparza's *Nomadic Plants* (2008-2014), and *Autophotosyntetic Plants* (2013-2014) or the Latin American collective of artists, denominated "Interspecifics" 's, algorithmic artwork *Codex Virtualis* (2021) reconfigured the humongous contraptions of a posthuman world. Other prominent personalities, not any less challenging were Iván Abreu and Malitzin Cortes, both of whom used live coding in their systemic constructions. Above all, with a somewhat self-absolving vision of technology indigenous artist Fernando Palma brings together native mysticism and technological consciousness in his mechatronic artwork like the *In Ixtli in Yololt* or "We the People" (translated from the original *Nahuatl* title), which was displayed in the unexpected contextual spaces of the PS1 at New York.

Keywords: Art, digital, electronic, pioneers, Mexico

*Speaker

Auro Lecci's Algorithmic Art: Towards the Computer as a Thinking Machine

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Abstract

Auro Lecci is an Italian artist who is still not widely recognised, despite participating in some of the most important exhibitions and publications related to computer art around the turn of the 1960s. While still working as a painter, he began experimenting with electronic technologies in the mid-1960s when he joined Pietro Grossi's Studio di Fonologia Musicale in Florence. The rigorous, mathematical process behind the creation of his paintings, influenced by Arte Programmata, also came to characterize his computer-generated works. Thanks to Grossi, in 1969 Lecci had the opportunity to learn the programming language 'Fortran' and was able to produce his first plotter drawings at CNUCE (Centro Nazionale Universitario di Calcolo Elettronico) in Pisa. In line with the research of leading pioneers of computer art, such as Frieder Nake and Georg Nees, his computer-generated images reveal the geometric aesthetic of the machine and question the relationship between programming language and image, pre-set data and random numbers. The computer programs written by the artist are algorithms that dictate a series of instructions to the machine, with fixed parameters and random choices, to create plotter drawings. In this way, Lecci was using a method which also characterized Arte Programmata, based upon the balance between a set of rules and an openness to chance. However, instead of the viewer having a perceptual or physical participation, as in the work of Gruppo N and Gruppo T, in these computer-generated images it is the machine that participates in the process of creation.

Lecci's experience is particularly significant considering that he worked in isolation in Italy, exhibiting with artists who were not interested in digital technologies. The only exception was at the 1970 Venice Biennale, where he was the only Italian artist to be included in a section devoted to computer art. In the same period, he participated in a number of significant international events, such as the fourth edition of New Tendencies (*tendencije 4*): a series of exhibitions and conferences held in Zagreb between 1968 and 1969 under the title *Computers and Visual Research*. This event opened a productive debate around the use of computers in visual research, supported by Max Bense and Abraham Moles's Information Aesthetics: a theory which based the aesthetic value of an artwork on scientific and objective principles and which also informed Lecci's work. *Tendencije 4* was his first opportunity to show his computer-generated artworks, and was followed by other exhibitions (e.g. *Generation Automatica de Formas Plasticas*, Madrid 1970; *Grenzgebiete der Bildenden Kunst*, Stuttgart 1972; *tendencije 5*, Zagreb 1973) and publications (e.g. the review *Computers and Automation*, 1969 and the book *Computer Graphics Computer Art* by H.W. Franke, 1971). In 1970 Lecci moved to the University of Massachusetts in Amherst where he began to explore artificial intelligence and generative grammar. These became the basis for his last

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computer art project, where for the first time the computer was a "thinking machine", able to imagine and create structures starting from a grammar and a syntax built by the artist himself.

Keywords: computer art, algorithmic art, artificial intelligence, New Tendencies, Information Aesthetics

Immersivity in techno-scientific artistic performances: an archaeological approach

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Abstract

Immersivity is essential so we can be disturbed by different imagery mediations, both from older and recent "haunted media" (Jeffrey Sconce). In the field of moving image, immersivity leads us through different spectatorship regimes, shaped by particular historical contexts. In addition to the notion of cinematographic device (Jean-Louis Baudry), that systematizes the immersive experience based on the effect produced by the arrangement of the technical apparatus of the cinema, many other places were designed over time, in his relationship with moving image, which would allow free transit between the field of cinema and arts (Theo van Doesburg, László Moholy-Nagy, Stan Vanderbeek, Carolee Schneemann) and the migration of new forms of access to the cinematic experience between them. In fact, it's particularly pertinent to think how ghostly figures and monsters, which are the first images to be drawn and projected by pre-cinematographic devices, are perceived in contexts in which techno-scientific performances presuppose a participative observer, both optically and acoustically, in the immersive cinematic experience.

In the 17th century, Athanasius Kircher popularized techno-scientific illusionist performances through the use of a magic lantern, enhancing the frightening effect of this new machinery, by placing it at the service of religious belief. In fact, Kircher claimed the supernatural character of these apparitions, a justification that emphasized their popular success, as well as an important argument used by its detractors. However, he would inscribe the spiritual potentiality of these images as an element of a show precisely capable of raising doubts about the rationality of the senses. Also an issue that will aid Étienne-Gaspard Robertson to think about the concept of his phantasmagoria shows. As these necromantic sessions will have as inspiration the knowledge associated with the magic lantern and Kircher's presentations. Another reference is the "*Magiae naturalis*", by Giovanni Battista Della Porta, which was his first manual of experimental physics. By establishing an affinity with the dramatized presentations performed inside the *camera obscura* by Della Porta, which presupposed a precise narrative structure and where spectators also found themselves in a space isolated from the outside and immersed in darkness.

More recently, Tony Oursler's work is also an excellent vehicle to understand, through an archaeological approach, the contemporary pertinence of immersivity in techno-scientific performances in an artistic context. In Oursler's "*The Influence Machine*" (2000), the reference to phantasmagoria shows is direct, with Robertson himself being one of the characters of a monologue present in the immersive installation. Projections onto trees and clouds of smoke that pursue, throughout their figures, an alternative history of the media, not by the sound of a strident harmonica like in phantasmagorias, but with a soundtrack by Tony Conrad, one

*Speaker

of the pioneers of expanded cinema. In an environment, which urbanizes the ethereal projections of the end of the 18th century, technology is now presented by some of its inventors, through different elements dispersed in this psycho-landscape, as a system that is potentially open at the time of its invention. Like something that has not yet been appropriated by use.

Keywords: immersivity, media archaeology, expanded cinema, phantasmagoria

Preservation of early computer-based art using ChatGPT

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Abstract

Computer-based art, also known as digital art or new media art, has played a significant role in shaping the art world since its emergence in the 1960s. This form of art utilizes technology as a medium for creating and displaying works, such as computer graphics, digital animation, and interactive installations. Despite its importance in the history of art, early computer-based art is at risk of being lost due to the obsolescence of the technology used to create it and the digital nature of the works themselves.

The preservation of early computer-based art is crucial for future generations to understand and appreciate the origins and evolution of this medium. In this article, we will explore the challenges and current efforts being made to preserve early computer-based art. We will also examine the role of ChatGPT, a large language model, in preserving early computer-based art.

Preserving early computer-based art poses several unique challenges. One of the main challenges is the obsolescence of technology. The technology used to create early computer-based art, such as mainframe computers and specialized software, is now obsolete and no longer in use. This makes it difficult to access, display, and preserve these artworks as the necessary hardware and software may not be available or may no longer be functional.

Some artists and researchers are working on creating new versions of early computer-based artworks, using modern technology to update the original works, allowing them to be experienced by new audiences.

ChatGPT, a large language model, has the potential to play a significant role in preserving early computer-based art. In this article we will report how the available documentation of early computer-based art can be used by ChatGPT to emulate and simulate early computer-based artworks. For example, we will demonstrate how from the pseudocode for generating computer graphics by Georg Nees (*Irrweg 1965*) and A. Michael Noll (*Gaussian Quadratic, 1963/1865*) ChatGPT can create computer code in *Processing* for generating new versions of the original graphics. This can allow early computer-based art to be experienced by new audiences, and also provide new perspectives on the original works.

Keywords: preservation, computer, based arts, ChatGPT

*Speaker

Alarms won't go off if you get too close: Disembodied(?) experience of exhibition spaces hidden in digital spaces

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Abstract

As the pandemic accelerated the process of a digital transition in many areas of life and knowledge, we encounter a situation in which exhibition visitors do not always find themselves standing on their feet in a gallery or a museum. When visiting some exhibitions, visitors do not even have feet - nor a body as we have historically understood it. Online exhibition spaces burst onto the art scene during the past years as a response to the impossibility of visiting museums in person. However, this mode of exhibition remained after social restrictions were lifted, as we have found a new way to transmit and experience art. In digital exhibition practices, both artworks and the audience must find ways of encounter, as they are "hidden" from each other and need mediation to meet. But, in the end, is this any different from a so-called in-real-life situation? To explore this question, this talk will focus on two main topics related to the experience of museums and galleries in online spaces. On the first hand, I will present two different routes exhibition spaces have taken to have a presence online, which can be broadly summarized in (1) existing in a hybrid mode, with virtual representations of their building and/or keeping the same name in virtual realms than in tangible realms (such as Bitforms Gallery and Tabakalera Centro de Cultura Contemporanea) and (2) spaces born solely online that, however, sometimes make excursions into the tangible realm (such as New Art City, Silicon Valet, Panther Modern) and the special case of The Wrong Biennale, which started online and then it became partially in person by collaborating with certain institutions such as Centre Pompidou in Paris. I will especially focus on purely online spaces since they still are hidden or unseen from the established art circuit and represent the starting point for emerging digital and multimedia artists that explore current topics of interest using new media technologies.

Second, I will also discuss how the viewer, even though s/he is not present physically, is immersed in a sensory encounter that can be productive in terms of feeling and experience. For this, I will briefly discuss how the body is engaged in non- tangible, mostly visual experiences that depend on vision and sound to mobilize a full body experience. Taking on theories of embodiment and disembodiment, I will make a case about how these new forms of online and hybrid curation could activate the viewer in new ways that help both institutions and audiences, while simultaneously it could become a pathway to obtain further knowledge of decentralized, emerging art and technology practices.

Keywords: Online, digital, hybrid, exhibition, museum, virtuality, embodiment, experience

*Speaker

The Future of Memory: Art, Interdependence and Socio-Cultural Cognition

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Abstract

My paper will address the relationship between heritage and adaptability in public display by using the city of Venice, and the climate challenges it faces, to explore how new forms of responsive matter (smart ceramics, memory materials, bioactive polymers) might exist in the realm of culture. More specifically, I intend to explore the scholarship of early 19th century aesthetics and reception theory in the context of adaptive materials, to demonstrate that there is a great potential for objects of art to function as a form of real-time media which displays a tangible social reciprocity between ourselves and others.

I intend to draw on the neurological understanding and art historical origins of empathy to link the social construction of experience with the frontiers of matter as media that can be engineered to shift shape in the presence of others. I will suggest in my analysis that contemporary public art can learn from social media and social networks to invent new forms of material engagement that can reinvigorate the tangible aspects of our experience as a mark of social connection. My proposal centres on my interest in constructing the idea of a social object—an object that emerges from our interactions with others as a symptom of that interaction. Using this social object as a foundation of a new cultural form, I intend to outline this idea by imagining a new aesthetic language based on the principle of formal interdependence.

An aesthetics of interdependence is a much needed shift from our current culture of extraction and alienation to a system of art and culture that acknowledges, in its forms as well as its critical thinking, that art is always a symptom of our interactions with known or unknown others. Combining notions of real-time interaction, networks with innovation in materials science, I hope to reimagine Venice's heritage through new forms of globally shared cultural memory, and thereby model how the future of memory might look where encounters with the city's cultural objects, people and histories are active, intentional acts of co-creation.

By identifying this potentially new category of cultural objects and interfaces designed to be resilient, I propose a shift from understanding art objects as fundamentally inert (and therefore vulnerable to time, weather, etc.) to the prospect of understanding them as always emergent in physical shape and continuously evolving over time. The notion of materially-based art as phenomenal in form likewise requires a new post-representational aesthetic paradigm that identifies objects as nodal artefacts of behaviours and events that circulate in a networked, distributed economy that nonetheless bear the signs of this circulation physically—in their surface, scale, scars and other tangible signs of transformation.

My paper proposes that the value of articulating the psychosocial dimension of the relationship between responsive materials and culture is the possibility of identifying a category

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of art and media objects whose social life (display, circulation, adaptation, use) becomes a legible part of their visual morphology and a way to imagine more resilient forms of shared heritage.

Keywords: memory materials, smart matter, functional materials, synthetic matter, responsive matter, social cognition, empathy, reception theory, aesthetics, phenomenal media, phenomenal form, adaptive matter, social objects

Challenges of Creating a 30 years Media Art Retrospective

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Abstract

In 2019 we were approached by the curator Karin Ohlenschläger to realize a 30 years retrospective exhibition of our interactive media art works. For the title Karin chose "The Artwork as a Living System." It was based on a paper we wrote together with the Japanese curator Machiko Kusahara in 1996 (1). The paper laid out our artwork principle that combines user interaction with life-like algorithms and natural interfaces. The concept for the retrospective was to focus on 14 interactive artworks that display artificial growth, evolution, generative design and A-Life.

Organizing a retrospective exhibition with media artworks that have been created partly 30 years ago is a big challenge. Firstly because the artworks depend on computers, interfaces and programs which have been changing over the decades. This means that we had to partly re-create, re-activate and re-program some of our more historical art works. Several of them, such as for example *Interactive Plant Growing* (1992) have been shown regularly over the past years and have been constantly updated to newer and faster computers. Others however, such as *A-Volve* (1994) had to be re-created, with all the challenges of producing a new pool, a new touch screen input device and a new camera tracking system. Art works such as *Haze Express* (1999) had to be re-created almost from scratch. While in some case new technological possibilities of today made it easier to re-create these artworks, in some other cases technology that disappeared had to be replaced by in-house built interfaces.

For the installation part of the works and for the aesthetical elements we decided to keep the artworks as much as possible to their original state, not aiming to make the interaction faster or the 3D graphics with higher resolution.

For the production of the retrospective there were also many organizational challenges to be overcome: from the co-production, to the presentations and the organization of the traveling exhibition tour. The co-production of the exhibition was done in collaboration with the fantastic team at the ZKM Center for Art and Media (Karlsruhe), OÖ Landes-Kultur GmbH (Linz) and the iMAL Brussels. Finally there was also a large book produced with the MIT Press bringing together all our artworks since the early 1990s (2).

In the proposed talk we will speak about the details of organizing, producing and re-producing many of our media artworks from the past 30 years. We will share our experience and the challenges we encountered and pay special attention to conservational issues. The

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task is to share useful information with other media artists, practitioners and curators who might encounter similar opportunities and situations in the future.

(1) M. Kusahara, C. Sommerer and L. Mignonneau, "Art as Living System," In: *Systems, Control and Information Journal*, vol. 40, no. 8 (Tokyo: Institute for Systems, Control and Information, 1996): 16-23.

(2) K. Ohlenschläger, P. Weibel and A. Weidinger, Christa Sommerer & Laurent Mignonneau: *The Artwork as a Living System 1992-2022*, The MIT Press, 2023.

Keywords: retrospective exhibition, reconstruction of media art works, challenges of conservation

Turning to Experiential Media for Environmental Empathy

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Abstract

When philosopher Günther Anders proposed humanity's central flaw was its apocalyptic blindness, he was facing the omnipresent nuclear threat of the cold war. To him, the atom bomb epitomized the most destructive technology humans were able to produce, all while being fundamentally incapable of imagining its effects to full extend. It seems Anders is now rediscovered as humanity faces the slower though similarly 'unimaginable' threat of a warming planet. Due to its intangible complexity and vast spread across time and space, the climate crisis has been conceptualized in terms of a "hyperobject" (Timothy Morton 2013) and "super wicked problem" (Kelly Levin et al. 2012). 'We experience weather, but not climate' has been a commonplace assumption-one whose implications are widely debated across disciplines (e.g. by Mike Hulme 2016, Peter Rudiak-Gould 2013, Birgit Schneider 2023). But how have media arts responded to the climate crisis as an 'imperceptibility problem'?

In recent years-as climate reports conveyed more urgency and the effects of global warming became in fact more palpable even in the Global North-aesthetic strategies gained momentum that aimed at extending the flawed human sensorium and at making the climate crisis 'experiential'. Not only did news outlets review their visual politics and wording so that their climate reporting would prove more 'emotionally impactful'. Media arts and branches of the tech industry were seeking to move viewers and users by providing multisensory experiences of rising sea levels, droughts, wildfires, biodiversity loss and other effects of global warming. Speculative practices in the arts rendered the Anthropocene an 'aesthetic problem' relying on new technology as an enhancement for 'sensing the insensible'. After all, photography had been a primary technology which helped to visualize the melting of glaciers. Now, the new technological prostheses intervene more directly in the human perceptual faculty, resulting not only in a visual but visceral experience.

The aim of this paper is to provide a careful and critical review of recent media art and VR experiences that seek to foster 'environmental empathy' by making the effects of the climate crisis experiential. How do media technologies implement 'experientiality'? What is the impact of a greater perceptual and emotional involvement? And besides their diverging aesthetic and affective strategies, what do these works disregard when privileging the "authority of experience" (Joan Scott 1991)? Established feminist and decolonial critiques of VR as an 'empathy machine' have suggested that the overwhelming feeling of full-bodied immersion rather undermines historical causalities that have made empathy necessary in the first place. Further, recent studies have shown that a rise in 'emotional empathy' doesn't necessarily help to grasp complex phenomena. Turning to experiential media to make the climate crisis more tangible thus runs risk to be out of touch with the ways it is already experienced and understood.

*Speaker

Keywords: climate crisis, Anthropocene, experience, sensing, immersion, VR technology, media arts, environmental empathy, affect

Rumble in the Sea: Fostering Criticality and Media Literacy through Game

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Abstract

A great deal of artistic production seeks to raise awareness on the topic of environmental degradation and climate change. However, ‘raising awareness’ is a term that is too unspecific to grasp objectives and ways of evaluating artistic engagements with citizens, who have access to public policy discussions and oversight of environmentally hazardous industrial infrastructures. Against such background, we want to present “Rumble in the Sea”, that is the first iteration of our research project seeking to investigate the prospects of fostering media literacy on environmental issues through participatory art, and to stage artistic interventions that activate criticality, enable playfulness, and educate the public about deep-seabed mining.

In Rumble in the Sea, we decode the persuasive rhetoric deployed to justify the need for deep-seabed mining (dsm) and to build subversive authority on the issue of its ecological, economic, and social ramifications. For that, we apply the methods of Critical Discourse Analysis (CDA) to the language of open-access policy documents, audits, and statements by mining companies. The discussions around dsm are led by a swathe of heterogeneous actors who build their scientific authority along the way of assessing risks associated with the insufficient knowledge of environmental ramifications of dsm, especially as experimental studies on the disturbance of ocean floor by mining are underprioritized. This heterogeneity of actors along with a fast-tracked legislative development enabling this nascent extractivist industry underpins the diversity of discourses around dsm. This creates informational obstacles in the way of the public’s meaningful engagement in policymaking.

In response to that, we set out to develop a series of artworks that do not just raise awareness about dsm but foster critical thinking and media literacy around this topic. The choice of artworks as a primary outcome of our investigation is motivated by the Heideggerian framework of technological enframing, within which we problematize the exploitation of the ocean floor and rhetoric of greenwashing dsm. “Rumble in the Sea” is a two-player card game, which we presented at the MicroPOM Aalborg 2022-Politics of the Machines. Through the game, we fostered the audience’s understanding of how different social actors use language to construct or dismantle the need for dsm, establish or diminish the risks associated with it, and build their credibility. Mary Flanagan’s account of critical play became our main framework for connecting CDA with the experience design. By the same token, it allowed us to experiment with the game as an artistic medium: (i) we discovered novel possibilities in the game itself by successfully incorporating CDA into its very mechanic; (ii) we created a process-oriented participatory artwork that is only minimally supported by the digital device market, which is one of the main areas in need of supplies of virgin metals that bolsters the

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business case for dsm; (iii) finally, we tested our hypothesis about the existence of the link between activating criticality, enabling playfulness, and supporting learning for the exhibition audience on the subject of dsm.

Keywords: media literacy, critical thinking, greenwashing, deepseabed mining, environmentally hazardous industries

Technology as Resistance: Pioneers of Korean Media Art during the 1960s to 1990s

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Abstract

The political situation in 20th century Korea greatly influenced the formation of and formal experimentation in Korean modern and contemporary art. From 1961 to 1987, the military government constrained freedom of speech across all fields, including art, music, literature, and the press. Under the tight censorship, early avant-garde artists, prohibited from artistic experimentation and social engagement, failed to establish a distinctive style or norm, and, in turn, remained on the margins of the Korean art scene. For that reason, the belief has been widespread that resistance art or activism has had no place in Korea's avant-garde. Among the avant-garde artists of the time, however, some pioneers did, in fact, use technological materials as a means of resistance.

This paper calls for reassessment of this early stage of Korean avant-garde and experimental art as the cornerstone of Korean media art in particular. The aim is to discern a new genealogy of media art in Korea by tracing and linking the activities of early avant-garde artists and media art pioneers who have been neglected in the dominant art historiography, which has shown a preference for painting and video art. My detailed analysis of the experimental artists of the 1960s and 1970s, small groups in the mid-1980s, and the Art Tech Group in the early 1990s demonstrates how they revealed and articulated their spirit of resistance against academism and the mainstream through the use of technology, in doing so following a different trajectory from that of the Western avant-garde or Minjung art.

I argue that the use of technological materials served as a strategy of defiance in the face of the dictatorship and the oppressive atmosphere in which the small groups in the 1980s and Art Tech Group in the 1990s operated, tracing this strategy back to the avant-garde artists of the 1960s. Seeking alternative forms of expression, these earlier artists similarly turned to media experimentation and the incorporation of technology in response to an environment in which political speech was impossible. By rethinking these artists' activities in the context of Korea's early industrialization and digitalization, this discussion will shed light on media art pioneers whom mainstream discourses have overlooked so as to establish a new historical narrative that better accounts for the myriad digital arts being practised in Korea today.

Keywords: Korean avant garde, experimental art, media art pioneers, Korean media art, The Art Tech Group, small groups

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If-else. Dependency and Conditionality of Computer-based Artworks

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Abstract

Computer-based artworks pose a series of challenges both in analysing as well as documenting them. They are embedded in a delicate and complex system of hardware and software. The interdependency makes them extremely susceptible to changes in a multitude of software and hardware components as well as social practices. The fragility of the artefact is not only an obstacle to overcome to keep it accessible to future research, but also an inherent characteristic. Finding an adequate method of analysis and documentation (Dullaart-Sakrowski-Method) of these works therefore also means learning something about the theory of digital imagery.

In this paper I will collate the existing theories of the digital image (Nake, Pias, Hoelzl, etc.) with the methodology required to work analytically and documentally with the artefacts. With the example of artistic browsers, most prominently I/O/D's WebStalker and JODI's %WrongBrowser, that we researched in our team over the past three years (*Browser Art – Navigating with Style*), two challenges will be examined in this paper: a) technological dependency and b) computational conditionality.

Ad a): The web browser is a hybrid that is at home in both worlds at the same time: in the quick and almost unperceivable changes of the protocols and standards on the internet and the slower evolutions of the operating systems and hardware structures and therefore an ideal research object to explore the first challenge.

Ad b): As a basic structure of all modern computer programs, on the code level conditional constructions inform our concept of computational interactivity. It is the second challenge and the root of the problems scholars run into when trying to describe a computer-based artwork. Both the behaviour as well as the experience of the artworks is determined, to some extent, by the source code, but at the same time are as numerous as the potential users and uses of the piece; not understood as a subjective experience but as defined and objective paths afforded by the system.

The result is equivalent to a big data problem. In order to analyse and communicate big data, one central point is to create abstractions in the form of parameters to be visualised, for example. But other than the analysis of films with methods tailored for coping with a great number of datafied elements (Manovich), the hypothesis explored here is that analysing computer-based artworks not only allows but requires the application of parameters that are drawn from both the phenomenological as well as the code level of the work, and that this necessity is an inherent characteristic of computer-based artworks.

*Speaker

Additional to proposing a pragmatic approach to analysing computer-based artworks and a way to combine findings on the code level with the experience of the artwork on a phenomenological level, this paper will identify the theoretical consequences for the digital image as well as questions to be addressed, like the translation of qualitative observations into quantifiable values and the implementation of the method into art historical practices and traditions.

Keywords: documentation, digital imagery, visualisation, computer, based art, artistic web browsers, code analysis

Deleting without forgetting: designing interventions for a sustainable engagement with our digital memories

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Abstract

We recognize two complementary perspectives in a future that prioritizes a long-term sustainable engagement with our digital memories; sustainability in terms of environmental impact, and in terms of our personal legacy. This contribution critically examines the material and infrastructural conditions of digital memory practices. To do this, we take inspiration from critical approaches that challenge the common sense of current personal digital archiving practices while also offering alternative frames. We formulate a set of aspirations for future interventions that address both perspectives on sustainability by 1. prioritizing thoughtful deletion over effortless preservation as a default, and 2. exploring a commons-oriented framework.

When intervening in digital memory practices, we also intervene in re/sources. The digital is not ephemeral, it is material. Making digital memories impacts our environment because the relevant infrastructures rely on scarce or hard-to-obtain resources like lithium but also on water and fossil fuels. Storing digital memories extends these extractivists practices through a wide-spread, growing and actively promoted dependence on commercially-driven cloud services. The capitalist logic of these services obfuscates the need to question whether it is worth keeping all digital material; the consumption imperative dictates that if you can afford it, you can save everything.

The affordances of the current technological infrastructure makes it easier to keep than to delete. As an alternative to control and ownership of the Big Tech hegemony, we explore the possibilities of a "commons-oriented digital culture" (Sollfrank et al., 2021). Moving towards commonly governed digital infrastructures is necessary because of existing power dynamics involved with practices of deletion. When data is still seen as a commodity, Big Tech will not go along with alternative interventions that focus on deleting their source of income. Instead, we use the commons as a thinking tool built around relations between resources, communities and affects.

The second perspective on sustainability conjures up discussions on legacy; everytime we create, save, share digital material, its provenance becomes more intricate. What does this mean for our long-term preservation and care of our digital memories for future generations? Starting from a postdigital perspective (Cascone & Jandric, 2021), we recognize the messy entanglement of the digital and the analog, creating a space for questions about materiality.

^{*}Speaker

To foreground individuals' reflection on long-term preservation, we emphasize "forgetfulness by design" (Hoepman, 2021) by focussing on deletion, deconstruction and degrowth. By posing limits to future design interventions, that is to say, aiming for a reduction of our digital footprint, we put forth an alternative to fuel current academic and societal debates on a sustainable future for our personal digital legacy.

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Keywords: digital memories, digital material, legacy, sustainability, interventions, the commons, postdigital, forgetfulness by design

Convulsive Automation. Surrealist Aesthetics as a Resource for Grappling with Soft Robotics.

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Abstract

Surrealism and robotics share a connection through the concept of 'the uncanny' (Jentsch, Freud). Art historians have, for instance, remarked on the persistent presence of archetypically uncanny motifs, including automatons, dolls, and prostheses, within surrealist art (e.g. Foster, Krauss) and research on social robots frequently mentions the concept of the 'uncanny valley' (Mori) to understand human-robot interaction experiments. In this paper, however, I seek to construct a different pathway of connections between surrealism and robotics through the newly emerged field of *soft robotics* research.

Soft robotics designates a radically novel class of robotics technologies and a line of research that eschews traditional ambitions of robotics research (e.g. the quest for precision) in favor of leveraging the functional benefits that come with constructing bioinspired machines from pliable materials that have mechanical similarities with organic tissue. Albeit more often inspired by the anatomy of animals than that of humans, soft robots, arguable, sit uneasily between the perceptual categories of inanimate objects and living beings as well as those of the intimately familiar and the morbidly strange. Soft robotic designs are often composed of silicone modules and structures with simple abstract geometrical shapes yet possess smooth surfaces with skin-like haptic qualities. During operation they bulge out to assume highly biomorphic forms and perform smooth movements by means of pneumatic actuation and are specifically designed to diligently adapt to the surroundings. They can deform, alter their shape, or even go shapeless and dynamically change back and forth from being hard to being soft – operations and procedures that figure prominently within surrealist visuality and the surrealist imaginary.

Drawing on surrealist art and theoretical writings (Breton, Bataille, Aragon) as well as art historical accounts of surrealism, this paper presents an argument that a surrealist aesthetic reverberates throughout soft robotics and seeks to interrogate how soft robotics activates central categories and themes of surrealist art practice (beyond 'the uncanny'). Furthermore, it raises the question of what explanatory force surrealist concepts including Breton's notion of 'convulsive beauty' and Bataille's 'informe' might have for understanding and contextualizing soft robotics as an emergent cultural phenomenon? Are the apparent similarities between the two merely a surface phenomenon that leaves by the wayside the social and revolutionary agenda of the surrealist movement or could they run deeper? Might surrealism as a technique, method, or theory potentially hold some explanatory force for understanding the epistemic practices of soft robotics or the specific ontology of robotics that is enacted through soft robotics?

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Keywords: soft robotics, surrealism, robotics, human, robot interaction

Obsolescence and the representation of climate change in photography: Mergulho by Tito Mouraz

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Abstract

How may an artist capture the shifting landscape of a region prone to sea erosion and climate transformation? What medium may be chosen, and may the use of obsolete material better contribute to summon the effects of the elements on the Azorean coast?

In 2021, artist Tito Mouraz (Portugal, 1977), developed the photographic series *Mergulho (Dive)*, a work carried out on the Azorean landscape, a Portuguese-archipelago situated in the middle of the Atlantic Ocean. Here the artist used instant peel-apart film, Fujifilm FP-100C, whose production was discontinued in 2016, to build images that lie between the figurative and the abstract. The film chosen by Mouraz is composed of three main components: the negative, the photographic paper and a chemical pod. After exposing the negative, when the user removes the film from the camera, the pod is crushed releasing the chemicals that, in contact with the photographic paper, generate its positive. Thus, as long as it is done quickly after the release of the chemicals, this film has the ability, through direct contact with the negative and using pressure, to have its positive image transferred on to another base. Such transfers can be overlapped infinitely, generating unique images. By using expired materials, Mouraz increased the unpredictability of the results, questioning the supposed indexicality of the photographic image – and thus bringing it closer to processes such as painting or engraving – as well as its reproducibility. The chemical remnants left over the images blur them, making the seascapes look as if they are in a process of decay.

Located above an active junction between three of the world's major tectonic plates – the North American Plate, the Eurasian Plate and the African Plate –, the Azores is prone to volcanic and seismic events, such being reflected on its rough terrain and isolated landscapes. With the advancement of sea levels due to climate change, the Azorean coastal area has become further susceptible to erosion, endangering houses and forcing the move of a number of local inhabitants.

In this presentation, I propose that the choice of an obsolete medium in Mouraz's photographic series is ideally positioned to reflect on the transformations inflected by climate change to the depopulated landscapes the artist has captured. Using notions on obsolescence put forward by Rosalind Krauss, such as the possibility of a retrieval of the aura in moment a technology is 'released' from its use as a commodity, and the nostalgic dimensions this may carry, I will examine how media artists may lean on the material specificities of obsolete technologies to explore environmental concerns.

Keywords: Photography, Obsolescence, Contemporary Art

*Speaker

Investigative Media Arts as Grassroots Empowerment to Environmental Research

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Abstract

In the current state of multiple and repeating planetary-scale crises, ranging from climate disasters to resource mismanagement, the complexity of problems often takes humanity into exploring unknown unknowns. Through a gradual consolidation of networks and platforms across realms of education, economy and both NGO as well as public cultural institutions, it is especially the media-artistic practice (and discourse!) of the investigative kind that paves possible itineraries and develops (at least speculative) tools for venturing into any kind of livable future, possibly such that might surpass the aporia of the Anthropocene and find a new way of making (up to) kin.

The selected project cases of media art depict two possible strategic approaches typically lending to grassroots initiatives, *Taming the Forest* being an academic and *xMobil* a rather community-driven endeavor. The contribution raises the issue of visibility, sustainability and preservation of such transitory projects or platforms, where artistic(-cum-scientific) works are based on grassroots research and experimentation, examining their methodological approach as well as their topic-setting as regards the limits of growth, and not least discussing their costs to social and natural ecosystems, increasingly permeated by technology.

An ongoing collaborative process between art and science, *Taming the Forest* (2022-) is being implemented by a group of students, artists and researchers charting an interdisciplinary cross-field among bioeconomy, cultural history, policy, and art(ivism). Researching the conflicting narratives of history and economy about biodiversity in general, and specifically on forests, the project brought about several public formats such as lectures, video installations and AV performances. The project-as-process shows how different blends of methodologies in artistic-cum-scientific research can become truly relevant for both of their respective realms, opening new creative pathways and pedagogical registers, while repeatedly returning to the local (forest). Moreover, *Taming the Forest* manifests the need for a new sensibility and complex knowledge, moving beyond the objective study and becoming attentive to different dimensions of research and its outputs that emerge through the introduction of Art Thinking. This becomes crucial in order to tackle the manifold big-scale problems such as climate and biodiversity crises which call for both acting decisively and transforming radically, above all in regards to how we perceive, relate to and manage forests.

xMobil (2021-) is a multi-stakeholder prototype development process of a mobile laboratory in a solar-powered car trailer, assembled mostly of salvaged technology parts and reused

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materials, geared for investigative-art and DIY/DIWO-workshop applications. Empowering creativity and innovation in off-grid public and remote locations, and promoting autonomous art-science practices as well as creative-community projects, particularly in the realm of environmentalism, it combines the work of artists, designers, architects, researchers and engineers who act as mentors to both students and non-formal learners coming from diverse educational programs, both formal and non-formal. xMobil was conceived by a community of developers and future users representing highly diverse sectors, from industry, independent arts production, natural sciences and education (teachers and students), to activism, and even local governance or cultural policy.

Keywords: art thinking, investigative, ecology, bioeconomy, do, it, yourself, autonomy, mobile, art and science

Sensoria the Art and Science of Our Senses

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Abstract

Sensoria the Art and Science of Our Senses

In the last decades recognition of intrinsic values of sentient beings has changed significantly, forcing a revision of interdisciplinary knowledges around sensory perception and our engagement with and within our broader environments. Contemporary research has confirmed that our senses are fundamentally interrelated and interact with each other and that our perception can change as a result of information exchange between receptors that oscillate between known receptors of visual, auditory, haptic etc. However, as David Howse has observed, "the perceptual is cultural and political, and not simply (as psychologists and neuroscientists would have it) a matter of cognitive processes or neurological mechanisms located in the individual subject" (2).

This paper at RE:SOURCE 2023 considers the simultaneity and intersectionality of biological and cultural receptors through theoretical readings around the project *Sensoria: Art and Sciences of Our Senses* initiated and led by Nina Czegledy. It will focus on 3 main points:

- The expression of multi-sensory awareness through artistic and process-oriented works in the contemporary Museum setting.
- The consideration of issues of ecological collapse catalyzed through olfactory modes of engagement with plants through works in the exhibition.
- Sensory modalities of underrepresented groups such as the visually impaired and Indigenous scholarship.

The *Sensoria: The Art and Sciences of Our Senses* project explored multisensory perception via artworks and thematically linked participatory discussions. Beginning 7 years ago in 2015, research for the project included the investigation of a broad variety of topics including olfactory sensation, gustation, environmental/genetic memory etc. and its manifestations in the changing environment. At its onset, information on the sensory awareness of non-human species was scarce, and so ongoing research on non-human forms of engagement became an important consideration, which naturally led the project to considering non-visual modes of representation such as smell-compositions with VOCs (volatile organic compounds) in plants and trees, including the impact of emerging cultural and political representations of environmental change on organisms in hominoids. In addition, the project also approached sensory perception from the perspective of sensory loss, or impairment, engaging in a workshop for visually impaired participants to form the basis for one of the exhibited works.

In September 2022 the *Sensoria* exhibition was realized at the LAZNIA CCA in Gdansk and the Gales Gallery, York University, Toronto featuring the artworks of fifteen international artists offering mediations of these sensory experiences, providing a direct sensorial landscape for the visitors and participants alike. The hybrid symposium on October 4-5, 2022 featured keynotes by David Howse, Chris Salter and Ryszard W. Kluszczyński focused on multisensory perception in the arts and the sciences.

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In 2022 Sensoria became an intercontinental inter-institutional project that bridged LAZNIA Centre for Contemporary Art in Gdansk, Poland and Sensorium: Centre for Digital Art and Technology at York University in Toronto, Canada.

Reference:

1. Cameron, Liz. Indigenous ecological knowledge systems – Exploring sensory narratives (2022)
2. David Howes, "Architecture of the Senses," *Senses of the City: An Alternative Approach to Urbanism*, ed. Mirko Zardini (Montreal and Baden: Lars Muller, 2005).

Keywords: multi, sensory awareness, ecological collapse, Sensory modalities

The Algorithms of Abstraction: From Constructivism to Computer and Post-Gravity Art

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Abstract

This contribution attempts to establish a dialogue between the pioneering endeavors of artists in the 60's and 70's of the 20th century, such as New Tendencies and namely Edvard Zajec, the pioneer of Slovenian media art, on the one hand, and the more recent art practice based on the advances of technology, as seen in the work of Slovenian artist and theater director, Dragan Živadinov and his post-gravity art collective, on the other. Moreover, we intend to investigate a seeming temporal as well as conceptual continuum of avant-garde art-science experiments with new forms in Slovenian art: from the first constructivist works by the avant-gardist Avgust Černigoj and the Trieste Constructivist group that exalted the aesthetics of the machine and technological achievements in the beginning of the last century, to the artistic exploration of digital media, and the integration of advanced space technology in art. In this contribution we will focus on the following works in more detail: Avgust Černigoj's *Trieste Constructivist Cabinet* and Eduard's Stepančič's levitating construction (1927), Edvard Zajec's *INFORMATRIX*, and Dragan Živadinov's 50-year theatre project *Noordung::1995-2045*. Through their work these artists display a ceaseless innovativeness and engagement with the creation of new forms of artistic expression with the use of new technologies. In one of his interviews from the 80's Avgust Černigoj predicted the continuation of constructivism in computer art – which was clearly being realized through the work of his student Edvard Zajec, who started experimenting with the use of computer in the visual fine arts since 1968. At that time, diverse experimentations with the computer led to the first attempts to form algorithmic texts, images and sound, and this announced the beginning of computer art. Those works created some of the first abstract images with the help of algorithms and computer functions. *INFORMATRIX* represents the entire artistic program of Edvard Zajec that went through three versions: 1) as a book published in 1979 in Trieste, which went against the traditional conventions of reading by requiring communication based on pictures instead of words; 2) as a website in 1996; 3) as an offline interactive system in 2007 at the exhibition in Ljubljana (MGLC) and at the MFRU Computer Art Festival in Maribor. From the start the initial idea of the book was to engage readers into constructing their own compositions in order to eventually discover the mechanism of "one's own compositional procedures", that would ideally be experienced on the "electronic computer video display", which indeed became possible when computers became more accessible. A deeper understanding of the importance of the pictorial and spatial dimensions of Edvard Zajec's work can serve as a way to observe the mentioned specific temporality as well as conceptual connections in Slovenian art-science projects that derive from the two main procedures: abstraction and constructivism.

*Speaker

Keywords: computer art, algorithmic art, generative art, avantgarde, constructivism, postgravity art, abstraction, Edvard Zajec, Avgust Černigoj, Dragan Živadinov, Eduard Stepančič, Slovenian media art

Documenting electroacoustic music for preservation: the design of a network-driven application based on MemoRekall and IIIF

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Abstract

MemoRekall is a free and open source web app for the documentation and preservation of time-based media art that has been in active development since 2015. Subscribing to a practice-led approach to development, we shall examine how a number of collaborative projects (Bardiot et al. 2016; Bureau 2017; Bardiot 2022; Bardiot et al. 2022) allowed the tool to materialize into its current state, and the methodologies that have emerged through these case studies. Taking video as a primary resource, MemoRekall proposes an interface for the redocumentarisation (Pédaque 2006; Zacklad 2007) of this essential yet incomplete artifact. Through the creation of capsules which augment the video with intra- and inter-documentary, multi-modal annotations, the user creates a new digital document which can be shared and embedded. MemoRekall has imposed itself as a powerful tool for the documentation and valorisation of digitized time-based artworks and born digital artifacts for a number of different user-types: researchers, artists, cultural institutions and mediators, teachers and students.

Recent work (Jacquemin et al. 2023) - notably around the constitution and materialization of Art Zoyd Studio's archival collection of multi-modal documents around the work of composer Gérard Hourbette - has proposed new avenues for the development of MemoRekall. Since 1999, the studio has welcomed a number of electroacoustic composers for residencies such as Alejandro Viniao, Luc Ferrari and Kasper Toeplitz. One of the studio's missions is the preservation and integration into repertoire of musical works that use electronics : since 2018 the studio has been actively developing ways of preserving their rich archives that include including digital objects and sources in peril of technological obsolescence.

These questions combine with fundamental theoretical discussions around the friction between performance and time-based artworks and their documentation and preservation (Saaze et Laurenson 2014; Bardiot 2021). We propose a network-driven, heterarchical approach to documentation and analysis. Not only does this concept marry with the reality of archival collections which can constitute thousands of documents of multiple natures, distributed across multiple databases and institutions; it also allows new perspectives on the work to emerge without seeking to supplant or appropriate it.

^{*}Speaker

To meet the technical requirements of this approach, we have made MemoRekall compatible with IIIF (International Image Interoperability Framework, <https://iiif.io/>), a standard that is already implanted in the world of GLAM. We have adapted the IIIF Presentation API in order to create networks of manifests which can be navigated within a version of MemoRekall that comes as a plugin for the manifest viewer Mirador (<https://github.com/ProjectMirador/mirador>). This allows for the construction of complex networks of multi-modal documents, and dynamic navigation of these networks within MemoRekall. The integration of IIIF also circumnavigates two important issues in contemporary documentation: the multiplication of interfaces (we have integrated MemoRekall within an existing framework that is already used by much of our target user base); and the multiplication of ressources (with IIIF, we can reference already existing media, avoiding the need to systematically upload more content to servers which has a significantly negative ecological impact).

Keywords: development, IIIF, MemoRekall, networks, electroacoustic

Étienne-Gaspard Robert(son)'s Fantasmagorie: How to make use of his immersive techniques in media arts and for curatorial practices?

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Abstract

The phantasmagoria was an immersive multimedia show that evolved out of the culture of the magic lantern projection and celebrated the uncanny. It was particularly prevalent from the late 1700s to the end of the 1830s. Étienne-Gaspard Robert(son) (1763-1837) was the leading figure of this media format, even though he did not invent it. He perfected his *Fantasmagorie* to an exceptional level by exploiting all available technological, performative, and psychological tricks to achieve an intensive immersiveness. Robertson crafted an illusionary experience to intensify the emotional and physical sensations of the audience.

In this presentation I will provide a short introduction to my theoretical work(1) on the history of the phantasmagoria (including some of its predecessors) and Robertson's *Fantasmagorie*. By employing the "dispositif"(2) as an analytical tool, I closely examined Robertson's immersive- and illusion-inducing methods(3) that aim at the psychology and the neurophysiology of the senses and their impact on his audience. I will lead through a brief imaginative journey, attempting to transport you to the ambiance and settings of Robertson's *Fantasmagorie* to illustrate his techniques. Finally, I will summarize the elements that constitute the "phantasmagoric dispositif", and suggest a few equivalent constructive components of an "exhibition dispositif".

Based on the presented theories on immersion in accordance with the phantasmagoric dispositif, I will focus on the expanded utilization of sceneries and spaces. I will provide several examples and, lastly, offer suggestions to help create phantasmagoric-immersive artworks or exhibition experiences.

(1) Vera Wittkowsky: The Phantasmagoric Dispositif – an Approach to Uncanniness. 2021. <https://phaidra.ufig.at/open/o:2754>

(2) I adopted the French term "dispositif" as it is the form employed by most media theorists.

(3) Robertson, Étienne-Gaspard. 1831. *Mémoires: Récréatives, Scientifiques et Anecdotes* Du

Physicien - Aéronaute E. G. Robertson. Paris: Librairie de Wurtz.

*Speaker

Keywords: media archaeology, media art history, magic lantern, phantasmagoria, Robertson, phantasmagoric dispositif, exhibition dispositif, immersive, immersiveness

Interactive performance conservation and how to create documentation, preservation of interactive performances through artificial intelligence

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Abstract

Interactive performance conservation presents unique challenges due to the ephemeral and often participatory nature of these artworks. As technology continues to play an increasingly significant role in these performances, the documentation and preservation of interactive performances become even more critical. This abstract will explore the challenges of creating interactive performance conservation and the potential of using artificial intelligence (AI) in the documentation and preservation of these artworks. Creating interactive performance conservation requires a multi-disciplinary approach that includes the participation of artists, performers, technicians, and conservators. It is essential to understand the conceptual and technical aspects of the artwork, as well as its interactive and participatory elements. The documentation and preservation of interactive performances require the collection of both tangible and intangible components, including visual and audio documentation, participant feedback, and audience responses. However, these components can be difficult to capture, store, and access, making interactive performance conservation a complex and ongoing process.

The use of emerging technologies, such as AI, can potentially aid in the documentation and preservation of interactive performances. AI has the potential to capture and analyze large amounts of data, making it a valuable tool for recording and documenting these artworks. By analyzing audience participation and input, AI can create a more complete and accurate documentation of the artwork, including the ephemeral and participatory elements. Furthermore, AI can also aid in the conservation of interactive performances by identifying potential areas of deterioration or degradation in the artwork's material components. However, the use of AI in interactive performance conservation also raises ethical and practical concerns. AI may alter or manipulate the artwork's original intent, and the use of AI may also raise privacy and data ownership issues. The development and implementation of AI for interactive performance conservation must be guided by ethical principles and best practices to ensure that these artworks' integrity is not compromised.

Despite these challenges, the potential benefits of using AI in interactive performance conservation are significant. By creating more comprehensive and accurate documentation of these artworks, AI can help to ensure that they are preserved for future generations. Additionally, the use of AI can aid in the development of new conservation strategies and techniques that are better suited to the unique challenges posed by interactive performances. In conclusion, creating interactive performance conservation requires a collaborative approach that integrates a variety of disciplines. The use of AI in the documentation and preservation of

*Speaker

interactive performances presents opportunities and challenges that must be carefully considered and addressed. With the proper ethical and practical considerations, AI has the potential to revolutionize the way we preserve and document interactive performances, creating future memories that accurately capture the artistic and participatory elements of these artworks. By working together, artists, institutions, and conservationists can ensure that interactive performances remain a vital and vibrant part of our cultural heritage.

Keywords: interactive performance, media art conservation, performance documentation, artificial intelligence

A Personal History of New Media Art in Australia

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Abstract

I will discuss the origins of video art, my work in new media and video conservation in Australia.

Video was the first New Media activity. It began with the development of the Challenge For Change project in Canada. Then in 1973 there was the Aquarius Festival at Nimbin and the creation of Bush Video who set up a video Communications Centre at Nimbin. Bush Video returned from Nimbin and established an experimental video studio in Sydney.

The Canadian project and the Nimbin Communications Centre models became the basis for the Video Access Centres established in the capital cities of Australia.

Having met Bush Video at Nimbin I joined up with them in 1974. At that time the Paddington Video Access Centre was directly across the road from their studio and squat and thence began a great deal of collaboration.

Bush Video shut down at the end of 1974. I went to Brisbane and made video with the Brisbane Video Access Centre. I then returned to Sydney and began working at Paddington Video Access where I learnt a great deal about video electronics and became the technical producer in their studio.

The Video Access network closed at the end of 1978.

Through Paddington I was asked to provide technical assistance for the 1976 Nam June Paik & Charlotte Moorman exhibition at the AGNSW and then to continue that work for the Biennale of Sydney until 1988.

Over 1976-1982 I built a series of Video Synthesisers and established a post-production facility (Heuristic Video) in Sydney for video productions by Australian artists.

I used the video synthesisers for live electronic dance-music performances with the band Severed Heads from 1983-93, made video clips, toured the US, Canada and Europe and regularly toured Australia with them. Meanwhile I was working with physical interaction systems and, with Severed Heads, had an interactive installation in the 1988 Biennale of Sydney.

I was also technical manager for the first two Australian Video Festivals, 1986 and 1987.

Then in 1989 I was invited to join the installation team at Apocalypse Post (whose promotion used the slogan "The Final Word in Post"). I was retained to document the facility

*Speaker

and then to develop the infrastructure for the first fully digital video post-production facility in Australia. This involved the design and implementation of numerous items of digital video equipment, its installation and the operational staff training.

Between 1999 and 2002, I worked at the Advanced Telecommunications Research Institute in Kyoto, Japan, building custom electronics for major interactive installations based on principles of Artificial Life produced by the European artists, Christa Sommerer and Laurent Mignonneau, then resident at ATR.

I then returned to Australia, worked at the Powerhouse Museum for two years and continued providing technical support for video-art installation. Since 1990 I have been digitising the history of video art in Australia, a project through which I am now running the leading video art conservation facility in Australia.

Keywords: video access, video synthesis, digitisation, new media conservation, technical support

Sustainability through a New Materialist Lens: A Visual Ethnographic Study on Food Practices

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Abstract

Food production, -consumption and -waste are major contributors to greenhouse gas emissions. Understanding household food practices is crucial for addressing the challenge of creating sustainable societies. To create a nuanced account of the inter- and intra-connections of four food-related practices of households, this research combines audio-visual- and conventional ethnographic fieldwork in a case study with twelve Dutch households. Visual methods offer the opportunity to observe and exhibit those relationships that are sensorial, material and embodied in nature, drawing upon audio-visual media's distinct ability to explore the multiple registers of the human experience (Pink, 2011). The accompanying ethnographic documentary shows how one household's food practices are enacted in daily life, highlighting humans' constant negotiation with cultural norms, social and family life and ecological and infrastructural materialities. Using the theoretical frameworks of Social Practice theory and New Materialism, this research examines the use of visual ethnography as a methodology to understand the complexities of household food practices and their impact on climate change. Food practices, a term derived using Social Practice Theory, are routinized actions such as cooking, doing groceries, or putting out the trash. Looking at food sustainability through a practice lens means humans are no longer the analytical focus, instead, they become the carriers that (re)produce a practice (Reckwitz, 2002). With the focus on a practice instead of behaviour, we move away from the argument of individual human responsibility to 'act sustainable' and towards a more systemic approach. Taking this a step further, this research also applies a New Materialist ontology, emphasizing the agency of non-human actors and the interplay between materialities, cultural- and social practices (DeLanda, 1996; Braidotti, 2000). Through this theoretical perspective, it is highlighted how food practices are shaped by the materialities of their infrastructure, and how power dynamics and gendered divisions of labour intersect with these materialities and contribute to unsustainable household food practices. The case study that is used creates an understanding of local food practice dynamics in the context of three suburban Dutch municipalities, using visual methods as a tool for reflection and analysis, highlighting patterns and perspectives that may not be immediately apparent in written forms of data. The documentary is also an alternative way of representing data that is more accessible outside of academia. The findings of this research shed light on the complexities of household food practices in contributing to climate change while demonstrating the potential of visual ethnography as a tool for studying these dynamics.

Keywords: Visual Ethnography, Sustainability, Social Practice Theory, New Materialism, Food

*Speaker

Democratization of art in the context of technological changes in the 1990s: the Estonian example

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Abstract

In the presentation, I reflect the arrival of open and technological art forms in Estonian art, which reflects Eastern Europe as a whole after the Iron Curtain of the 1990s. More specifically, the focus is on participatory and interactive art, which was born partly as a spontaneous reflection of democratic tendencies in society, partly due to the international circulation of ideas and new technologies. Digital technology made it possible to create environments and works that react to the viewer's behavior. These were fundamentally new types of works that, apart from activating the viewer, demonstrated the competence of local artists in reflecting international art trends, but also the natural urge to adapt to new technologies. I argue that the drivers of participatory art are rather societal changes, general freedom and democratization that unleashed playfulness to engage the audience. Rather, the ability to involve resources and collaborators was necessary for the creation of interactive art, although these works were also created individually; of course, the availability of new technology was decisive. Finally, I will dwell on the controversial attitude of Estonia as a "digital country" to the private data of its citizens, which has been reflected in Timo Toots' interactive installation "Memopol 2", which received the main prize for interactive art at Ars Electronica in 2012. The presentation offers a short and concise history of Estonian participatory and interactive art projected against the background of social and technological changes. I cover the activities of artists who have contributed to the development of local participatory and interactive art: Kaarel Kurismaa, Peeter Linnap, Peeter Allik, Marko Laimre, Kadri Kangilaski, Toomas Tõnissoo, Ando Keskküla, Anu Juurak, Laur Tiidemann, Märt Väljataga, Lennart Mänd, Erik Alalooga, Reimo Võsa-Tangsoo, Juhan Soomets, Timo Toots, Varvara Guljajeva, Mar Canet.

Keywords: Eastern Europe, media art in Estonia, interactive art, participatory art, digital art, democratisation

*Speaker

Sinking into Soil: Mediating Experiences of an Inaccessible, Vulnerable Environment

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Abstract

The condition of the world's soils is one of the "forgotten" climate crises. In the contemporary global situation of the Anthropocene, planet Earth has reached "peak soil", the point at which human societies are destroying fertile soil faster than it can recover naturally. This is a problem for food production, biodiversity and the climate, which the Norwegian Research Council-funded project Anthropogenic Soils: Recuperating Human-Soil Relationships on a Troubled Planet (SOILS, 2022-2027) seeks to address. The proposed paper emerges from the author's PI role in the work package Experiential Soils of the SOILS project. It investigates the material aesthetics and concept of soil through visceral means, exploring how art can engender lively encounters and caring interactions between soil environments and audiences. How do soils emerge as aesthetic and material artifacts within artistic practices? How might artistic means of engagement enable newfound engagements with and understandings of soils as living multispecies assemblages? In this conference paper, these research questions will be explored through discussion of artworks from very different contexts and media, from Nordic experimental performance art that mobilises the idea of cinema in creating immersive via Sami place-based art and a Ghanaese Instagram artwork to American virtual reality that offers the audience the otherwise unattainable experience of being fully immersed in a soil world.

The paper's discussion centres on how these artworks, through mediated experiences, facilitate slowing down and sinking into the dark, dull, brown stuff of the earth. As argued e.g. by Maria Puig de la Bellacasa (2015), slow encounters with soil has the potential to overturn Modern, future-oriented, hasty temporalities, engendering liminal notions of care and new modes of attentiveness to a more-than-human environment (Krzywoszynska 2019; Ingold 2000; Haraway 2016). More radically than the laborious yet comforting act of human hands digging into soil, the paper argues, artistic penetrations of the soil barrier potentially overturn everyday perspectives and uncomfortably place the audience into the foreign land underground.

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*Speaker

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Keywords: Soils, environmental art, material aesthetics, more, than, human, virtual reality

From scenography to zerography

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Abstract

Panel submission RE:SOURCE
From scenography to zerography

After speaking many times about the French scenographer Jacques Polieri (1928-2011), a major precursor for the history of media art, on the occasion of several ISEA meetings, a study day is organized, with the help of Federico Biggio (an academic media semiotician) during the 2023 edition at the National Library of France between "scenography and/or symbiosis" the theme in Paris.

This year 2023 is also the 40th anniversary of a historic video conference by Jacques Polieri "human-machine interface" between New York, Tokyo and Cannes in 1983. A retrospective had already been exhibited 20 years ago at the National Library of France but in the "classic" form of an exhibition of models, plans and other archive documents. But how else to transmit and study this work from its archives to publish a new document, between paper book and online data?

It's here that the concept of zerography developed by Franck Ancel since the research of Jacques Polieri can be unfolded for a rereading of his work in three deployments: a symbiosis of artistic disciplines, a spatial schematization as fiction then the desire to leave gravity in space.

The hall in Paris for "scenography and/or symbiosis" will welcome 64 people in the room, 12 contributions and interventions via Zoom. All the words will be recorded and will be analyzed multiple times to identify key words but also a graphic equivalence, a process that we are presenting to you today in Venice.

As he had participated in the first edition of Media Art History in Banff in Canada, Franck Ancel offers in Venice during this tenth edition, today a new light on Jacques Polieri to re-think his re-sources on two thematic logics:

How to create future memories: documentation, preservation and new technologies

Pioneers of Media art

It is a question of talking about this important study day, the 15th May 2023, in Paris, English and French during ISEA, but above all of offering you, through our communication, the materials to imagine something new... As a specific example, how to show the video

*Speaker

program of Jacques Polieri's video-conference in 1983 today if we can no longer decode the videotape which is nevertheless in the bottom of the Polieri archives in BnF? It is therefore for us to produce a new device other than an exhibition scenography.

Keywords: #corps #dispositif #espace #fiction #mémoire #média #scénographie #sémiologie
#technologie #topologie #symbiose

Digitalise a marginalise community memories: The relocation of Billingsgate Fish Market

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Abstract

More than a final result, Illustration is a tool for researching, archiving, interpreting and communicating. The definition of illustration expands based on its usage and adapts in different ways and forms, analogously and technologically. In the 3D scan illustration, with its subjective eyes, it records, preserves and archive in a virtual space. In the conventional illustration, it opens up dialogue with the community, allowing one to deepen research content and facilitate archive creation.

My recent project Barter Archive (2019-ongoing), is a community archive created through bartering sketches in exchange for memorable objects from the fishmongers who must be relocated due to the city development in East London. Over the past 3 years, I have immersed myself in creating highly personal sketches in the Billingsgate Fish Market in London from 5 am every Tuesday to Saturday. Through observational sketching, I employed the community language - barter - in exchanging my illustration with the fishmongers' memorable objects. In the project, the fishmongers and I determine what records have enduring value with the community, who may not otherwise engage in archiving, denoting a bottom-up method of preserving memory.

Since April 2021, I have received funding from the Varley Memorial Award and Art Council England (Project Grant) to conduct a series of 3D objects scan and construct an interactive online archive of oral histories on barter-archive.com. The funding has also manifested in two exhibitions held in the Billingsgate Fish Market and Canary Wharf Group Rooftop Garden. I used the 3D scan data to generate a series of fictional stories related to the city development and the conflict of land use.

The project has facilitated connection and collaboration between the community and the practitioners through illustration and 3D scans to create authentic artefacts in archiving the collective memory of the community. The process of recording evolves from a 2D flattened image expands to a 3D dimensional space with its locational accuracy and comprehensively. This data can form and help to further explore the way and format of storytelling in demonstrating in physical content, including museum and gallery space, through a convergence of analogue and digital illustration.

In this paper, I will use the Barter Archive project as a reference in elaborating on the digital archive method in use in the emergency of relocation. Expanding to discuss the accuracy, accessibility, potential future format, authenticity, heritage and conservation value and narrative construction of the 3D scan digital archive for every individual, institutional and community group.

*Speaker

Keywords: community, digitalise, 3Dscan, archive, oral history, illustration, citydevelopment

Metaleptic objects and their aesthetic properties: biomedica art using human bodily excretions and fluids as resources

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¹KONTEJNER / bureau of contemporary art praxis – Croatia

Abstract

The excretions, secretions, fluids and solids from the human body are in the western cultural context perceived ambiguously. They constitute useless waste, to be discarded, an excess that refuses to leave and disappear from the planetary ecosystem. Simultaneously, some of them are idealised as valuable, respected, untouchable and considered to be carriers of life forces. As a resource, the human body and its biological surpluses are among the remaining taboos in the cycle of waste and the system of social values. Referring to the discourses of art theory, anthropology and philosophy like the concepts of exform (Nicolas Bourriaud), the unclean (Mary Douglas), abjection (Julia Kristeva), as well as to the nonhuman turn, speculating about different perspectives in the positioning of humans in relation to other living and non-living entities, this paper reflects upon contemporary biomedica art, which is finding a new purpose for human bodily solids and fluids. In artworks using living materials as medium, these items are becoming a new resource for harvesting energy, repositioning humans in the same function as any other entity on this planet - objects for recycling. The bodily excretions and fluids are transgressive, migrating from being either sacrosanct (blood, mother's milk) or unusable, unimportant waste (sweat, urine, faeces, adipose tissue) to the extraordinary, progressive and dramatic entities we identify as metaleptic art objects. Bearing specific aesthetic properties, metaleptic art objects are projective representations colliding with and exceeding norms thus shifting ontological borders and mixing the different levels of reality in which they operate. Due to the unusual and unexpected visual representation and conflicting connotations, they are phenomenologically eccentric. That makes them impossible to overlook because they keep magnetically and tenaciously hold of the participant's attention, triggering powerful and affectively intense experiences. These consist of discursively unarticulated sensations of disturbance as well as of repugnance caused by the disruption of regular functioning and the disclosure of the hidden meanings of metaleptic objects. Because of the ethically provocative status, they also activate socially normative reactions of unacceptability. To test the particularities of metaleptic art objects the paper analyses selected biomedica artworks using resources like human milk, body fat, tissue, venous blood, menstrual blood and tissue, urine and hair (Tajči Čekada, Dorotea Dolinšek, Antonio Kutleša, WhiteFeather Hunter, Theresa Schubert, Maja Smrekar, Hage Tapio, Zoran Todorović) to generate other forms of energy like food, fuel and fertiliser.

Keywords: biomedica art, metaleptic objects, human body excretions and fluids, energy resources

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The media art of Augmented Reality Filters

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Abstract

Although AR facial effects have for a long time been associated with face editing applications that allow improving appearances (with consequences ranging from the so-called Snapchat Dysmorphia to privacy concerns) – such as Facetune, Meitu and SwapCam, which mainly focus on beautification – the marketing of user-friendly software development kits such as Spark by Facebook and Lens by Snap has stimulated and fostered the creativity of many users and designers, thus heralding a new season of media art.

AR facial effects work by the addition of partially transparent virtual layers to augment aesthetically the physical user's face displayed as a digital image within the device's screen. Undoubtedly, they constitute a form of entertainment and engagement for social media users. However, increasingly more "creators" have adopted nowadays user-oriented software development kits such as Meta's Spark AR or Snap's Lens Studio to express their creativity, which has not been limited to the mere "beautification" of the face. Such an evolution in the technological scenario has coincided with the emergence of aesthetic and artistic experimentation practices, so that the ARFs currently available are of countless types and, in some cases, considered "artworks".

The humanistic and social issues raised by these semiotic objects are varied, and in the space of this intervention, it is proposed to address only those concerning their aesthetic grammar.

One of the fundamental visual rhetorics of AR filters is the "ascription": in these cases, the filter is used to anchor tattoos, masks, not necessarily beautifying make-up and objects of various kinds to the face (hats, caps, glasses, objects of various kinds). It is not, however, the only one.

A key figure in the field of media art to have experimented with these instruments was Jeremy Bailey whose artworks include facial tracked objects since 2005. based on FaceOSC, a tool for prototyping face-based interaction, by Kyle McDonald. Today, such instruments are used by artists such as Ines Alpha, Johanna Jaskowska, Hugo Maury, Kamilia Kard and many others (see Valentina Tanni's exposition on 2021), and often such effects of artistic status are described as responses to the cognitive and psychological discomforts created by the beautification filters.

Nonetheless, Augmented Reality video-selfie effects, which are nowadays depopulated on social media, can be placed in continuity with a tradition of media artworks that are characterised by the fact that they interact in real-time with the viewer's face, creating sense effects ranging from goliardy to criticism of socio-technological systems (in particular, face-tracking

*Speaker

and face-recognition). It is no longer self-presentation that is at stake here – which relates to manipulation *by* the user – but neither is the generation of faces by machine learning technologies: rather, it is the face as a surface of syncretic inscription and filtering to become an “interface” to set up meaningful communications based on grammars of physiognomy. For example, this is the case of the exhibition #FacceEmozioni. 1500-2020: dalla fisiognomica agli emoji (2019, Turin), the recent works by Christa Sommerer and Laurent Mignonneau (2021), or the installation “3x3x6” by Shu Lea Cheang (2019).

Keywords: Augmented Reality, face effect, Software Development Kit, User Generated Culture, Jeremy Bailey

Empathic Bond with Robots through the Lens of Robotic Art

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Abstract

Anthropomorphism has been a widely discussed topic in many fields related to AI and robotics now. It involves not only understanding the mechanism of human cognition and psychological traits, but also the potential influence of technologies like AI and robots on the human lifeworld. Empathy in human-robot interaction is one of the topics related to anthropomorphism that artists and scholars are becoming more interested in. Human empathy is embodied by the ability to identify with, understand and share others' emotional states. Empathic bonds with robots raise ethical concerns about current and future human-robot relations. Research into empathy in the field of human-robot interaction and social robotics typically conducts empirical studies to understand how robots elicit empathy in users. Philosophy of technology and ethics reflect on emotional-moral implications from empathic human-robot interactions. Another locus to look into is robot stage performance. Using existing research on empathy from various fields and integrating it from the perspectives of media art (history), this article will focus on robotic performance, a subfield within a larger technological art nexus, to consider the aesthetics, ethics and cultural dimensions of empathy in robotics.

To investigate empathy, this article revisits and compares three robot artworks by pioneers of robotic art. The first is Louis-Philippe Demers' *The Blind Robot* (2012-2014). This artwork embodies vulnerability and is designed to elicit empathetic feelings: *The Blind Robot* performs visually impaired agent that uses the lightweight plastic hands with delicate fingertips to touch the face of the person sitting across from it, much like what a person with complete loss of sight might do when recognizing an object through a sense of touch. The second case study is a humanoid, more precisely, an animatronic of the German writer Thomas Melle, staged in the theater performance *The Uncanny Valley* (2019-) from Stefan Kaegi, one of the founders of the Berlin-based theatre group Rimini Protokoll. The animatronic attempts to build an empathetic bond with the audience by performing as a human who struggles with bipolar disorder. Kris Verdonck's *Dancer # 3* (2010) is the third case study. The robot performer elicits empathy by failing in making motions skilfully – the dance move is clumsy and hindered by many technical malfunctions.

There are three key elements that constitute our inquiry into empathy in human-robot relations from these three case studies. The first one is how anthropomorphism may lead to empathy. The second is the question of trust in empathetic human-robot interactions. The third element is the concept of embodiment and it will be addressed in both physical and underlying cultural senses. To broaden the cultural angle of the inquiry, we also bring robot performance in Japan into the discussion.

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Keywords: Empathy, Robots, Performance, Aesthetics, Ethics

Pioneers of Virtual Reality: Then and Now

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Abstract

The two distinct waves of engagement with Virtual Reality (VR) in artistic practice - the first during the initial technological development in the 1990s that enabled VR to become accessible to artists - and the second wave that has been based on a much greater accessibility of immersive headsets for artists and a wider general public (Slater and Sanchez-Vives in Kozel et. al 2018). The term 'Virtual Reality' has been interchangeably used to mean virtual environments and virtual worlds. In this paper I examine the use of VR in artistic practices where the intention is for the participant to largely experience virtual space through total immersion. The work undertaken in the first wave was critical to the developments in the current second wave. Indeed, the role played by artists during this first period in pushing the boundaries of this new technology, should not be underestimated. The paper introduces an overview of the historical developments of the technologies that made immersive virtual reality technology possible. The early pioneers including Heilig and his multi-sensory 'entertainment system' *Sensorama* built in 1962, and Krueger's *Videoplace* in the 1970s advanced concepts of virtual space, artificial reality, and interactive responses within virtual environments. The invention of the CAVE (Cave Automatic Virtual Environment) by Carolina Cruz-Neira and her colleagues in the early 1990s, all laid the foundations for what was to come. The influence of the Arts and Virtual Environments project at Banff in the first half of the 1990s should be acknowledged and the projects realised by artists such as Laurel and Strickland, Dove and Mackenzie, and Gromala and Sharir, made advances in the contemporary understanding of virtual environments and the ways in which an audience could interact with them, to experience virtual environments through what Laurel, Strickland and Tow termed the pleasure of the embodied imagination (1994: 123). The fact that Char Davies helped develop the *SoftImage* software specifically to enable the creation of her artistic imaginations is testament to the contribution she made to the technological developments of 3D immersive space, and indeed advancing the understanding of what contributes to a fully 'immersant' experience. Lanier's data glove helped artists like Davies to further explore and extend the sense of 'being there' through the stimulation of other senses through haptics and Jacquelyn Ford Morie's scent collar took a step closer to extending sense stimulation in virtual environments further. Artists working in the second wave of VR such as Bjork and those whose artworks were celebrated by the Lumen Prize have begun to develop the language of VR further and, with the help of more advanced and more accessible apparatus, are creating new spatial experiences for their audiences. Works such as *Tree* (2017) by the New Reality Company and Camille Baker's womb-like experience in *InterHER* (2021) are pushing multi-sensory stimulation of the senses further. Slater argues that VR should be seen as a medium within its own right and should have its own conventions acknowledged (Slater in Kozel 2018).

*Speaker

Keywords: Virtual Reality, First Wave, Second Wave, Immersion, Slater, Kozel, Banff, Lumen Prize

Bogdanka Poznanović: The Art of Communication and The Emergence of "Mainframe Arte Povera"

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Abstract

Bogdanka Poznanovic (1930–2013) was the Yugoslav media art pioneer and the professor at the Academy of Arts in Novi Sad, where she established the course "Theory of shape and space with visual research" (1967) and founded the Visual Studio For The Intermedia Research (1979/1980), the first of this type in Yugoslavia. During the 1970s, The Atelier DT20, a studio of Bogdanka and Dejan Poznanovic, was an art-hub for the Novi Sad neo-avant-garde scene; they acquired the status of "influencers" in regard to the promotion of conceptual art, arte povera, mail art and video art. Technologically based artworks of Bogdanka Poznanović thematised information as an artistic entity on micro/macro level, often introducing body imprints into the technological structure of the medium.

This article has been written by her student from the standpoint of the appliance of media art epistemological tools she provided for the digital migration of generation X, specifically: Fluxus intermedia, "multi-vision" and postmedia. An outline of Bogdanka Poznanovic seminal work-environment art, video art, communication art and networking-is given in relation to the evolution of cybernetic patterns in art and the position of technologically augmented artists within the global techno-ecosystem. Special focus is put on newly detected cyber-anthropological phenomena dubbed as "mainframe arte povera", i.e., the historical examples of artworks created from computer consumables in the time of mainframes scarcity.

The example of the "mainframe arte povera" was a participative photo-performance *Computer tape & body*, made by Bogdanka Poznanović at the Tribune of The Youth (Novi Sad, August 22, 1973). She photographed participants of the action whose bodies were marked with the projected content of diapositives - a segment of computer tape accentuated with a binary-digit serial number. The outcome of the performance was catalogued documentation consisting of slides and photographs of 10 individuals exposed to the computer artefact under the concept "to mark humankind with numbers." The artwork was restaged as a projection at the exhibitions: CAYC in Buenos Aires (1973) and Contemporanea in Rome (1974).

NOTE: The paper will be enriched with the documents from the Archive of Visual Studio at the Academy of Arts in Novi Sad, the Legacy of Bogdanka Poznanović at the Center for new media kuda.org Novi Sad and the interviews with students of Bogdanka Poznanović in relation to the students' works from Visual studio which were shown at ŠKUC, (Ljubljana, 1981), Youth Biennial (Paris, 1982), *Centro Video Arte* (Ferrara, 1984), Youth Biennial (Rijeka, 1985), Biennial of Art Schools (Toulouse, 1987), etc. In addition, the highlight would be put on the Italian period of Bogdanka Poznanovic work – she was recipient of the six-months grant from the Italian ministry which she spent in Florence and Rome (1968/69), and three-months specialisation in Venice (1977); she also gave lectures in Ferrara (1984) and Bologna (1985).

*Speaker

Keywords: site, specific media art history, intermedia, postmedia, video art, networking, media art education

Spatial Oddities: Examining Accessibility and Sustainability in New-Media Art and Beyond

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Abstract

This article investigates the implications of the accessibility of art in relation to sustainability, specifically considering historical and recent artworks and developments that can be seen or experienced without physical travel. These types of works use different kinds of strategies: they might be online, they might be made not to be seen, they may enter your home via postal service or they may require you to call the work, like in the case of Kalle Laar's sound-based work *Calling the Glacier* (2007). The focus for this selection of artworks from history and today has been on the question of accessibility or non-accessibility, in particular on how these surveyed works propose alternatives to the traditional idea of visiting exhibition spaces. An example of an artwork that one could claim doesn't need to be physically visited is art that is based on instructions. In the 1960s and 70s, artist Sol Lewitt produced works that were presented as instructions made for people to execute them. Similarly, one can claim that programming is based on types of instructions that anyone can do when access to a computer and a network is provided. Fifty years later, in his digital art that is based on instructions, but this time for coding, Casey Reas has referenced the earlier 'analogue' works of Sol Lewitt.

An earlier popular claim has been that the Internet can democratise knowledge. One could think that is the case also concerning forms of art that are accessible online. But in facing today's environmental challenges, it makes sense to investigate how sustainability or unsustainability issues are actually addressed in the diverse artworks. An obvious contemporary example of online art is the NFT-art (Non-Fungible Token). Questions on its sustainability have been surfacing in recent years, which have revealed that these kinds of immaterial artistic practices are actually producing a high carbon footprint, though often thought of as more sustainable production.

Another perspective is offered by artworks that are made to be sent to space. Since the late 1960s outer space has been considered an alternative exhibition venue, and several artworks have travelled to space. Both the "Moon Museum" (1969), a ceramic plate measuring less than 2 cm which features the work of contemporary artists of the time, and the "Fallen Astronaut" (1971), a tiny aluminium sculpture by Belgian artist Paul Van Hoeydonck representing astronauts who have lost their lives in space, are permanently exhibited on the moon. In general, an interesting aspect concerning the works that have been sent to space is their implication and expectation to represent entire humanity for potential non-human or alien audiences. Obviously, in the end, these works are realised solely from human perception and for human physiological capabilities. At the same time, the initial starting point for these works has been the fact that they are sent to space and are non-accessible to us. This

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article surveys works that highlight the potentialities of accessibility, non-accessibility and their relation to sustainability and our current values.

Keywords: Accessibility, Sustainability, Art tourism, Art in space, NFT, Art, Immaterial art

Art, Science, and Technology Studies (ASTS): Methods and tools for considering the rhetorics and materialities of media

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Abstract

What should we make of objects created to overlap the knowledge communities of art and science? What should we make of curators who go to great lengths to show us the aesthetics aspects of media zoned scientific or the technical aspects of artisanal craft? And what can this tell us about those communities and the way they organize people and things to produce knowledge? I will draw on concepts from ASTS, particularly as articulated in the Routledge Handbook of ASTS (2021) and my recent monograph, *Art, Science, and the Politics of Knowledge* (MIT 2022) to consider the ways that overlapping resources are drawn on by scientists and artists as they conceptualize media, particularly in the exhibition context. In particular, ASTS is well positioned to deal with interdisciplinary projects which draw on knowledge making traditions from both art and science, so it potentially presents many tools for unpacking multidisciplinary in exhibition spaces.

Hannah Star Rogers received a PhD from Cornell University in Science and Technology Studies and an MFA from Columbia University. She is the lead editor of the Routledge Handbook of Art, Science, and Technology Studies and her monograph from MIT Press, *Art, Science, and the Politics of Knowledge* appeared in 2022. She is currently based at the University of Copenhagen, where she is researching Metabolic Arts as part of a Novo Nordisk grant through the Center for Basic Metabolic Research (CBMR). Rogers works as a curator for art and science exhibits including *Emerge: Artists and Scientists Redesign the Future* at Arizona State University, *Shadows and Ashes: The Perils of Nuclear Weapons* at Cornell University, and *Art's Work in the Age of Biotechnology: Shaping Our Genetic Futures* at North Carolina State University and the University of Pittsburgh. Her exhibition, *Making Science Visible: The Photography of Berenice Abbott*, received an exhibits prize from the British Society for the History of Science and resulted in an invited lecture at the Smithsonian Archives of American Art. hannahstarrogers.com

Christina Agapakis' *Extinct Perfume*. Under three glass cloches are different versions of the scent of Guadalupe Island flower, which will never be smelled again. perfumes created by Symrise: Isaac Sinclair, Fanny Grau, and Maurice Roucel and scans of horticultural specimens at *Art's Work in the Age of Biotechnology: Field Trial* at The Contemporary Art Museum in Raleigh, NC. Photo credit: York Wilson. Christina Agapakis with *Extinct Perfumes* at *Art's Work in the Age of Biotechnology: Field Trial*. Photo Credit: York Wilson.

Keywords: Art, Science, and Technology Studies ASTS, STS

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Walking with Bacterial Communities on Permafrost

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Abstract

This paper looks into barefoot walking on permafrost and possible co-living with the bacteria related to it as artistic research. Barefoot walking is investigated as a method to study the experience of permafrost condition and soil relations through sensorial, bodily encounter. It juxtaposes the vulnerability of the permafrost with the vulnerability of the human body. The more-than-human of walking methodologies, in this case with the bacteria, can be considered by engaging with feminist new materialism and posthumanism (Springgay & Truman, 2018).

Permafrost is soil that stays frozen continuously for more than two years. It is an essential carbon sink and the climate breakdown causes melting of it. For instance, the measurements done in Abisko Scientific Research Station since late 1970' indicate that the permafrost can thaw by meters because of the warming (Johansson et al., 2011: 558). This leads to irreversible changes as there are more water, CO₂ and methane released from the thawing ice (Overland et al., 2019). Mitigating climate breakdown at large is preventing the loss of permafrost. There are also other type of experiments such as Pleistocene Park that plans to bring large herbivores to the Siberian Arctic to change the ecosystem back to how it was 10 000 years ago. It is proposed that these large mammals would change the vegetation in favor to preserving permafrost and they would trample the snow to expose ground to colder temperatures (Zimov, 2005).

In this paper, the permafrost condition is approached through the active layer which is the part of soil on permafrost that seasonally freezes. Active layer can be sensed with barefoot when the actual permafrost layer is oftentimes deeper in the ground. The walking is conducted in a following way: 1.) samples of the permafrost active layer are collected and filmed on a microscope to observe the movement of vast amount of microbes and the repetitive movement patterns are documented and 2.) the movement patterns are repeated on the permafrost active layer – at the mire – to attempt to connect with the bacteria within this movement. Thus, it is also an attempt to walk with the bacteria. This paper presents investigations on if it is possible to relate to the bacteria through the movement and discuss the permafrost hydrobody condition through human bodily sensing, resilience of cold and intuition. It asks what kind of knowledge is stored in the permafrost archive? The research manifests into a video piece capturing the processes.

Keywords: permafrost, active layer, bacteria, walking methodology, interspecies, artistic research

*Speaker

between sound and technology: the 60's roman school of electronic musical experimentation

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Abstract

Everybody knows that electronic music was born in the late 40s as tape music, produced in specific studios of big institutions.

Rome was a unique case: no institution but the initiative of a few innovators, from the association Nuova Consonanza and Accademia Americana, favored the overcoming of tape music.

In the late 50s to the mid 70s in Rome were born many sound collectives, private studios, experimental project, that gave birth to pioneering examples of sound art.

In 1959, a concert of live electronic music was performed for the first time in the world, and two years later, the first instrument for live electronic synthesis, the synket, was invented.

Franco Evangelisti, Walter Branchi, Guido Guiducci, John Heinemann, Ennio Morricone, Paolo Ketoff, John Eaton, Domenico Guaccero.

These innovative musicians managed to combine sound research with technological research, opening up electronic music to other disciplines.

My speech wants to trace the steps of this story as important as it is unknown.

Keywords: electronic music, live music, sound art, technological, synthesizer

*Speaker

Ecological Exosomatic Organogenesis and the Eco-centric Brain

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Abstract

My discussion will be divided into four parts. Firstly, I want to hypothesize that the architecture of the brain of humankind has been modeled and sculpted in the past two million years by a vast network of anthropocentric social, political, economic, and technological relations to produce a destructive humanity on the brink of ecological extinction as a set up for what will be the main thrust of this presentation: the eco-centric brain. (The brain, as used here, is not limited by the bony skull, its intracranial component, but is embedded in the politically contested, socially constructed, and technologically elaborated world of relations that I call its situated extra-cranial complex.) Secondly I want to extend the understanding of the Anthropocene, as originally introduced by Paul Crutzen to emphasizes the important role of human-kind in the negative transformation of geology and ecology soon to be beyond repair, as well as an epistemological concept which entangles it with powerful psychic dispositifs that challenge thinking leaving it no room for new creative thought. Bernard Steigler, in his book *The Neganthropocene*, called this condition de-noetization which he claimed resulted in climate denial in the post-Truth society and nihilism. At its heart is an eco-cidal epistemology or anthropogenic epistemicide perpetrated by the oil and coal industry in the context of neo-liberal communicative capitalism. They induce a condition I have dubbed, eco-agnosia, a term related it to the larger scientific enterprise, agnotology studies, that discloses the ways our knowledge systems build ignorance.

The third section of the talk will build on the theories Bernard Stiegler for a techno-material developmental paradigm of the brain. A co-evolution between nervous tissue and the history of technics or what he referred to as an exosomatic organogenesis. In *Technics and Time 1*, Stiegler suggests that in the evolution from *Zinjanthropus*, 175,000 years ago, to *Neanderthals*, 40,000 years ago a process of instrumental maieutics, or mirroring, took place in which the effect of this coupling was an expanding cerebral cortex itself. I am speculating that these changes are the result of Anthropocenic forces acting on the brains plasticity. There is a mirroring of fire, spear and knife production, weaponry and sacrifice, slash and burn agriculture and recently with the steam engine, and the atomic bomb and neural counter parts over time. This process is still ongoing. Lastly, I want to introduce the possibility that the antidote, I alluded to earlier, is found in the ideas of the deep ecology and the Ecocene in which a future brain might be produced by the invention, distribution and accumulation of technologies of caring for nature that sculpt its synaptic weights differently. In this account nature is understood to have its own self-worth beyond human consummation. One in which human consciousness is entangled equally with plant and animal consciousness. Ecological exosomatic organogenesis will be a process to first unveil the blindness of eco-agnosia in the process of creating a new brain-mind configuration and ultimately consciousness.

*Speaker

Keywords: deep ecology, anthropocene, neural plasticity, exosomatic organogenesis, ecocene, anthropocentric epistemicide, climate change

Art and Media in Japan around 1930 Represented as Kimono Textiles

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Abstract

Japan went through an extremely rapid modernization process in the second half of the 19th century until mid 1930s. But people's lifestyle did not change immediately. For most Japanese kimono was their daily cloth. But fashionable kimono design, which had been accessible only by higher class people during the feudal era, was enjoyed widely thanks to new dyeing technologies. New art and design trends introduced from abroad and new media technologies such as gramophone, musical instruments and cinema became part of fashionable kimono textile design. Conflicts and mixtures between Japanese traditional art and Western style art are also observed in the textile design. Interestingly, due to the traditional aesthetics and unspoken rules, such textiles were usually used for underwear or lining especially in case of men's clothes. People wore contemporary topics such as best seller novels, films, actors and actresses, popular animation characters such as Mickey Mouse, or even newspaper articles - closer to their skin. The paper presents rich examples of these textiles and explores social and cultural reasons behind the phenomenon. This is a new development of the research the author has been carrying on correlation between art, technology and media in Japan from 19th century to today.

Keywords: Fashion, Textile Design, Japan, Kimono, Modern Art, Cinema, Music

*Speaker

Fever Dreams of a Digital Archive

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Abstract

This talk presents a portion of my project on "Platform Memories" and discusses the role of algorithms in our changing relationship to "technologies of remembrance" (Jones 2003). Drawing in part on Derrida's (1996) *Archive Fever*, I explore where and how the "archival act" occurs. Derrida (1996) reflects on the transformation of our technologies of remembrance through computers, email, and his own writing as he is in the process of composing *Archive Fever*, declaring that "what is no longer archived in the same way is no longer lived in the same way." (18). Writing of and with technology of the mid-1990's, Derrida frames the archive within the conceptual boundaries of writing, inscription, and (with Freud's mystic writing pad never too far away) *impression*. Some three decades later, our current algorithmic culture has once again reframed the archival act, and how we (re)live the archived past. Where do we locate "the *moment* proper to the archive" (Derrida 1996, 25) when algorithmic *sorting* processes preemptively curate—and often predict—a human decision of when and what to preserve or recall? Who or what is running the archive, and for what *sort* of future encounter?

At the most general level of assessment, the digital archive is fundamentally dynamic, based on computational processes more than object-retrieval (Parrika 2012). We no longer experience an act of retrieval, but rather a process of active construction in which each query creates the "thing" we are trying to "retrieve" (Ernst 2013). In this regard, platforms operate as instances of what Ernst (2013) describes as a *transarchive*, a "new type of generative archive" that is "dynamic" and "permanently updating." (84). The digital archive no longer *contains*; instead, algorithmic recall creates dynamic, fluid systems of enunciation that determine *what* is retrieved, for *whom*, and under *which* terms and conditions (Ernst 2013). As information asymmetries move databases even further beyond the reach of a user's direct access, and as the algorithms driving those retrieval processes become all the more opaque, this dynamic act—the moment of the archive—increasingly involves the platform's own data-driven agency. As a technology of remembrance, the digital archive does not simply externalize remembrance as a "storehouse" of the past; it likewise externalizes the recombinant, meaning-making process of "retrieval" itself. What Derrida claimed as a challenge to the archival letter by way of email is nothing compared to the challenge posed by the "platform mechanisms" of datafication, commodification, and selection (van Dijck, Poell, & de Waal 2018) and the messianic vision of hyperconverged data centers and yottabyte storage. While the fever vision of a more democratic and "horizontal" distributed archive still haunts our online dreams, it is clearly the case that the more we feed to the digital archive, the more the platform itself can curate how these images return, and their potential for individual and collective meaning-making.

Reference Page available on request (edited out to meet the 500 word limit)

*Speaker

Keywords: Digital Archives, Platform Memories, Algorithmic Agency

Observatories over the Critical Zone: monitoring and shaping art-lab practices

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Abstract

The ZKM Centre for Art and Media in Karlsruhe was the setting for a two-decade-long collaboration between the curator and media theorist Peter Weibel and the sociologist Bruno Latour. The outcome of this partnership was four 'thought exhibitions' (*Gedankenausstellungen*), in which they aimed to update a curatorial research approach that was also an exploration of display theory: *Iconoclash* (2002), *Making Things Public* (2005), *Reset Modernity!* (2016), and *Critical Zones: The Science and Politics of Landing on Earth* (2020). The latter fulfilled not only Latour's well-known interest in climate issues but also signaled a re-configuration of a specific area in the art-science relationship. The term Critical Zone refers to that thin outer layer of the Earth's surface, ranging from treetops to underground water, which is the site for fundamental life-supporting geochemical processes, but also the part that most suffers from anthropic impact. This fact forms the premise for the exhibition, which is conceived as a platform for the convergence of Latourian 'interconnections of actants', forcing the coordination of human and non-human relational agencies through planetary policies and advanced technologies. The selection of artworks was used as a commentary on the experience of representing climate emergency, employing the exhibition format to establish links between visual culture and the philosophy of science. Topics include Gaia theory, as theorized by James Lovelock under the influence of cybernetics, the lexicon of the Anthropocene, and the need for greater interdisciplinary consistency. The singularity of Latour's ecological approach lies in its inherent connection to the status of art, as he recognizes art's capacity to mediate public concepts in representation and politics. The Critical Zone is presented as a vulnerable environment-body, constantly monitored through machines, instruments, and the combined expertise of human sciences. And therefore, the evolution of artistic practices – within and beyond the exhibition – that refers to that: the specific operativity of New media art participates in this action, reinventing performative practices that closely resemble those of scientific observatories or laboratory outposts. Monitoring data, mobile labs and field research seems to replicate the role of the Critical Zone Observatories (CZO) – the international network of laboratories studying soil geochemical processes – reimagining a possible 'laboratory life' in the face of emergency.

Keywords: anthropocene, art, science, contemporary art, critical zone, exhibition

^{*}Speaker

Are you there? Mediating Distances in Wartime Through Sound Art

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Abstract

Are you there? is a sound intervention that took place in May 2022 in the 1896 Fritz Koch Kiosk in Aalborg (DK), during the *MicroPOM Aalborg Transition Regimes*, the sub-format of the international conference series *Politics of Machines*. The curatorial team invited nine sound artists to perform one-to-one audio pieces through an analogue phone: Piotr Madej (PL), Sebastian Milewski (PL), AKTRONER (UA), Anastasiya Voytyuk (UA), Ricardo Arias (CO), Sk.e.in (BY), Aleksandra Słyż (PL), Camilo Cantor (CO), AETHER.mcrt (UA), and Maskitol SAE (UA). Their musical compositions reflected on Russia's aggression against Ukraine and the affective experience of war and conflict. Inside the kiosk in Aalborg, listeners picked up the analogue phone and experienced a live sonic connection to the remote artists. By re-activating a former phone kiosk, the project created a dedicated time and space for focused listening and connecting in a time of crisis.

The phone calls of *Are you there?* mediated over large geographic distances, contextual differences between countries at peace and countries near to/ at war, and were impacted by noise. This paper poses the research question: how do a phone call and noise mediate geographic and contextual distances – specifically in relation to the Ukrainian war – between remote sound artists and participants in Denmark in the project *Are you there?* As an integral part of the project, the team conducted interviews with the artists and the participants in the kiosk after the performances, which serve as the basis of the analysis of this paper. These conversations focussed on noise, glitches, intimacy, distance, and the context of war. This paper argues that giving a platform to Eastern European and Colombian artists within Denmark had a symbolic value, as it made their voices physically present in Aalborg as a form of anti-war noise in the city, facilitating listening as a form of solidarity. The project broke traditional boundaries between performers and publics, as the medium of the phone call allowed the artist and the participant to switch between sending and receiving messages. During the experience, some of the artists and participants noted a feeling of closeness to each other as they were present in the sound 'space' of the phone call, despite being geographically at a great distance. The project embraced ambiguity as a resource, as the performances – which ranged from abstract to more specific meanings – emphasized the complex affective responses to war. The artists intentionally used glitches and errors in the construction of their sound pieces, whilst noting that transmission noise emphasized the realism of the transmission and the war theme. For the participants, the technical noise in the channel accentuated the instability and uncertainty of phone calls amidst conflict and they understood the noise from their respective subjective lenses, mediated through their memories, experiences, and associations. Especially participants who personally experienced war, felt the performances activated their memories. In addition, the paper is a documentation of the initiated network and sound intervention, as a recollection of artistic responses to the ongoing Ukrainian war.

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Keywords: Sound art, art intervention, noise, war

Vera Frenkel's String Games: Improvisations for Inter-City Video (1974)

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Abstract

In the autumn of 1974, the Canadian artist Vera Frenkel staged *String Games: Improvisations for Inter-City Video*. Two groups of participants-five each in Toronto and Montreal-engaged in a remote version of the classic string game *cat's cradle*.

String Games is the first piece of telematic art. However, art historical attention to the artwork has been insufficient. *String Games* emerged from a watershed moment for network technologies, specifically within a context of telecommunications development in the Canadian nation-state. Telecommunications-based art has a long legacy in Canada, the country that exactly a century before Frenkel's artwork saw Alexander Graham Bell's patent for the telephone in 1874. His namesake company launched the Bell Canada Conference TV System in the early 1970s. In its day, the System was one of only four organizations worldwide that provided conferencing technology that engaged video, audio, and computer networks. Decades before studies alerted us to the cognitive overload of Zoom fatigue, the effects of 'continuous partial attention,' and to the importance of non-verbal, bodily signals in digital media, Frenkel and her collaborators used telematics to consider new ways of being together with and through embodying new communications tools.

This paper provides a historical analysis of *String Games*, situates its role within the history of networked art, and explores the artwork's co-operative realisation of live connection and a feeling of co-presence in the context of technological development in the Canadian nation-state. Within the context of early interactive video work, *String Games* was a notable innovator

Keywords: telematic art, Vera Frenkel, Networked art, Canada

*Speaker

Incidental Genealogies? Continuities, discontinuities, and historiographic revisionism across the (pre)histories of NFT art.

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Abstract

In the fall of 2021, as the market for blockchain-secured art was raging, real estate developer Slate Asset Management announced that buyers of their eight new luxury penthouses at 1 Delisle in Toronto, Canada would each receive an exclusively commissioned and curated NFT by contemporary media artist, Petra Cortright. Despite being a technically and conceptually accomplished digital painter, the developer's descriptions of the works focused narrowly on Cortright's appeal to a global audience of collectors, the sale and resale value of her earlier NFTs, as well as her "pioneering" connection to a historical lineage of digital artists and art movements. Slate Asset Management is not alone (and not entirely correct) in their characterization and historicization of Cortright's work. Instead, while Cortright is typically framed as a representative member of the ultra-contemporary "Post-Internet Art" movement, within NFT contexts, Cortright's practice is repeatedly situated in relation to a historical lineage that goes largely without question or justification. The same is true for many of her peers, particularly those implementing generative approaches to artmaking as they are regularly framed as direct decedents of the earliest practitioners of generative computer art.

Much critical scholarship in the fields of media art history seeks to demystify, contextualize, and counter "rupturous" narratives surrounding emergent technologies through an archaeology excavation of their complex and manifold histories. The impetus here seems rather different and yet it has not been unpacked or critically examined. Is there a genealogical connection between contemporary NFT art and early histories of digital art? If so, how might we characterize points of continuity between past and present practice? What motivates the identification of historical lineage where NFT art is concerned? And, how are we to understand the relationship between works that are aesthetically and technically similar while being derived from a very different set of contexts, influences, questions, pressures, and intentions?

Responding to a sweeping review of contemporary curatorial discourse and art writing that draws unquestioned parallels between NFTs and ready historical precedents, the following paper will offer a comparative analysis that pairs close readings of the technical grounds, curatorial framing, and/or publicity surrounding three historical case studies – drawn from the canonical histories of media and computer art that contemporary NFT artists, curators, and gallerists associated with generative artmaking seek to align themselves with – alongside corresponding readings of three contemporary correlates. Grounded in archival and didactic materials as well as publicity and popular writing of the day, analytical pairings include:

*Speaker

(1) László Moholy-Nagy's *Light Space Modulator* (1930) and Dmitri Cherniak's *Light Years* (2022); (2) Grace C. Hertlein's generative graphics (1970 – 73) and Amy Goodchild's *Propagate* series (2021); and (3) the inaugural *Computer-Generated Pictures* exhibition at the Howard Wise Gallery (1965) and *10x10*, the inaugural NFT exhibition and auction organized by SuperRare and Verisart (2021). The aim of each discussion will be to parse and unpack a series of continuities and discontinuities between contemporary NFT art and the early histories of digital art.

Keywords: NFT Art, Generative Art, Media Archaeology

Breached Boundaries: Enter the Intruder in Sissel Marie Tonn's Plastic Hypersea

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Abstract

Plastic Hypersea (2021) is a two-part project by artist Sissel Marie Tonn consisting of a geo-located sound walk titled *The Facility* set in Amsterdam North, and an online multi-channel "sci-fi documentary" titled *The Spill*. In both works, the artist develops speculative narratives that explore the future possible outcomes of humans' material entanglement with micro-plastics. *Plastic Hypersea* was developed in close collaboration with a micro-plastic expert and an immunologist based at VU Amsterdam, and as such unfolds against the context of ArtScience. This is emblematic of increasingly frequent cross-overs between art and science, which is in itself worthy of further analysis. Through both *The Facility* and *The Spill*, Tonn explores how the ubiquitous presence of micro-plastics in our environment, food web, and physiological systems could prompt us to conceive of a more expanded sense of self. What kinds of transformations might occur within ourselves the moment that micro-plastics enter our body? What does this say about the more-than-human self? What to make of this intrusion that might prove lethal, but might also unlock certain evolutionary or morphological possibilities inherent in our selves?

In this paper, I think through the more-than-human self by referring to Nancy Tuana's "viscous porosity" (2010) and Stacy Alaimo's "trans-corporeality" (2010). Tuana and Alaimo articulate how coming into being is a matter of continuous material interchanges between the body and its environment, where the skin mediates what is allowed to enter the body and what stays out. Acknowledging such processes enables us to move towards an alternative understanding of 'the human' and articulate our humanity through a set of (political) practices that acknowledge non-human agency. Tonn brings up the notion of an immunological self at the moment when micro-plastics breach bodily boundaries and interact with human immune cells. She addresses the exclusionary war metaphors on which the field of immunology has been founded, wherein such an event is interpreted as an external attack on the human as an immutable entity. Here, I call upon Jean-Luc Nancy's conceptual metaphor of the intruder (2002) to complicate this simplistic view and elucidate the multi-directional and complex interactions - even within itself - in which the body necessarily enters and depends on for identification and survival.

Furthermore, I explore how Tonn employs the media of the geo-located sound walk, multi-channel video, and dance, to translate contemporary philosophical perspectives about the more-than-human self into an aesthetic experience. *The Spill* is experienced predominantly visually from behind the screen, but the site-specific dance portrayed in the video effectively illustrates how embodied practice not only re-embodies the act of seeing, but presents the body as a site where ontology, epistemology, politics, and ethics, converge. *The Facility* is an immersive aural experience demanding active physical involvement. The viewer is a *participant* whose physical presence is required at the designated site. These media are seen as

*Speaker

markers of the recent performative and affective turns in contemporary art at large that have accompanied the recent critical posthumanist and new materialist turns in the humanities.

Keywords: toxicity, microplastics, plasticity, immunology, sound walk, video, speculation, ArtScience, ecology, embodiment, transcorporeality, intrusion, Tonn, viscous porosity, posthumanism, new materialism

Yugoslav New Media During its Breakup

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Abstract

During the 1980s and 1990s, a new electronically- and digitally -mediated art form, new media art, emerged in various places across the world. This included Yugoslavia, which at the time was undergoing economic decline and the rise of nationalism, leading into a progressive and ultimately traumatic breakup into separate nations which were within the boundaries of the Federal Republic.

I have spent years in unsuccessful attempts to shed some light on the legacy of media art during this period by looking at all of its constituent states, as a unique case study in modern European cultural history. This holistic approach does not resonate with the relevant institutions in the former federal republics, who are mainly interested in respective national histories, most of them leaving out this period, and context as a blank spot. Meanwhile, ephemeral artefacts are being lost irretrievably.

It seems that for now the only way to offer some insight into these media art practices is to offer personal artistic journeys. I will weave in my story of strong opposition to the culturecide of Yugoslavia and the evil and authoritarianism of war, against the background of the events that led to the final stages of the dissolution of Yugoslavia.

In 1984, after 12 solo-shows as a painter I started experimenting in combining computer-generated images, using a pen plotter and serigraphy (as many other New Media art pioneers did at the time as I learned later), combined with traditional painting techniques in a series of works called "Parallel Worlds". The interplay between digital and analogue, and experiments with hybrid art forms across disciplines remained a constant feature in my artistic practice.

In the late 1980s my practice expanded to collaborations with composers of electronic/computer music, performing artists and software engineers in producing a series of installations and performances, videos (in spite of many obstacles, presented internationally, e.g. ISEA, SIGGRAPH etc.). The following project, "The Shirt of a Happy Man", included an interactive installation based on human pulse readings. It was selected for ISEA 1996, and de-selected due to international sanctions imposed on Serbia as the aggressor in Yugoslavian wars. My move to London in 1998 coincided with developing my next work, the "Infonoise" project that culminated with a large-scale interactive installation premiered in Belgrade, followed by the performance presentation at ISEA 2000. "Infonoise" was inspired by the atmosphere of fear, warmongering, confusion and disinformation campaigns that plagued lives of Yugoslav citizens back then, that still resonates beyond this specific context even today.

Alongside examples of my own artistic practice, my major aim is to provide international visibility for the the exclusive newly-digitised materials of the three major media art public

*Speaker

events that also form an integral part of my own biography: the international media art festival "Little Personal Music" (1987), the "Computer Art" exhibition (1991), and the "Short History of Electronic Art" symposium, attempting to promote the initiative for documenting and archiving this art, of which my presentation will be another, unfinished chapter.

Keywords: unknown histories — media art pioneers —

Haunted Future Memories. On the Golden Records in a Tender Time

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Abstract

For more than 40 years Voyager 1 and Voyager 2 have travelled through space transmitting data to Earth. Included aboard each of the Voyager spacecraft is a "Golden Record" containing sounds and images telling stories of life and culture on Earth, among them spoken greetings in 55 different languages, both ancient and modern, and 27 music pieces from different parts of the world. Now having left Earth's solar system, the only spacecrafts to have done so, the Voyager 1 and Voyager 2 spacecrafts continue their intergalactic journey with increasingly infrequent contact to Earth.

Existing at extreme distance from our planet, the Voyagers' Golden Records have emerged as uncanny artifacts, existing as echoes from the past that remain alive, moving continuously through space, and through time. These are the only extraterrestrial archives of human cultures. The Golden Records may survive for more than three billion years; they will be there long after our planet has been absorbed by the sun.

In the *Tender Time* installation, to be exhibited at the *Time Space Existence* exhibition in Venice May-November 2023, into the Voyagers' existing cultural archive new sonic layers have been curated, performed and woven, adding to the spectral sensibility of the work. The sounds and images etched into the grooves of the Golden Records will be (re)presented with sonic, visual and textual elements conjuring the disjunctions of space and time that the Voyager mission makes apparent. By recognizing the instability and interconnectedness of past, present and future, *Tender Time* aims to perform a hauntological aesthetic (Derrida 2006; Fisher 2014).

The Golden Records archive are not only a representation of the frozen moment of time almost half a century ago, but also a repository that tell us about the privileged set of information that found its way into the etchings. The team behind the Golden Record – led by Carl Sagan – decided to exclude the sounds and images of destruction, war, and distress: The Golden Record was to convey hope. This choice meant, however, that this archive of humankind is haunted by its own clinical purity and a superficial picture of geopolitical harmony. With the *Tender Time* installation, we attempt to challenge this harmony and explore the sense of vulnerability that we suggest haunt our current moment of continuous planetary crisis. We therefore recorded, mixed and 'sent into outer space' voices that spoke of regret: of plans that did not work out and futures that never got to be, but which still haunt.

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In the talk, we, the creators of *Tender Time* – researchers and artists from the Medea Lab, Malmö University – will discuss the uncanniness of the Golden Records and place them in a hauntological perspective. We will also discuss how the *Tender Time* project works on the production of haunted future memories; memories that do not shy away from time's out of jointness.

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Keywords: Archive, Media History, Future Memories

The "environmental installations" of Fabrizio Plessi

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Abstract

Among the different artists who have established a fruitful relationship with new media, Fabrizio Plessi (Reggio Emilia, 1940) is considered as a real pioneer on the Italian scene. Recognized by critics as "the aborigine of digital" (*Plessi. Video Going*, Electa 1985), Plessi was able to combine nature and artifice, art and technology, giving life to video installations of great evocative impact. Characterized by the decisive presence of natural elements such as water, fire, earth, lightning, sometimes re-proposed on a monumental scale, the artist's works take on the character of an allusion to the temporality and flow of life. Always attentive to the relationship between society and new technologies, Plessi has constantly investigated the possibilities offered by the video medium to express the power of nature. The encounter between the artist and video, in fact, arises from the practical need to identify a medium that perceptively simulate water with a fluid vision without boundaries or contours. Trained in Venice, Plessi has been in dialogue with media-art since the sixties, presenting films, video-tapes, video sculptures and video installations. Since the eighties, the increasingly evident attention to the technological possibilities of mechanical and electronic reproduction it leads the artist's research to reproduce videos on three-dimensional structures often accompanied by natural elements (rock, wood, hay, coal, earth). This has contributed to defining an illusionistic relationship between representation and reality of the element, whose consequence is a total immersion of the user; the video installation, according to Plessi, is in fact an extension of the perceptual space, an opportunity to amplify the visual imagination, but also an opportunity to relate to a real and virtual configuration at the same time. Through the reading and critical analysis of the works that have characterized the rich artistic production of Plessi, the intervention intends to retrace the relationship between the artist and media art, highlighting the innovation brought in the field of digital art. For this contribution will be also proposed an unprecedented interview administered to the artist at his Venetian studio. The vast production of works carried out since the dawn of the advent of new technologies is certainly testimony to a brilliant and multifaceted personality, but also especially in this particular historical moment, useful documentation to understanding the unpredictability and fragility of the natural environment.

Keywords: Fabrizio Plessi, video art, digital art, installation, environment

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Cyprus Vital Signs - A journey to enchantment

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Abstract

The contemporary emergencies that are faced globally and are interweaved between environmental, societal and economic urgencies and tensions, have been in the foreground of European Union's developing strategies and actions for a while now. Amongst the various policies, the EU has invested in novel approaches of investigating such contemporary issues through an interdisciplinary lens. The S+T+ARTs Initiative is one of these initiatives, through which the European Commission focuses on "projects and people that have the potential to make meaningful contributions to this effort (...) and driven by the conviction that science and technology combined with an artistic viewpoint also open valuable perspectives for research and business, through a holistic and human-centered approach".

Within these premises, the S+T+ARTS initiative partnered with CYENS as the Regional S+T+ARTS Centre (RSC) for Cyprus, announcing a series of open calls for art residencies with the theme of "Repairing the Present". The goal was to critically examine the impact of the tourism industry from a scientific, technological, and artistic perspective, while imagining sustainable tourism practices.

Responding to this call, the author submitted a proposal to the CYENS' RSC's focused call titled "SustainingScapes" and address issues related to sustainability tensions that affect Cyprus. A small Mediterranean island, known for its natural beauty and millennial cultures, Cyprus has become a popular destination for tourists from all over the world. In recent years, tourism in Cyprus has become a crucial part of the local economy. However this rapid growth has led to numerous negative environmental impacts.

The author's proposal titled "Cyprus Vital Signs," which emerged as the winning submission, sought to produce a comprehensive body of work raising awareness on the impact of human activities on the island of Cyprus, investigating the socio-environmental repercussions of tourism by inspecting, describing, transforming and narrating data generated by tourist activities. As the residency progressed, what began as a techno-scientific investigation evolved into a broader examination of the evolution of tourism in conjunction with modernity, the systemic nature of the ecological crises, a reassessment of values, an examination of the purpose of travel, and a reconsideration of relationships with nature.

The final work that was exhibited at the MEET center in Milan and the WIP22 show in Nicosia, is composed of video animations conveying the histories and the reality of the

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socio-environmental crisis. Unfolding as a polyptych voyage towards an enchanted reality, the work is based on digital and physical datasets which are analyzed, presented, and interpreted through a somewhat kaleidoscopic gaze. Scavenged by autonomous algorithms, hyperlocal and general datasets left behind by tourists are read as socio-environmental indicators and compiled into a daily report, while an open-source and continuously updated website makes available all the resources that continuously informed the project. The work culminates with a synergistic hi-tech/low-tech printmaking process, shifting the gaze from the deluging instrumentalization and the mega-views of our world towards the landing on an enchanted earth, the restoring of distance between objects, and the awakening to a new future-preserving cosmologies.

Keywords: art digital media tourism ecology environment crisis axiology values enchantment decolonization

Digital practices of alternative economics models in processes of tokenization of art.

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Abstract

The First 5000 Days by Beeple, Bored Apes or Cryptopunks is associated with the opportunity to make or lose quick money by trading mass media digital kitsch aesthetics, still, where new technologies enter the market, artists always find a niche to apply subversive practices, rethinking the idea of commodifying art. Hence, we have works such as NFT archeology by Fred Forest, Constant Dullaart's Unlock, Jennifer and Kevin McCoy's Public Key/Private Key, I am a coin by Kevin Abosh, Ready Made Token by Richard Prince, Hero by Marina Abramovic, or many else. The pop cultural market of NFT functions in opposition to the critical digital art. For the purpose of this distinction, two different terms should be applied: NFT product - a publicly available investment file on the market, and NFT artwork - an art project created in a subversive way, assuming a critique approach to the technology. The process of dematerialization of the artwork is governed here by the conditions of its economic, strictly market mechanisms and "screen-based aesthetics. Colloquially the knowledge about NFT has the status of secret knowledge, everyone has heard something, no one knows what's going on, what is a kind of crypto-marketing. The status of property occurs here as an attribute of class membership: class fluidity combined with Bourdieu's symbolic fluidity. By speculation one can move quickly from the lower class to the middle or dominant class, with the promise and belief that this can happen, what provokes the new field of cultural knowledge production, the belief that a decentralized system serves the libertarian purposes without affecting the global economy and ecology.

One of the biggest criticisms of NFTs is that they are harmful to the environment. Environmental issues - different technology Proof of Work vs. Proof of Stake, using Ethereum vs. Tezos becoming much more important in discussion about the technology. The problem of new colonization in the frame of NFT's production becoming more and more noticeable. Underdeveloped countries of the Global South are colonized by venture capitalists that investing there the most in blockchains mines.

The potential of blockchain in art as a subject of new technologies brings us back to the statement that no technology can liberate us on its own, each will always be a legitimization of the system in which it was created. Hence, we need such a frequent revaluation of outlooks.

The main question of the paper is how new media art reformulates the economic world of speculation in favor of pro-environmental sustainable artworks. As a starting point for analysing this issue, I will take the NFT artworks projects presented this year at documenta, led by the Indonesian Ruangrupa, that as the banner of "lumbung economy" brought together several

^{*}Speaker

pro-environmental projects related to blockchain and cryptocurrencies: BeeCoin (developed by the ZK/U - Center for Art and Urbanistics), CheeseCoin (INLAND), Dayra (The Question of Funding), and Jalar (developed by Gudskul).

Keywords: NFT, subversive strategies, critical art, climate changes, ecology and new media

Media Art Pioneers' Legacy: a powerful thesaurus for the new breed of digital humanists to help forge a sustainable human ecologies

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Abstract

This proposal presents an analytical synthesis of the profiles and creative abilities in a group of media art pioneers, establishing constituent parameters of its legacy for the integral formation within the Digital Humanities.

Creativity and digital communication are among the fundamental skills for innovative education that all curriculum should incorporate. These are recommended by leading institutions worldwide as guiding educational goals for this century. However, the application of these criteria does not always take into account the inclusion of the legacy of media art and its pioneers, as examples for teaching content in primary and secondary education. For instance, sustainable education for this century includes capabilities related to creativity into lifelong learning and the transversal skills acquired by human beings. Also, it is important include the relevance of the imagination and creation (individual or collective), they are also a part of deep learning, along with critical thinking and problem solving, communication, collaboration, global citizenship awareness and personal character formation, as fundamental abilities in education for the innovation contexts in the current millennium.

This paper, which is based on the on-line open repository of the International Training Programme "New Media for Teachers" 2020-22, that integrates the resources of an ongoing research project, in the context of the Cultural Ring Latinamerican-Europe initiatives in Uruguay and their global networks.

The thesaurus of characteristics of these pioneers profiles established from the on-line open repository is not conceived as a catalogue to be taught in a normative way, but as a roadmap in micro and macro formative capabilities that allow to connect in depth the creative areas with the digital world and the people formation. For instance, focusing on issues related to the climate crisis and questions of a sustainable ecology, the cognitive skills of convergence, interconnection, co-creation and imagination; based on the perspective of the theory of cultural transformation, as well as required skills in the Digital Humanities field.

In turn, this proposal intertwines the features needed for a digital humanist, -its current challenges and opportunities-, with these pioneers' profiles and the promising goals of a sustainable education for new generations.

In addition, this investigation bridges the existing gap between the marginality (in the universities, museums, etc) of the field of media art archives for the knowledge of its pioneers, and the current challenges in the recommended goals for an education of the future, exploring the benefits of the field of e-Culture in cross-sectoral co-creative sensitivity key.

In this way, the legacy of the pioneers of media art constitutes a corpus that contributes to a new curricular design in the training of future teachers, which will have an impact on

*Speaker

the training of new breed of digital humanists of society, both locally and globally. These elements of change could contribute to a new society and therefore its necessary to develop a strategy of outreach at local and global levels, starting with the presentation at this 10th International Conference (if this proposal is accepted).

Keywords: media art pioneers, legacy, e, culture, education, sustainability, creativity, co, creation, teachers training education, media art archives

The Mineral Image

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Abstract

Minerals are fundamental components of contemporary technology, but the conceptual ramifications of this have not been explored in depth in relation to digital images. Moreover, digital technology is mythological. It is marketised as being immaterial, ahistorical, clean and existing outside of geography (Vincent Mosco, 2004). In fact, the opposite is true. The mythological signature of technology extends to digital images. These images flow, torrent, stream and crystallise when the screen freezes. The Mineral Image traces a sustained interest in crystals in technology in the work of Suzanne Treister and Trevor Paglen and the artist group made up of Jonathan Kemp, Martin Howse and Ryan Jordan. Through a series of close readings of artworks, the paper shows how visual tropes, structures and symbols are used to reveal digital technology as somatically mineral. Further, the paper argues for the crystal as a conceptual manifestation of thinking critically. Philosophies that draw upon the crystal a form reveal minerals as abstract thinking tools (Walter Benjamin, Gilles Deleuze and Félix Guattari). The paper moves on to consider how crystal-technologies foreground the development of the digital screen (radar) and how, in turn, crystallography itself provided a motivating target for early digital image pioneers (eg. Ivan Sutherland, Ed Catmull, George Romney). In this way, the paper argues for both a recognition of minerals within the material supply chain of media technology as well as being a conceptual structuring force shaping how digital technology is made and what it is made to do.

Theoretically, this paper draws on the work of Donna Haraway who articulated the symbolic value of the crystal in *Crystals, Fabrics and Fields* (1976) and for whom the object became an optical/conceptual model. Further, Karen Barad's work, drawn together in *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (2007) builds upon Haraway's concept of the crystal as the articulation of diffraction. This project is scaffolded by Jussi Parikka's *A Geology of Media* (2015) and Esther Leslie's *Liquid Crystals: The Science and Art of a Fluid Form* (2018). Through linking media histories, contemporary media art histories and discussions of the earthly digital materiality, this paper offers a way of seeing digital images as mineral objects. Positioned in this way, the environmental comes into focus and the image is no longer bifurcated from the material props that support it but is analysed as a material/visual composite. Artworks are shown here to function as analytical tools through which to reveal the material structure of digital technology. Here, an environmental approach to digital materiality supports a media art historical analysis.

Keywords: media art, environment, mineral, Donna Haraway, Karen Barad, Geology, Jussi Parikka, Esther Leslie, matter, materiality, crystals, digital images

*Speaker

Media and Material in Hito Steyerl's Appropriation of Leonardo da Vinci's Submarine"

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Abstract

The work of German multimedia artist and theorist Hito Steyerl is characterized by the employment of the most up-to-date medium. Departing from super 8 films in the late eighties, Steyerl nowadays generates the images of her works with artificial intelligence, so-called *conditional Generative Adversarial Networks* (cGANS).

In one of Steyerl's latest works, *Leonardo's Submarine*, a site-specific commission for the 58th Venice Biennial, she constructs a narrative about art, technology, and ethics, based on a rough, technical sketch of a submarine by Leonardo da Vinci. In this three-channel video installation, which has hardly been taken up by researchers, Steyerl refers to Foglio 881 *recto* from Leonardo's Codex Atlanticus and transfers its drawings into the contemporary medium of three large-scale curved screens.

We like to take it for granted, states Leonardo scholar Martin Kemp, that the graphic means Leonardo employs in his manuscripts are the most logical way to represent all different kinds of movement. However, solely retrospectively, they appear obvious because they have evolved – through Leonardo – into standardized modi of depicting movement. Kemp emphasizes that Leonardos iconic strategies, he names 11 categories of movement, are only superseded by the emergence of the moving image itself.

In my paper, I reconstruct Hito Steyerl's approach to media and her aesthetic strategies in the field of the so-called post-digital art. Departing from Kemp's argument (that Leonardo's ways to depict movement were only replaced by the moving image) Steyerl's implementations of Leonardo's drawings into the moving image itself will be discussed. In this case study I will examine how Steyerl, certainly a pioneer of media art, approaches Leonardo's groundbreaking usage of the medium treatises and his graphic means. The rough and pixelated moving images of Steyerl's video-installation are always in motion, never still. Their genesis through cGANS will be explained and it will become apparent that Steyerl's use of technology relates metaphorically to the content of her artworks. Surprisingly, Hito Steyerl does not set Leonardo's Submarine in motion. She does not complete the technical sketches, nor adds any help to its understanding. Leonardo's drawings are derived from their original context, duplicated and rotated, but still, they are treated as ideas, as deciphered ingenious inventions. Even though Leonardo's submarine migrates from the medium of the treatises into the medium of AI-powered video-installation, it remains fragmented and represents rather the idea of genius. It cultivates an aura of mystery that is inherent to the myth of Leonardo. Lastly it will be shown how Steyerl locates Leonardo's drawings in the representational conventions of popular imagery and connects them to an iconography and a jargon of progress.

*Speaker

Keywords: Hito steyerl, Leonardo, Submarine, Treatises, AI, cGAN, artistic strategies, Movement, Moving Image

They said it couldn't be done: remotely installing a video art history exhibition in China during the Covid19 pandemic

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Abstract

Re-presenting and recreating historic video artworks from the 1960s to the early 1990s propagates complex challenges to actualise the works today and pushes research into unforeseen directions and territories. An examination of the exhibition *Refocusing on the Medium: The Rise of East Asia Video Art* (2020-2022) sheds light on the processes and strategies used to recreate more than twenty-five key pioneer CCTV video installations and video sculptures by eighteen artists from Japan, Korea, China, Hong Kong and Taiwan, including Katsuhiro Yamaguchi (1928–2018), Nam June Paik (1932–2006), Yoko Ono (b. 1933), Kim Kulim (b. 1936), Shigeko Kubota (1937–2015), Takahiko Iimura (1937–2022), Park Hyunki (1942–2000), Keigo Yamamoto (b. 1936), Soun-Gui Kim (b. 1946), Zhang Peili (b. 1957) Wang Gongxin (b. 1960) and others. The exhibition is the first time a dedicated examination of video installations from East Asia has been curated. Open from 27.12.2020 - 21.3.2021 at the OCAT Shanghai Art Museum the exhibition then toured with additional artists and works to Beijing Minsheng Art Museum from 5.3.22 - 8.5.2022.

The exhibition is a case study not only in a discussion of the hardware and software adaptations and challenges working with artists both living and deceased, but also the further complexity and new hybrid curatorial strategies necessary to achieve the installation caused by the COVID19 pandemic that meant all communication regarding the exhibition's installation needed to be coordinated and directed remotely from Brisbane Australia. As a PhD by exhibition and thesis incorporating curatorial strategies and creative processes, the project's outcomes recognized both the additional knowledge benchmarked and communicated, and acknowledged the unpredictable character of the new research generated. The necessity of remotely recreating the artworks and the actuality of constructing the exhibition in Shanghai and Beijing provided contrasting situations to document and test methodologies that would not have been formalized without the pandemic restrictions. Behind the scenes during the installation in Shanghai <https://vimeo.com/494735890>

Documentation by news media at the installation in Beijing <https://vimeo.com/691701584>

Keywords: video art, video installation, video sculpture, East Asia, post medium, medium specificity, global art, East Asian video art

^{*}Speaker

Calories for bytes! Earn your way through the internet

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Abstract

This contribution presents browser developments in the artistic realm but glances also at parallel developments from the domain of software engineering. In the early days – predating normed web browsers we mainly use today – a fascinating wealth of ideas emerged from both the cultural and industrial sectors. How do web browser conceptions and applications look like that explicitly go 'beyond digital' (Negroponte 1998) and that dismiss imagining the internet users as sitting at the desk? The possibility of exploring the world from an armchair is an old promise having a long tradition that was broadly brought to one's living room with the mass media technology. Some facets of that scopic regime were inherited also for the world wide web. Several early web browser prototypes explicitly tried to mimic the TV setup including a relaxing zapping attitude and a leaning back. Such aspects of remediation (Bolter/Grusin 1999) can be identified also in another set of web browsers that move towards the other extreme and introduce explicit physical activity in browsing. In Jonah Brucker-Cohen's "Crank The Web" (2001) you could negotiate arm muscle power for bandwidth. With the "EnergyBrowser" (2005) by Satoshi Nakamura and colleagues, the deal was to burn calories for bytes by running on a treadmill. Another set of works emphasizes the seemingly unavoidable dynamics such as the live heartbeat of a remote user (cf. Brett Stiller's "BPM Browser", c. 2016), or acknowledges the often-unnoticed long-distance performance of micro-movements of fingers (cf. Sarah Rothberg & Yotam Mann's "Scroll-O-Meter", 2015). The contribution examines how bodily activity is discouraged or rewarded in each case and what that meant for the design of the browser interface. In each case, the users are activated in a certain way, and the artists/developers pursue original aims and find solutions for that by proposing specific forms of queering software functions with physical activities. Overall, in a media archaeological approach, the research contributes to excavating the richness of approaches that have been proposed for online navigation.

Keywords: Browser Art, remediation, queering functionalities, navigation, user conception, internet, physical activity

*Speaker

Refocusing on the Medium: Video Art History Recalibrated via East Asia

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Abstract

The persistently Western-centric institution of art history has largely ignored the global aesthetic that can be found in early East Asia video art. A sharper focus on the uniquely experimental nature of the video medium gives reason for a recalibration of thinking and reassessment of the contribution that artists from East Asia have made to a still contested history.

Exhibitions exploring the histories of video art have featured prominently across Asia over the past decade. The cumulative results have enhanced detail and depth of specific national histories and substantially expanded a Western history of video art. These exhibitions and their accompanying research have exposed scholarly accounts of experimental practice and international exchange that provoke a more radical review of the way video art is considered. The rise of video art from East Asia is compelling because artists globally were responding to and experimenting with the same technological concepts with little or no precedent in disparate cultural settings and geographies. As a form of new technology, video as an art practice, had no established cultural traditions, established history, recognised conventions or specific national claim, which credibly makes it the first truly global contemporary art medium. As art historian and theorist Hans Belting (2009) asserts, new media art was global in a way that painting or sculpture had never been, professing that it removed not only geographical, but also cultural distance between the centre and the periphery. Artists from East Asia soon took up the culturally non-specific medium to enter new points of exchange and equally complex trans-regional and transnational networks.

As a key figure in the rise of video art in East Asia, Japanese artist Katsuhiro Yamaguchi (1928-2018) made early experiments leveraging art and science to create fantastic robotic sculptures and revolutionary spatial installations, which repositioned and integrated the audience through newly invented technologies, such as the Sony Portapak portable video recorder. Yamaguchi set out to transform the Velázquez painting *Las Meninas* (1656) from a physical object in the museum in Spain, to become an information object that has dynamic living characteristics, capable of being transported, duplicated, and reanimated in real time with the viewers integration and movement around the facsimile painting. A close analysis of Yamaguchi's interactive CCTV installation *Las Meninas* (1974-75) demonstrates both a preoccupation with the medium specific qualities of new video in the context of post medium contemporary global art while simultaneously demonstrating the contemporaneous experiments with video art occurring globally that requires further consideration. An attitudinal recalibration of video art history opens a compelling discussion of global post-medium practice through the medium of video art rising from East Asia.

*Speaker

Keywords: video art, East Asia, global art, Japanese video art, medium specific, global art

The Point Cloud Aesthetic: Defining a new visual language in media art

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Abstract

The development of remote sensing technologies, such as LiDAR and photogrammetry, accompanied by the exponential growth of easy-to-use 3D scanning applications and associated post-processing software, have made point cloud datasets accessible to a widening range of artists, designers, and creative technologists. This growth in interest and access has spawned the emergence of a new digital art medium. This paper offers an analysis of significant artworks that help define this Point Cloud Aesthetic as a distinctive visual language while situating these contemporary artworks historically and contextually. A brief introduction will explain key technologies in scientific and technical terms before outlining the historical progression of more recent technological advancements. This analysis will address the visual similarity that point cloud-derived imagery has with Pointillism, noting their shared reliance upon the science of optics that informs both techniques. An aesthetic analysis of selected artworks will then be undertaken that focuses upon four key elements used to distinguish their visual language: (i) subject matter (i.e., derived from a scanned 3D object or environment of the real world), (ii) visual transparency (i.e., the dissolution of objects and environments into data structures), (iii) ambiguity (i.e., technical artefacts, ‘glitches’ or ‘mistakes’ generated by the scanning process itself), and finally (iv) technology-driven post-processing (i.e., data manipulated into expressive or representational forms as moving image, generative visualisation, virtual reality). Through a detailed examination of both the technical process and visual systems generated by scanning technologies, this paper argues that, through a specific aesthetic, they mark a transformation into a new digital art medium and offer a more challenging way of looking at Point Cloud-derived artworks.

Keywords: digital art medium, remote sensing, photogrammetry, visual language, point clouds

*Speaker

Re-Imagining the Climate Emergency Using AI Visualisation

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Abstract

Media art is a creative catalyst for imagining the world to foster actionable understanding of the climate emergency. It has delivered benchmark evocations of fluctuating ecosystems, life-threatening wildfires and visions of life after ecological disruption. Seminal works such as ScanLAB's *Framerate: Pulse of the Earth* (2022), Hito Steyerl's *This is the Future* (2019), David Claerbout's *Wildfire (meditation on fire)* (2019/20), Uta Koegelsberger's *Cull* (2020) or Pierre Huyghe's *After A Life Ahead* (2017) connect in powerful ways to earlier ecological media art, such as Doug Aitken's *New Ocean* (2001) or D-Fuse's *Small Global* (2005). These converge aesthetic, technological and scientific methodologies to examine the complex processes underpinning the impact of global warming. Bringing into view the self-organising properties of ecosystems and the effects of human interventions, these artists have utilised scientific knowledge in spatially enveloping works that open new pathways for enhanced sensory and cultural engagement with these impacts. They transform the climate crisis from the abstract metrics of science into tangible visceral experiences.

The proposed contribution will chart the artistic use of computational and scientific insights in major 21st Century media art to expand the aesthetic imaginary of public discourse and engagement with climate change. It will survey the diversity of approaches and critically probe their contributions and limitations, considering how advances in media art have unlocked creative capabilities and expanded scientific practice.

Applying those insights, the authors will then outline new media artistic research that is currently being developed at The University of New South Wales (Australia), funded through a five-year Australian Research Council's Laureate grant. They will address the challenge of applying collaborative machine learning and AI aesthetics to visualising the unpredictable and autonomous interactions between populations and constantly fluctuating and interwoven extreme weather event variables, such as violent firestorm embers that can spawn new fire fronts many kilometres away within minutes and subsequent lightening laden weather systems. This research is especially pressing as the scope and scale of these unforeseen interactions are intensifying and surpassing commonly held conceptual paradigms, imaginary

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boundaries and cultural expectations. Assembling a team of Australian, European and US artists, scientists, technologists and theorists, the work explores the unforeseen nature of extreme weather interactions with users through 1:1 scale scenographies and evolving scenarios co-created by users and AI. Drawing on historical and real-time data, it provides an opportunity to digitally vivify and dialogically interact with climate systems in a safe virtual world where the autonomous behavioural transaction of climate and human actors are dramatised. Experimentally piloting the transformative life and habitat saving integration of recent artistic and scientific advances, the work explores how dynamically previewing the unpredictable interaction between extreme events and communities can facilitate a practical aesthetic of anticipation and preparation. This ability to viscerally imagine probabilities will make it possible to compellingly convey the range of potential scenarios flowing from breaching the totemic 1.5°C climate target, optimising pre-emptive decision making – re-imagining the future rather than observing the catastrophic aftermath.

Keywords: 21st Century, Artificial Intelligence, Climate Emergency, Contemporary Art, Extreme Weather, Immersive Aesthetics, Interactive Media, Machine Learning, Virtual Reality

Song of the Goddess: Ellen Pau and Media Art in Hong Kong (1980s to 2000s)

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Abstract

Elaine W. NG (HK)
Academy of Visual Arts, Hong Kong Baptist University

Song of the Goddess: Ellen Pau and Media Art in Hong Kong (1980s to 2000s)

Ellen Pau (1961-) was instrumental in the development of media art in Hong Kong. As a self-taught, openly queer female artist, Pau embraced the latest technology-from Super 8 to high res digital video-in her artistic practice. With a small group of like-minded creatives, she co-founded Videotage in 1986, the first and longest running artist-run nonprofit organization in Greater China dedicated to film, video, and new media. In doing so, Pau inspired Hong Kong artists exploring experimental film, video art, and video installations, mediums that were initially overlooked at the prestigious fine art degree program at The Chinese University of Hong Kong, where ink painting and other classical Chinese art forms prevailed. Through Videotage, Pau invited artists and curators active in the international media art world to participate in artist residencies, workshops, and exhibition programs, including American video artist Gary Hill, museum curator Barbara London, and Taiwanese internet artist Shu Lea Chaeng, at the same time providing an alternative learning and exhibition platform to young Hong Kong artists in the 1990s and early 2000s. In 1996, Pau established the Microwave International New Media Arts Festival-one of the only events in Asia dedicated to the mix of art and technology. Furthermore, Pau has been a role model for women and LGBTQ artists in socially conservative Hong Kong. In the 1980s and 1990s, while her contemporaries experimented with narrative and technique or reflected on the hand-over of Hong Kong to China, Pau was boldly exploring gender identity and queer love in works such as *Video Vogue* (1992) and *Song of the Goddess* (1992). This paper will study Ellen Pau's oeuvre from the 1980s to present day, highlighting the impact of her art and her advocacy for the development of alternative cinema, experimental art forms, and new media art in postcolonial, transitional Hong Kong.

Keywords: Hong Kong, Greater China, media art history, LGBTQ, feminism, experimental film, video art, new media art

*Speaker

Testing the Dandi Line - A Look at Livestreaming as a Medium for Interactive Art through a Pandemic and Beyond

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Abstract

Livestreaming is a medium that fits squarely into the lineage of digital media and interactive art. The huge presence of free and open-source tooling from online developer communities provides artists the ability to create entire broadcasts without specialized training or knowledge, using affordable computer hardware they already own. The tools are also versatile enough to create unique content combining media such as sound, video, interactivity and performance into one unified multisensory experience for audiences to enjoy from the ease and comfort of their homes. This format can foster the growth of unique communities that transcend geographic and cultural boundaries, audiences intimately connecting with creators and each other alike through shared experience and real-time communication unlike any other platform in the digital realm. These communities in large part were catalyzed by the emergence of the COVID-19 pandemic, when entire societies were forced into quarantine with only the internet to facilitate their social interactions and media consumption.

It was in this moment where Dandilion Wind Opaine and Matija Erceg pioneered in the migration of artists into the livestream space through their groundbreaking project "DandiDoesIt". This series follows the "Dandi Line" of clone products in a futuristic capitalist dystopia run by "The Company", where employee "testers" (the audience) gather to evaluate each new Dandi according to Company guidelines. The show (which Dandi and Matija describe as a "Live Performance Video Game" or LPVG) includes an approachable aesthetic that combines science fiction and 1980s jazzercise, with a cast of recurring characters and ongoing story arcs that invite audiences to actively participate and take part in the performance itself while also reflecting on the depth of the show's satire, which conveys multifaceted and profound commentary on the world and society in which we live.

This paper will demonstrate how livestreaming has yet to be sufficiently recognized in the broader history of digital art scholarship. Its potential as an effective medium for art will be made evident by deeply examining DandiDoesIt as a case study, including a short survey of their contemporaries in the interactive audiovisual livestreaming space. Then, the realization of that potential will be made evident by positioning these project examples into the context of not only the pandemic, but also into our broader contemporary movements of society, technology, politics and art in which they continue to reside.

Keywords: interaction, livestreaming, emerging technology, audiovisual, dandidoesit, pandemic, covid19

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Men of Letters: Perspectives on Multi-Sensory Environments in the Hall-McLuhan Correspondence 1961 to 1977

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Abstract

This paper introduces critical elements in the substantial, albeit mostly neglected and unpublished, correspondence between cultural anthropologist Edward T. Hall and media theorist Marshall McLuhan related to artistic practice with emerging media technologies in the 1960s. Their correspondence started in 1961 and lasted for more than 15 years until 1977, comprising of 137 letters, and accounting for both Hall and McLuhan's largest correspondence with a single person outside the immediate family. This compendium of thoughtful discussions on a large variety of topics has received only little attention in the critical discourse on Media.

The paper contextualises Hall and McLuhan's correspondence within the broader theoretical discourses and artistic practices surrounding systems theory and media technology. It introduces Hall's conceptual framework concerned with the influence of different cultural systems on verbal and non-verbal communication patterns and McLuhan's proto-postmodern media and communication theory that emphasises the complex interrelation between media technologies and human culture. The paper specifically highlights intersections between Hall and McLuhan's theoretical framework related to concepts of indeterminism, systems theory and cybernetics in technology-based, kinesthetic, multi-sensory environments in the 1960s, with particular focuses on overlapping conceptual approaches towards the interrelation between the individual, the socio-cultural environment, and the emerging media-technological ecosystem.

The development of cybernetics in the mid-20th century significantly impacted the fields of communication and media, technology and art. Both Hall and McLuhan were substantially influenced by the concepts of cybernetics and systems theory; their correspondence brings to light the significant impact of cybernetic and systems thinking on their respective areas of study and provides insight into ways in which these ideas influenced their views on technology, communication, and art. This cybernetic approach was highly valued in the 1960s by artists experimenting with media technology in music, performances and happenings. It contributed to a cybernetic vision that imagined material reality as an information system. It provided artists with a corresponding theoretical framework that anticipated essential principles of a postmodern theoretical approach to an artistic practice that challenged traditional modernist notions of artistic practice, works of art, and artistic authorship.

The paper argues that the application of indeterminist, cybernetic, and system theoretical approaches in Hall and McLuhan's respective research areas signifies an essential element for the definition of a broader conceptual framework for artistic practice with media technology

*Speaker

that reverberated soundly with the emerging analogue and digital media art scene in the countercultural avant-garde art scene of the 1960s.

Keywords: Media Art History, Media Theory, Cultural Anthropology, Cybernetics, Systems Theory, Interactive Media Art

Messages to the Future

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Abstract

Juha van Ingen's sculptural installation 1996 (Gallery Artina, Helsinki, 1995) consisted of unopened packs of VHS cassettes stacked together to form a minimalist sculpture installation, conceptualizing the duration of one year into one spatial object. The virtual duration of the work is $365 \times 24 = 8760$ hours. The "embalming" of the period of one year renders the duration as "mummified", or like a virtual break in time. The work commented the human tendency of building memorials and founding museums, where the fragments of recorded images from a lost time are collected, stored and exhibited. It is a work of the future at the moment of the making, a silent virtual resource of all the alternative directions, choices, developments that the events during the year 1996 could have followed, a ghostlike branch of bifurcated time. The artist goes much further in his most important work so far. The eternal GIF animation AS Long As Possible (ASLAP) has 48 140 288 frames which change in ca. 65 second intervals. This makes the total duration close to 1000 years possible for the animation. "Because the work has a loop function, the animation is intended to play for ever", says van Ingen. ASLAP can be seen as a reminder of the project in the late 1970s, when NASA sent two space probes, Voyager 1 and 2, to deep space. They were equipped with recorded golden laser discs containing images, sounds and symbols and greetings relating to life on Earth. Van Ingen's one-channel video Hello everybody (2018) consists of a one-shot image depicting blossoming cherry trees and people of different age underneath them spending cheerful and freewheeling time in a garden. The image is shot with a hand-held mobile phone camera which moves around slowly, engaging the viewer into fragility and happiness of the passing moment. The texts that you would expect to find from greeting cards appear over the image: "Good health to you now and forever." "Greetings to you, whoever you are. We come in friendship to those who are friends." "Greetings to our friends in the stars. We wish that we will meet you someday." In the end of the video van Ingen reveals that the texts are English translations of the greetings spoken in different languages and sent in the Voyagers to space. The Voyagers will fall silent around 2030, once their power sources can't produce any more energy for the equipment. Although the golden records in the Voyagers will remain functional for "at least a billion years" before "succumbing to erosion from micrometeorites and cosmic rays", the equipment to play them will be lost. ASLAP, the GIF animation from the dawn of the digital era is maintained by two art museums so far. It is relatively a similar kind of message, but maybe this time just from humankind for itself? With it van Ingen is asking a serious question about the changing of the technologies over time.

Keywords: obsolete media, digital media, media art maintenance, time, art & science, communication

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The future of human reproduction in bioart

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Abstract

The paper will discuss artworks of bioart and speculative design addressing the future of human reproduction in precarious times. A telling example is Japanese artist Ai Hasegawa's *I Wanna Deliver a Dolphin/I Wanna Deliver a Shark*. Hasegawa's project involves accommodation of the female womb to deliver endangered species or, alternatively, to carry the same as edible animals in times of food shortage.

Emerging biotechnologies challenge the basic understanding of nature by transforming nature and natural processes and blurring the line between biology and technology. Contemporary bioart and speculative design stage experiments and encounters of technoscience and human biology, thus experiments with the very 'facts of life'. Cloning, gene editing, and reprogramming of cells are examples of new biotechnologies that undermine the idea of human bodies and reproduction as products of nature, feeding uncertainty as to the biological future of humankind but paradoxically also belief in new medical technologies. The sci-art works to be presented involve critical perspectives on technoscience of assisted reproduction including surrogacy and genetic engineering, but still, they do not necessarily configure nature as unambiguously threatened. There are artworks that expand the vision of human reproduction by surprising and mind-expanding figurations exploring the potentiality of emerging biotechnologies based on an understanding of nature as dynamic, responsive, and continually undergoing change. Can we imagine a shift whereby emerging biotechnologies do not associate to threatening natural processes but rather aim towards opening the mind to new perspectives on techno-futures and techno-natures?

Keywords: bioart, speculative design, techno, natures, human reproduction, assisted reproductive technology

*Speaker

Genetics and the Media Art History

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Abstract

Genetics and the Media Art History

In the context of the Sixth Extinction of Species, biological sciences have directly addressed the field of image sciences in light of the extended debate on whether images-only should be used for taxonomy of biological species (and specimens abandoned). However, this only applies to databases. Rarely has art been discussed in the context of the new algorithmic computation of genetic heritage. Yet, in the field of genetic computation, however, media art history sources such as early algorithmic art, EvoArt, and generative art are rarely considered.

The concept that biological and technological systems operate on a similar basis has bolstered system theory, particularly Maturana and Varela's 2nd wave cybernetics. The introduction of computers and the subsequent accumulation of incalculable data have spawned a parallel system of memory and thought. Genetic computation is predicated on the notion that any autonomous system can behave biologically and engage in *technoscenosis*, as proposed by Boris Kudrin in the 1960s, the notion that the code of life contains executable instructions. On the basis of this agreement, transhumanists advocate numerous technophilic ideas, such as the notion that life can be uploaded into machines, as Ray Kurzweil argued.

Richard Dawkins (1986) was the first to describe *Biomorph Land*, a program that could generate new generations of artificial life based on the Darwinian model of natural selection, in his book *The Blind Watchmaker*. Since then, a number of A-life artists have utilized and expanded the program (Whitelaw 2004). Authors such as Tatsuo Unemi and Peter Kleiweig have imposed a media metaphysics on evolutionary art systems and art of artificial evolution based on the genetic evolution model. Genetic algorithms calculate genotype mutations and their relationship to phenotype under specific fitness functions (or environments) based on the premise that the process of biological evolution can be solved through computation (Romero and Machado 2007). Phenotype image blending art has been highly explored by Nancy Burson and other artists.

Today, artificial intelligence facilitates our comprehension of the self-organization principle in biology, phylogenetic evolution, embryogenesis and metamorphosis, brain development, and cell formation (Boden 2016, 121). Also, genetic algorithms, also known as evolutionary programming or computing (EC), calculate genotype mutations and their relationship to phenotype under a particular fitness function. This is based on the premise that the process of biological evolution can be solved by computation. Today, neural network implementations are more prevalent than genetic algorithm (GA) implementations. Training neural networks in DNA mining and editing is one of the most complex data mining tasks

*Speaker

imaginable. One of these networks, CRISPR/Cas9 (Clustered Regularly Interspaced Short Palindromic Repeats), is used to edit DNA by sequencing it in two parts - an enzyme that functions as DNA scissors and guide RNA.

But some new models can be considered in artworks of Anna Ridler, Jake Elwes, Daniel Heiss, and Philip Wang, among others. This presentation examines some of the most important pillars of media art history that were instrumental in the formation of the field of photogenetics (Peraica 2021).

Keywords: genetic memory, genetic art, generic art, EvoArt

Low Fi + Hi Tech: On Fluxus's Ambivalent Embrace of Technology

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Abstract

The Fluxus (non-)movement in art featured many pathbreaking figures in the history of media arts. This would include, but not be limited to, such figures as writer/publisher Dick Higgins and his theory of "intermedia" and its residual influence, or Nam June Paik with his video art experiments, Alison Knowles and her computer assisted poems, along with other artists such as Shigeo Kubota and Yoko Ono and their work with moving image and experimental sound. This paper seeks to trace however the tensions between a loose affiliation of artists who sought to disrupt both quotidian life and gallery art, but had multiple, often conflicting and contradictory attitudes towards technological innovation. This also manifested itself in widely varied texts, events, works, exhibitions, and sharp differences in the later historiography of Fluxus. This is the contradictory feast that is offered up to the Fluxus scholar in the current moment. Despite all the technological innovations that may be attributed to Fluxus artworks, its members often tended towards low fi, rapidly executed, easily reproduced cultural production. In the earliest Fluxus events, they retained a rather classic avant-garde notion of shocking the bourgeoisie yet at the same time a much more quotidian, stripped down, grass roots rather than high art notion of what an artwork could be, as the event scores tended towards outlining a basic action that could be replicated by anyone: pouring water, tearing paper, shaving a head, preparing food, shouting, or destroying a musical instrument. These tensions and contradictions I would argue regarding low tech / high tech are not merely circumstantial but core to the very contradictory nature of Fluxus itself.

Keywords: performance, avant garde, sixties, Fluxus, moving image, early computer art, intermedia

*Speaker

Moving memories, or the paradoxes of preserving processes: Designing an archive of French digital language art

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Abstract

Literary scholars are mostly not used to worrying about the nature or ontological status of the objects they are studying and how they will survive. But with the explosion of digital modes of writing, the face of literature is changing, and we cannot continue ignoring the emerging forms of (creative) writing. These often raise similar issues to other kinds of media art. The boundaries fade, both between types of "content" and around "individual works", which become reticular spaces evolving in time. The process might matter more than the result, the "content" might be a potentially infinite production, while the "receiver" might (need to) intervene and become part of the creative process. Authors also often affirm the ephemeral nature of their work. From *alire*, the first digital literary journal (1989-2010) to today's social media and AI-based creative writing practices, the difficulties facing research and teaching on this growing area of contemporary culture are numerous.

The first one is access, now and in the future, which is the basis for this production to be able to remain part of our collective memory. But trying to keep an "object" that is *not* one or that is not *one* comes with its own questions and paradoxes. In this paper, I propose to discuss three of these by drawing on theories and models proposed by French theorists, while keeping the concrete objective of defining the key parameters of an ideal archive-to-be of French digital language art:

Do we?

Do we *have to* or want to keep artworks that acknowledge their ephemeral nature in their very design or paratexts? Is it not a violence to their identity if we do? Should we recognize and perhaps renounce our "archive fever" (Jacques Derrida)? But even if we do, don't we still need to make sure that there are at least some traces left of their past existence? What place can we give to the "presence of lost works" (Judith Schlanger)?

What?

If the "object" is no longer contained in a directly readable physical medium, what exactly should we keep? Philippe Bootz proposes a Spinozist approach to the identity of digital artworks, consisting in three parts: an extensive part, a "singular essence", and a relationship between these two. This model allows us to distinguish between the changing material aspects, and an invisible essence that has only a virtual existence. The key would then be to focus on maintaining the link between the two. But

^{*}Speaker

How?

Bruno Bachimont argues that memory does not mean keeping things intact, but a "permanent reinvention of the content". He points out that "the definition of the non variable elements constituting the identity of a work (...) is always temporary". The archives would therefore need to be both sufficiently concrete and open to provide a basis and space for reinvention. Bootz developed a model of "reading machines", which would enable different kinds of access and rereading. Is this this model implementable? Might it work also for other digital arts? Let's see what it would take.

Keywords: digital literature, digital language art, French pioneers, digital archives, digital preservation

Media Art and Technological Control, a history of hybridization

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Abstract

In the 21st century, especially after 9/11, physical and virtual space are gradually being shielded. Nowadays, especially after the hasty digitalization during the pandemic, users ignore critical voices about the fate of their data and submit to the rules imposed by large multinationals. Faced with such a complex panorama, a new line of work manifests itself in media art, which transforms the classical vision of the panopticon into a transparent approach to the real impact of Internet-centrism (Morozov, 2012). These theories are revised and updated in texts such as *The age of Surveillance Capitalism* (Zuboff, 2020) or in *Atlas of anomalous AI* in the face of the change of paradigms. If the former focus on demonstrating how governments rely on technological multinationals to stay in power and on exposing the decline of our privacy, Zuboff and Crawford openly criticize how algorithms and AI are generated and used to maintain this system.

The proliferation of these factors has given rise to a panorama in which it is increasingly difficult to produce and access critical proposals in media art. The control of tools and the systems of diffusion hinder the visibility of pieces with high critical content on the surveillance society. Despite this, multidisciplinary creators such as Danja Vasiliev, Trevor Paglen or Paolo Cirio successfully stand out with their proposals that criticize the individual and collective consequences of the lack of ethics regarding the generalized control of technology. The impact of AI, Deep Learning or the proliferation of biometrics are among the common points in their works.

This current positioning is not new. Since the seventies, there has been a special interest, on the part of creators, in confronting and offering their personal vision of the real consequences, methodologies and new uses of technified recording and monitoring systems, taking the baton from the participatory experiences carried out since the end of the sixties and the beginning of the seventies. Some of the most significant video pieces of this stage exemplify how a spectator is integrated and invited to participate in an attempt to raise awareness of the hidden possibilities offered by video surveillance from a conscious and innovative artistic perspective, as in *Wype Cicle* (1969) by Frank Gillette, *Video Surveillance Piece Public Room, Private Room* (1969-1970) by Bruce Nauman. *Der Riese* (1983), by Michael Klier, is one of the works that best represents the criticism of these mechanisms of substitution of the man behind the camera.

The pioneers of net.art also criticize the technological registry and its impact on privacy. Muntadas or Julia Sher are two of the artists who most clearly describe the ambivalence of the Net: a means of information and, at the same time, of censorship. Both advocate for criticism and collective action, as defended by Mattelart and Lyon (Lyon, 1995; Mattelart, 2009) A situation that contrasts with the prevailing digital individualism of today.

*Speaker

Keywords: media art, control, hybridization, surveillance, history

Curating the Future: Artists and other interdisciplinary contributors in media art as archivists

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Abstract

Art making that takes advantage of and coincides with our technologically charged world's affordances has become an integral part of cultural expression and artistic criticality. Such artworks, falling in the premises of the New Media Art genre, use electronic, digital, web and virtual technologies, as well as biological materials, resulting to complex and multi-layered artefacts. The importance of developing effective and reflexive safeguarding methods for new media artworks grows as rapidly as technology changes and becomes obsolete. One key aspect of the ongoing efforts for documenting and preserving such artworks, is the role of artists and other interdisciplinary contributors, like scientists and technologists involved in this field, and their increasingly prominent and active role to archiving new media art. This paper explores the potential of including artists and interdisciplinary contributors in new media artworks, and specifically art & technology projects, in the development of a reflexive digital archival resource. Taking into account that art & technology projects inherently carry multiple conceptual, technical, technological and disciplinary layers, the participation and contribution of all actors in the production of such artworks is crucial in formulating an all-encompassing archival resource. Additionally, we argue that such an archive's structure, content and indexing have the potential to serve multiple disciplines and purposes, incentivising each actor's short- and long-term involvement in supporting such a resource.

To support this, we focus on art & technology projects' creators that have been hosted in the CYENS Centre of Excellence, through the dedicated artist residency and exhibition programs held in the past two years. Tapping into the creative, technical and archival process of individual creators in such projects, we proceed with inquiries about their needs and possible contributions to such an archive. Additionally, we explore how they view the potential of having access to an open archival framework aiming to address and contribute to both creative and scientific networks. Furthering this investigation, we draw examples from established international new media art archives and initiatives to contextualise the challenges and opportunities in archiving art & technology activities. Moreover, the role of artists in comprising archival logs for these initiatives is also investigated, aligning the presented paradigms and experiences to the on-going efforts towards the effective safeguarding of art & technology synergies through archival asset preservation.

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Overall, this paper aims to contribute to the development of collaborative practices, trans-disciplinary synergies, and infrastructures in the digital, aimed at the reflexive archiving of art & technology synergies. Our goal is to communicate our research findings on how new media art can be preserved over time through dynamic, and eventually interoperable digital archiving practices, which recognize and employ the value of artists and other interdisciplinary contributors in the preservation of this genre of art.

Keywords: New media art, art & technology, documentation, preservation, archive, artists, interdisciplinary contributors

Conversation Through Light

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Abstract

In 1953, 25-year-old Gordon Pask presented a puppet play entitled *Moon Music*. On stage, a pianist performed alongside an autonomous machine that listened to and learned from the music, and replied to the musician with patterns of colored light. This machine was *Musicolour*, an electronic computer designed to "function as a dummy partner" to musicians and to "entrain and couple (them) into the system." With *Musicolour*, Pask realized an artistic-scientific experiment: he used his expertise in electronics and theater lighting to simulate processes of human learning. Indeed, Pask was an artistic and scientific polymath who would later become a leading figure of the cybernetic movement.

What is then *Musicolour*? In the history of cybernetics, it is "a computer of revolutionary design (that) has, quite literally, all the properties of a living organism." It is a machine that enacts Pask's model of cognition and prefigures his *conversation theory* (1975).

But for the arts, *Musicolour* "has yet to be recognized as the first interactive artwork" (Penny 2017). It is a pioneering example of a novel aesthetics of interaction that Pask will further investigate in a *Proposal for a Cybernetic Theater* (1964), and with the autonomous sculpture *Colloquy for Mobile* (1968) commissioned by Jasia Reichardt for her groundbreaking exhibition *Cybernetic Serendipity*.

"Conversation through light" discusses Pask's *Musicolour*, a pioneering interactive artwork that realizes the dreams of machine autonomy of pre-WWII artists and sets the stage for the development of computation-based media art practices.

First, this presentation contextualizes the work of Pask in an artistic history that entangles the medium of light with the crafting of machine-based behaviors. Pask is part of a century-long lineage of artists including the likes of Thomas Wilfred, László Moholy-Nagy, Frank Malina, and more recently Memo Akten who sought to harness the expressive potential of electromechanical, electronic, and computing technologies in the creation of generative and interactive light works. Little discussed in theoretical and historical literature, this sustained practice of machine-based light creation remains to be studied.

Second, this presentation discusses Pask's cybernetic principles of human-machine interaction. His model, or "set of metaphors" (Agree 1994), includes terms such as "partner," "entrain," "talk," "train," and "reply" to characterize a model of shared control distributed between co-operating entities. As early as the 1950s, Pask's principle of "conversation" offers to the arts a novel conception of human-machine performance that is all the more pertinent in view of the contemporary development of artificial intelligence and machine learning practices.

*Speaker

Keywords: cybernetics, light, machine, learning, performance, human, machine cooperation, computing

Fermenting Data, or what does it mean for data to have a life? (experiments in Curating Data)

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Abstract

Fermenting Data is a research and curatorial project to explore relations between management of data and management of life. It is organised through different curatorial formats such as workshops, public seminars, artist residencies, commissions, an exhibition, datasets and database. Since its initiation Fermenting Data generates different kinds of data and fermented food, while also creating a space for conversations about and experiences of processing data and vegetables. Through sensing and sense-making participants engage with data processing through practice of fermentation. Artists are also invited to interpret 'fermenting data' into a creative process and to propose what fermenting data could be as they respond to the project's claim that "to ferment data is to speculate and create ways to live together as people and others who care." This presentation will start by introducing different curatorial formats of the project together with data that they produce. The main focus of the presentation will be on workshops as spaces where different forms of data are generated and different kinds and formats of life – digital and other – encounter each other. If digital curation more generally is about the management of data life-cycle, and if digital curation in art and heritage institutions is about preservation, provenance, indexing and metadata, what can be said about curating data in the project Fermenting Data? Why to use speculation as a strategy for curatorial approach and what does it generate? Or to ask differently, what kind of life is part of Fermenting Data and how it is managed? Inspired by Lynn Margulis' 'symbiotic alliance' and understanding of 'worlding' as a reality which to Donna Haraway is an active verb, I will propose Fermenting Data as an experimental curatorial approach, a framework and a figure with which to think with and process data.

Keywords: curating data: fermenting data, symbiotic alliance, lively data, digital curation, curatorial practice

*Speaker

Memorising the Generative

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Abstract

In 2019, the author of the article fine-tuned GPT-2 (a pre-trained Transformer language model) to generate real-time conversational bots for a curatorial project on AI. Nowadays, large-scale machine learning models, despite the heterogeneous discussions they have triggered, reshape the power relationship between artists and algorithms. Once viewed as aesthetically potent and open to modifications/customisations, algorithms models nowadays flatten users - especially artists - from active tuners to passive prompt senders. Post machine-learning generative art intensifies the human-machine dynamics, the techno-archival modes and the epistemology of memorisation - what will the domain of mnemosyne transform into if the whole-web content is recursively re-packaged(in Ted Chiang's words), pattern recognised, re-generated at extreme microtemporal level, and what does it mean for media art? Will the notion of archiving and memory still be relevant if new, "valid" and cross-disciplinary content can be generated endlessly, non-repeatedly at every millisecond?

The article will trace the genealogy of generativity from the 1950s and illustrate how the notion of generative content has been recontextualised from early days of computing to the era of cloud-based, large-scale models, and challenges this paradigm shift has brought to the narration, research, archiving and memorization of generative art. Elusive as it may appear, "generative" can be viewed as a space of specific epistemological configurations: the autonomy of codes (Vilém Flusser), the reproduction, emergence and serendipity(from Jasia Reichardt to Galloway) of creative content, the notion of software based durations (algorithmic clocks) and our relationship with computationally structured knowledge.

If the conservation of historical algorithmic art often apply a material and technical based approach and focus on the preservation of codes, the respective IDE, running environments and hardware (as elaborated in detail in Net Art Anthology), the article further interrogates/speculates research and conservation strategies in a time of cloud-based, large scale models and generative art derived from them, when the "hardware" is numerous distributed CPUs and remote data centres, the "IDE" is web-based, and the main body of the "codes" (neural networks) are black-boxed. A few methodologies/perspectives that drift away from technical oriented analysis and recontextualise the study of generative art in post machine learning times will be further elaborated: the historicising and theorising of large-scale models rather than considering them as mere tools or running environments; the analysis of "cultural dependencies" (in parallel with technical dependencies) to understand the locality of such algorithms, and cultural layers packaged within; interpretation modes of generativity with machine learning (multi-modular, non-linear, and so on) and their ontological implications; the meshed relationship between individuals and large-scale machinic apparatuses that reframes the archiving process; and so on. Last but not least, the article proposes a reflexive state on the relationship between generative and memorising/archiving.

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Keywords: generative, memorisation, AI

The Medium of Intensity. Thomas Wilfred's Interwar Remediations

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Panthéon-Sorbonne – France

Abstract

Focusing on the North American media art pioneer Thomas Wilfred (1889–1968), this paper proposes an alternative approach to the modernist trope that considers light as the essence of optical mediations. Convolving modernist discourses on photography, the technical history of television and that of electronic images, I will study two cases of remediation of Wilfred's aesthetics. The first is photographic. In October 1921, the American Francis Bruguière captured four black and white snapshots of the luminous forms in movement projected by Wilfred's Clavilux. The second is televisual. In mid-September 1938, Wilfred broadcast on NBC's experimental channel W2XBS a sequence of moving light forms using one of his optomechanical devices.

The first remediation was at the origin of one of the key works in the history of modernist photography: Bruguière's abstract compositions, produced by means of paper structures on which were projected changing plays of light. I will show how this use of Wilfred's aesthetic intersects with László Moholy-Nagy's views on media and will oppose the Bauhaus master's theories to Wilfred's refusal of Bruguière's photographic remediation. I will then evoke how Wilfred did not justify such refusal with the intent to oppose Lumia to the static nature of the photographic medium, nor its reproducibility, but rather according to the lack of light sensitivity of film. I will argue this position reveals Wilfred's desire to characterize his art as an alternative practice in the media ecology of the interwar period, the core specificity of which would lie in the possibility of a variation of light intensity.

In a second part of this paper, I will consider the reasons of Wilfred's enthusiastic approval of the televisual remediation of his art, but also the meaning of a brief remark by Hans Richter for whom Lumia was a fundamentally televisual artform. Using NBC archives, I will explore Wilfred's collaboration with the RCA/NBC television engineers, and I will show Lumia's alleged affinity with television can be explained by the technical limits of the cathode ray tubes of the early electronic television cameras. In conclusion, I will discuss the reasons of the end of Wilfred's collaboration with NBC/RCA, and the limits of his conceptions of light intensity as the specificity of his art. The televisual remediation of Lumia was indeed made redundant by the direct control of electrons. This possibility was in fact suggested as early as 1937 by the RCA engineer C. E. Burnett, whose checkerboards, traced by variations of electric intensities in the cathode ray tube during resolution tests were the starting point of some of the most famous artistic uses of the oscilloscope, a medium based on a radically different conception of "intensity".

Keywords: television, video, light art, lumia, mobile color, Thomas Wilfred, media archeology

*Speaker

Knowledge production and the art-science of farming

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Abstract

Knowledge is created in and outside of the sciences. Agricultural knowledge, f. ex., consists of knowledge from microbiology, botany as well as farming, traditional and indigenous knowledge. Science nevertheless often holds the primary claim for truth values which can undermine this complex construction of knowledge. This "regime of truth" has been discussed in feminist philosophy of science (Lorenzini, 2015; Harding, 2008), following Foucault's concept (1976). If we separate the epistemic object as a thing in itself from the technical object which results from scientific inquiry as Hans-Jörg Rheinberger suggested (2006), we can open knowledge discourses for other forms of knowledge production.

I argue that collaborative practices in art-science have the potential to bring together and make visible diverse forms of knowledge production. Such collaborations can establish new methodologies on combining knowledge in interdisciplinary research and beyond. At the same time, researchers can discuss conditions of knowledge production more critically, e.g., by examining the social dimensions of scientific research. Collaborators can question positivist or reductionist forms of modern science and try to develop alternative practices of research.

Art-science in this form is less concerned with innovative research within modern science (or contemporary art). It is more focused on searching for new ways of producing knowledge. Practices can be a form of reflection or an ontological questioning of infrastructures in the respective fields. They can be a form of citizen science and reexamine how to include the non-academic public into knowledge production.

In the presentation, I want to discuss case studies of art-science practices about farming as local knowledge, cultural heritage, and a form of political protest. From a social perspective, farming unites knowledge of food production, of home, of history and of locality and land ownership as well as of soil, micro-organisms and plant growth. The art-science projects made visible the connections between knowledge spheres and created experiences for participants to explore them.

Keywords: philosophy of science, non, science knowledge, collaboration, interdisciplinary research, farming

*Speaker

Digitizing remembrance, creating memories: the case of Kosancicev venac Library in Belgrade

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Abstract

One of the pivotal points in memory studies is the theoretically debated division between what constitutes remembrance and what memory. From its beginnings until today, in this debate, the first notion refers to personally and affectively lived elements of the past, an intimate recollection of things experienced in the past. The second notion represents a socially created and shared knowledge about the past or one of its aspects. Remembrance stands for individual recollections, while memory refers to a contemporary social/political/cultural creation of knowledge about the past and its utilization. In this paper, we are presenting our work in creating a lasting memory by digitizing recollections through the Filecoin foundation supported project *The Kosancicev venac Decentralized Library of Suppressed Heritage*. In our project, the focus is on digitally reviving the institution that was the principal depository library of Serbia (and Kingdom of Yugoslavia) at Kosancicev venac that was intentionally destroyed, together with all of its materials, during the Nazi bombing of Belgrade on April 6th 1941. The building and the site were never reconstructed or made into a place of memory, despite its central location in downtown Belgrade.

In the project, we employ ethnographic and archival work to document and digitize recollections of relevant actors of the library's work and ultimate demise. Further, incorporating values of the digital age such as participatory culture, open access, and universal access to knowledge, we develop a mobile application that enables users to creatively reconstruct, reimagine, and reexamine the library through the use of AR/VR. Users will have an opportunity to upload their own materials (family letters, photographs, etc.) to the library collection in the participatory knowledge form of public humanities, transforming cultural heritage from a closed historic experience completed and rooted in the past to an ongoing creative process. This project, thus, aims to provide not only ground for an uninterrupted memory of this heritage site, but also an active discussion of what a library as a place of memory is, what are its boundaries in the digital era as an archive, and what are its functions in the contemporary world.

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Keywords: Digital Memory, Library, Digital Archive, Augmented Reality, Digital Culture, Kosancicev venac.

Pauline Oliveros' Expanded Instrument System (1965-2016): Toward an Operative Media Archeology of Simultaneity and Delay

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Abstract

Pauline Oliveros (1932-2016) was an experimental American composer, performer, writer, teacher and humanitarian renowned globally for her original conceptions of Sonic Meditation and Deep Listening. Less widely known are her engagements with sound and media technologies, spanning fifty years and charting the spectrum of electronic sound art and intermedia—from oscillators and tape recorders through modular and digital versions, algorithmic processing, and intermedia installations. Oliveros designated this panoply of ever-shifting technologies and set-ups the "Expanded Instrument System." The key operator in the Expanded Instrument System is time delay: the EIS is a device, Oliveros wrote, to permit present, past and future to be experienced "simultaneously with transformations." EIS served Oliveros as a laboratory for technologically-augmented improvisatory composition, tending over the half-century of its development toward growing degrees of autonomous agency as an improvising partner.

For Media Art Histories 2023, I contextualize Oliveros' Expanded Instrument System as an extended work over the lifetime of a pioneering media/sound artist, technologist, and philosopher, and the proposal will contribute to two of the MAH thematic tracks: Preservation and documentation of media technologies, and Artist-Pioneers.

My study of EIS is practice-led (1). By improvising with the system in its latest version as a MaxMSP patch I have gained embodied knowledge of the dimensions of the system's actual, potential and residual capacities. This leads me to formulate an "operative media archeology" of EIS spanning its multiple iterations across half a century and to theorize it as a "philosophical instrument."

Simultaneity and delay are not opposed in this philosophical formulation, but understood as dialectically related (2), permitting the derivation of three dimensions of instrumentality in the system: density, elasticity, and spatiality. In EIS the density of subjective time consciousness is *thickened*, the duration of the present moment *expands and contracts* flexibly, and spatial properties, like trajectory, velocity, and reverberation, become *dynamic* elements.

To substantiate the background of an operative media archeology of EIS, I present a genealogy of time delay in the arts, comprising the use of canons, phasing and recombinatory elements in classical and popular music, multi-temporal video installations (eg Graham's Time-delay Rooms), interactive art as a "transforming mirror", and media-theoretic readings of Libet's neuroscientific experiments on the "lateness" of consciousness. Keying off the

*Speaker

latter's measurements of latency between evoked potential and cognition, Oliveros latterly came to regard her EIS as a "very crude model of how the brain works."

In my conference presentation, segments of audio and video documentation of Oliveros' creations with EIS will be supplemented by an analysis of my own explorations. I conclude by describing an intermedial application of EIS, *Latent Cartographies*, a live coding and electronically modulated audio-visual performance by myself and Shawn Lawson. This work uses a Machine Learning algorithm trained by Lawson on images from 100,000 historical maps, while I use EIS to produce a corresponding sonic timescape of latency and simultaneity.

(1) By permission of the Pauline Oliveros Trust and the Ministry of Maat.

(2) Lampert, J. (2012). Simultaneity and Delay: a dialectical theory of staggered time. Continuum.

Keywords: Pauline Oliveros, Delay and Simultaneity, Expanded Instrument System, Operative Media Archeology

Of Mentors, Teachers and Pioneers. Herstories of video and media art in Europe.

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Abstract

In the 70s many women artists perceived video – that at the time was relatively new - as a tool free from the heavy patriarchal imprint of traditional artistic practices. Thanks to its technical specificities, it facilitated performance to camera and allowed working in intimate contexts.

In several countries, the UK among them, many women artists who were experimenting with video were in Fine Art and Sculpture Departments. These milieux were marked by a strong male culture and most of the teachers were still men. A few years later, women video pioneers would become teachers in the Art Schools and Universities in Europe, inspiring a new generation of artists – and, more importantly, women artists - to explore video and new media. Their relevance and influence as educators have, however, not been acknowledged in the histories of the medium and are yet to be properly investigated.

An interesting and yet marginalised figure of artist and educator is for example that of the British artist Elsa Stansfield – who, as part of the duo Hooykaas/Stansfield, is now recognised as one of the most significant pioneers of video art in Europe.

In 1980 Stansfield was invited to establish a Time Based Media Department at the postgraduate institute Jan van Eyck Academy in Maastricht, where she organised symposiums and exhibitions and invited some of the most important video artists and new media artists of the time including Bill Viola, Joan Jonas, Marina Abramović, Al Robins, and Toni Oursler. Stansfield's work as an educator and mentor influenced several video and media artists who were students at the time at the Jan van Eyck Academy. For example, Swedish video and media artist Antonie Frank Grahamsdaughter recalled: "For me Elsa Stansfield was a great inspiration as a teacher. It was very important to meet female artists such as Joan Jonas and Marina Abramović, along with others who were invited to talk about their work at the Jan Van Eyck. It was also significant that they were female artists as we female students could identify with these female video artists in a film world dominated by men, which is still the case even today."

Expanding on recent research of the author, this paper aims to question transmissions and teaching methods and approaches as well as to discuss and reassess the legacy of a generation of women video and new media pioneers – including Stansfield, Nan Hoover, Tamara Krikorian, Maria Vedder, and Ulrike Rosenbach - who became teachers and mentors in Art Schools and Academies in Europe and influenced deeply succeeding generations of media artists.

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Keywords: video art, feminist art, herstories, media art, video performance, legacy

A Movable Panorama: Relocating Memory with Augmented Reality

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Abstract

Whether installed in a permanent or temporary building, panoramas maintain an ambivalent relationship with their site. Often, they present exotic landscapes that have little to do with the place where they are located. They then function as a simple showroom, carefully separated from the actual world and open to a virtual world—a kind of *heterotopia* (Foucault 1967) or *non-place* (Augé 1992). The goal is to offer total immersion, that is, an experience of radical delocalization and relocation of the viewer (Schaeffer 1999, Ryan 2001, 2015, Grau 2003, Griffiths 2008, Calleja 2011, Therrien 2013, Chan 2014). Often, however, panoramas represent a historical event that occurred on the site itself. They then function as a monument, that is, as a localized commemorative image, with a double reference, iconic, to the past place and, indexical, to the present place—a kind of *homotopia*. The experience is then more dialectical, oscillating between immersion and emersion: the panorama shows and hides at the same time the place where it is located.

From this point of view, the *Cyclorama de Jérusalem au temps de la Crucifixion* is a complex work: a remake of a Munich panorama by Bruno Piglhein, the Cyclorama was installed in Montreal, in a building specially built for it, inaugurated on February 4, 1889; but in 1895, after 5 years of active life, the panorama was dismantled and moved, 300 km away, to Sainte-Anne-de-Beaupré, a Catholic shrine, and place of pilgrimage, where it still stands today (Caron 2000a, 2000b, Sirois-Trahan 2018).

After reconstructing the circumstances of its first presentation in Montreal, of its original production and reception, we will present here a project that involves the temporary relocation of the *Cyclorama de Jérusalem* from Sainte-Anne de Beaupré to Montreal using augmented reality. We have made a complete scan of the panorama and its building, mainly for documentation and research purposes. But we have integrated an optimized version of this scan into a simple augmented reality application, to geolocalize it in Montreal, to allow users, with a simple phone or tablet, to discover the full-scale building in its original location, to enter it and explore the painting virtually. The objective is not to replace the original, but rather to highlight it in its uniqueness and current location, and to recall its history through an immaterial and ephemeral counter-monument inscribed in its first location. At a time when the future of the Cyclorama is uncertain (it has been classified as a historical monument, but is currently closed), such an initiative could also have political effects. To give a better idea of the experience, we also propose to install this virtual version of the Cyclorama de Jerusalem in the Piazza San Marco for the duration of the conference.

Keywords: panorama, immersion, monument, augmented reality, location, based

*Speaker

Art Development and Conceptual Shifts_ LIFE, COMPUTERS and the ECOSYSTEM paradigm

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Abstract

Since Crutzen and Stoermer published the term Anthropocene in 2000, we have assisted an increasing number of art events addressing climate change and its consequences. Some examples are Earthbound (HEK, Basel 2022), Critical Zones (ZKM, 2020), Eco-visionaries (Royal Academy of Arts, 2019-21), presenting projects that not only warn about environmental collapse but try to elucidate the complex relations between Nature and Culture and repurpose them towards the possibility of resurgent forms of life. Complexity and trans-disciplinary are the characteristics of the works exhibited in these events. They combine knowledge from diverse fields and disciplines – from biological sciences to sociology and anthropology- and deal with different frames of reference -from the technologically mediated society to rituals of minoritarian cultures. Furthermore, deploy disparate methods and practices from state-of-the-art technologies – data-driven visualizations, immersive spaces and augmented reality- to craftsmanship and performative practices such as singing or dancing. Finally, these artworks share new concepts emanating from different disciplines and offer a new understanding of the environment in which human beings do not occupy a privileged position and are not the only agents. Quoting authors like Donna Haraway, Bruno Latour, or Lynn Margulis, these works share a new mindset and a change of perspective from the techno-management of nature towards resilience and continuity with damage limitation to the creation of new ways of relating to our environment towards resurgence (Alvaro, 2022). The fact that the artworks about the Anthropocene share concepts and practices developed in other disciplines confer them a complexity that does not accommodate well in the categorizations and divisions that characterize dominant art discourse. Based on previous work from media art theory and history that linked computer and media art development to other fields of research and practice – from videogames to military research and physical sciences- as well as previous avant-garde practices and discourses – Aesthetics of communication (Dieter Daniels), Interactivity and the performance (Kwastec, 2013, Boissier, 2004), Virtual Reality and Image Science (Grau, 2003)-, as well as the proposal of aesthetic theories linked to speculative realism (Colebrook 2014, Haraway, 2014). I propose to address the history of art related to the conception of nature and our changing relations with the environment from a situated perspective following an immanent approach in which the categories that shape our world are not transcendental principles but originate in the complex relations we entertain with different fields of research and practice. In this presentation, I will address the development of post-formalist aesthetics with the advent of ecological consciousness in the 70s, the development of systems theory and cybernetics and the ecosystem paradigm, followed by the capacity of computers for simulating population dynamics and evolution that translated into art in Christopher Langton's proposal of A-life that influenced Christa Sommerer and Laurent Mignonneau and their works. The discussed artistic developments showed

*Speaker

nature not as a passive receptacle but as agential and performative, pioneering actual art-works about the Anthropocene and its crafting of alternative relations with the environment alive and populated by coactive humans and non-humans.

Keywords: Anthropocene, especulative aesthetics, situated art history, system aesthetics, ecosystems, a, life

From Open Data to the Museum as an API: Opening up the Garden

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Abstract

As custodians, curators, researchers, educators and as artists we are confronted by a tsunami of access and automation that inverts the dynamics of how value is derived from collections. The historically constrained ‘enclosed gardens’ of the museum and archiving world have cultural characteristics which may limit future exposition and research.

A “walled garden” as metaphor for a restricted telecommunications and information platform originates in the late 20th century (1) and was rapidly extended to cultural institutions and digital heritage collections as the Web 2.0 paradigm developed (2). Indeed, some scholars identify the use of the term in the context of information repositories as even more ancient (3).

Recent years demonstrate a massive growth of research topics in need of large amount of machine-readable data. Access to multiple sources enables researchers to use available statistical, demographic, and other data to empower novel research approaches and model development. Perhaps most importantly it enables these in multiples; no single presentation or interpretation will be or should be canonical.

Will you exclude your collection from this opportunity to inform, explore, understand and democratize a global cultural heritage?

Our research at the Center for Image Science (VR2) at the University of Continuing Education Krems has revealed to us, four core observations that inform the case opening up of our gardens:

Comparative ontologies will let us refine *and broaden* our definitions: The language of the north-south divide and the process of decolonization and detoxification of curatorial language, is by necessity an undertaking which requires the ingestion and analysis of different corpuses.

Digitization allows us to separate the presentation of content from its storage: One object can exist in multiple locations, contexts and hierarchies simultaneously. An image may thus be presented with a formal metadata to a scholar, and also be presented in a cloud of visually similar images in a VR interface used by a school student.

A network’s value is multiplied by the number of nodes and the traffic between them: Our collections have a heritage value which we seek to conserve by diligent custodianship, however the connectivity of the digital age introduces the opportunity of returning

*Speaker

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this value and more to the public and our colleagues by leveraging the two above trends.

Automations build on automations: In late 2022 the public witnessed an explosion in the hitherto nascent area of art generated by AI. These are based on large training sets harvested over the years through the use of established web crawling tools and openly available image data.

These considerations prompt our thinking as architects of archives, and our detailed presentation of each of these observations will we hope, inform the manifestation and outcomes of automations, which are yours to decide.

(1) <https://www.techopedia.com/definition/2541/walled-garden-technology>

(2) "Walled Garden", Dekker, Annet & Wolfsberger, Annette; Editors, 2009. ISBN 978-94-90108-03-8.

(3) <http://miglior-acque.blogspot.com/2006/11/walled-gardens.html>

Keywords: Open Access, Walled Garden, Decolonisation, Democratisation, Automation, Artificial Intelligence

Re-Animating Performance Art: Animation as Contemporary Performance Art, Reenactment and Documentation of Past Artworks

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Abstract

Performance art, originating in the 1960s, is based on the actions of the artists, performers and the audience and raises questions about liveness, physicality, and shared spaces. Documentation of performance art questions how to preserve works based on spontaneity. This paper examines animation imaging techniques as a form of documentation of past performance art and as a new performance characterizing the contemporary digital (art) world.

Artists Eva and Franco Mattes explore the issue of documentation of performance art through novel technological re-enactment. They question the role of the body in contemporary networked existence in a series called *Synthetic Performances* (2006-present), where avatars reenact important performance artworks in the virtual world of *Second Life*. Here an animated body drains the meaning of the original performance piece, which was based upon the embarrassment, pain, shock, fear, danger and even potential death involved. On the other hand, the interactive virtual simulations maintain the spontaneous interactions and liveness (albeit not physical) in the original events. The use of animation to contemplate performance art, its current incarnations, and the technologies best suited to conserve it, expose animation as a contemporary imaging technology that has become a staple of digital culture (especially in online interactive platforms such as games). Animation, a visual aesthetic that constructs rather than captures images, does not attempt photorealism, may break ties to materiality (depending on the technique) and which is used to create online interactive platforms is a multilayered aesthetic that reconsiders the questions that preoccupied earlier performance artists about bodies, interactions, and shared spaces of life.

Animation has been theorized as a new form of performance since it is the range of technologies that simulate life, questioning what liveness means in a posthuman era of AI and robotics. Also, since performance art is grounded in physical presence and interactions, the Mattes' reenactments contemplate the body today, (mediated) presence, shared spaces and their digital counterparts. This is interesting in relation to environmental sustainability and preserving physical spaces. Finally, animation is a dual documentary – it is an interpretive reenactment of physical events but is also a direct capture of digital puppetry as online performances in virtual worlds, important when considering how to document the mixed realities (physical and virtual) of today and performance art made within them.

2021-2 artworks by Lu Yang use varied technologies to explore these issues.

*Speaker

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Keywords: animation, documentary, performance, avatars, games, digital spaces

What does noise have to do with capturing the unknown?

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Abstract

Only the captured can be tracked, according to Philip Agre, as "without a grammar of states and state changes and the technical means to detect the states (or the state changes), "tracking is impossible (1994: 113). This argument about an inherent representational theory paving the way for habituation to computer systems by inversely re-appearing in shaping the actual grammars (of coding and action = thinking) without question is still relevant. It is especially apparent in terms of intrinsically transposed systemic impositions of race and gender hierarchies into coding systems (Benjamin, 2019). Considering such a specific perspective regarding the contemporary social-technical moment, Agre's terminology of "Grammar of Action" gains especially interest here. His analysis of the procedure concludes the process of capturing (human) activity "as a kind of language" (1994: 108). Despite displaying a pervasive trait in structuring the contemporary appliance of human-non-human-technological intertwinement, it often remains unattended due to being ubiquitous.

Under these aspects, anything yet not formulated within the current (linguistic/coding) system, i.e., considered illegible and thus unknown, cannot be rendered as providing relevant information. However, the exclusion or irrelevance of noise within the negentropic assumption that established cybernetics' relevance for decision-making needs to be rethought when considering an opening towards the yet unformulated. The unformulated manifests sensory ex-and impressions that challenge and exceed the representational. Noise, commonly associated with the unpleasant or neglected, is an acknowledged contributor to information providing to some extent such im- or expressions, according to Shannon and Weaver.

In a current performative experiment, the transmittance of noise amplified from simple sensory devices was understood as voices (language) beyond the understandable (i.e., represented/able) realm. Such inversed tracking allowed the unrepresented to 'speak' by considering these neglected (thingified) voices as actively affected and affective. Questions for the frame of a standardized 'representational grammar' arose. Are these sounds still noise in the sense of the undefinable or/and neglectable? In what ways does their integration push the limits of what is representable or knowable?

Focusing on this experimental excerpt, the paper intends to develop a scope on noise that takes a recourse through definitions in sound studies and information theories but researches how these theories can initiate a broader frame of reinterpreting the knowable. Such interest is essential regarding the increasing digitization and automation (data as action conversion) and significant to redefine frameworks of the knowable to exceed the limited systemic structure of the Global North. It formulates a demand for listening guest visits (Robinson, 2021)

*Speaker

to other knowledges.

As future memories, these will be crucial in determining how the world becomes (worlds) and in defining which parts become apparent and knowable.

Keywords: noise, knowledge production, listening

Nightmare and Matter: The Three Little Pigs by Albert Serra, Between Cinema Hall and Museum Space

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Abstract

The media art project created and presented during the dOCUMENTA (13) of Kassel a decade ago was remastered and exhibited anew at the Fabra i Coats Contemporary Art Center of Barcelona (19.11.2022 - 12.02.23). Although it's been quite a while since this colossal (101 hours long) art piece was conceived, the context and the political agenda that surrounds the today's spectator is more than appropriate for the project, whose discourse (at least its most visible part) is building around three such eclectic figures of German origin, as Goethe, Hitler and Fassbinder.

This paper tends to study the context of this project in general, and some of its main themes in particular. Among the key notions to be studied there are such as the complexity of representation of historical figures (especially those whose profile is inseparable from the collective idea and moral evaluation); the problem of documentary certificate and limits between fiction and non-fiction; the phenomena of the biography and how a written text becomes a preformed, spoken, pronounced one; the concept of the beginning and the end, due to the "never-ending" nature of this "absurdly long" projection, which makes it *a priori* inaccessible in its integrity; the (im)possibility of representing such figures as Hitler basing on the previous cinema experience (films by Sokurov and Syberberg); the solitude of three protagonists, multiplied by the solitude of the artwork itself, the fact that Serra mentions in his *Diari de Kassel*, referring to the problem of singularity as something almost illegitimate in the era of the community dominion over individual artist and the paradox of the absolute fiction, based *exclusively* on biographical materials.

The other matter which is important to be analyzed in the context is, in this case tautology seems legitimate, is the very idea of the *matter*, inseparable of Serra's theory in this project in particular and in his working practice in general. Working mostly with the mythology (Dracula, Don Quixote) or the collective mythology (Casanova, Luis XIV), as to say, with the construction of the myth on historical base, the Catalan director tends to treat the past as present, emphasizing the concept of matter. In his own words, speaking of the past in the film should not reveal anything, but show the matter, the physical presence.

Speaking about the experience of presence at this exhibition, it is important to mention also the specific way the artwork had been exposed: three large screens forming a triangle in the darkness of the museum space. The spectator, whose gaze is never allowed to perceive three screens simultaneously, is left with his (her) anxiety and desire to look on the other side and to listen., as in this case, the sound and the silences also play an important performative

*Speaker

and substantial part.

Keywords: Albert Serra, Documenta, video art, media art, cinéma d'auteur

Reclaiming Women's Work: Tracing Fiber Art Precedents to Pioneering Computer Art

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Abstract

Many studies that seek to recognize women's contributions to early computer art inadvertently perpetuate the masculine historicization of the field. For example, in his essay "Up for Grabs," Grant David Taylor highlights naturalistic works such as Grace Hertlein's *The Fields* and the Bangerts' *Large Landscape* as examples of pioneering women artists' subversion of the field by "shifting computer art away from the cool rhetoric of mechanical abstraction, toward styles informed by the organic and the human." However, by focusing on these specific works, the essay reinforces the assumption that algorithmic abstraction is inherently masculine. This conference paper challenges this narrative by tracing the roots of abstraction to the textile arts, which have traditionally been women's work. While Jacquard's loom and Ada Lovelace's famous analogy of the operations of the first computer to the weaving of "flowers and leaves" are often cited in primary histories as the sole influences of textiles on computing, this paper brings in the work of Ada Dietz, Anni Albers, Lenore Tawney and other textile artists who embraced the algebraic nature of textile art in the decades right before the first computer graphics. Through this analysis, the paper explores the relationship between the artist-weaver and artist-programmer paradigms and the influences of textile thinking in early computer art beyond the jacquard loom. In addition, the paper rethreads these textile influences in the work of pioneering women artists such as Sylvia Roubaud, Joan Truckenbrod, and Vera Molnar, among others. By illuminating the contributions of textile artists to the development of pre-computer abstraction, the paper underscores the need to *re-source* alternative origin stories, redefine histories, and move beyond the limited recognition of women's agency in the field.

Keywords: computer art, algorithmic art, textiles, women pioneers, feminist media art histories

*Speaker

Critical Database as a Form of Anamnesis

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Abstract

This proposal points towards the notion of database as a critical object and excavates its passage in media history and media art as an archival form. In doing so I will first give a brief overview of information life cycle and its (im)materiality via the work of the new media historian and curator Sarah Cook. I will then introduce the (dis)correlation between database and narrative via the scholarship of the new media theorist Lev Manovich while positing database as a form and concept in media history that impedes and fragments the discreteness of information and the logic of sense making that relies on causal sequences and predictability.

In the next section, I will shift my focus to new media art in particular and draw on the interpretive nature of data as an imaginative phenomenon that needs to be ‘called up’ to come into existence as media and communication scholars Lisa Gitelman and Virginia Jackson claim. I argue that this interpretive immanence that ‘cooks’ the raw data into an expressive form affords database the opportunity to act as a critical object able to grapple with the impossibility to *phenomenologize* hyperobjects.

My attention in the last section will be centered around the hyperobject as unfathomably complex socio-political circumstances leading to disasters as I will illustrate this critical affordance of database through three seemingly disparate case studies intertwined with disaster: Forensic Architecture’s 2022 project *Drift-Backs in the Aegean Sea* that documents and archives over 1000 cases of violent border defence practiced at the EU’s southeastern frontiers against asylum seekers in the form of a data visualization platform; Morehshin Allahyari’s 2015-2016 project *Material Speculations: ISIS*, that provides archival databases on artifacts destroyed by ISIS embedded as flash drives into their reconstruction as 3D prints; and finally my own ongoing project *Circuits & Nerves* that collects my somatic markers during exposure to live audiovisual feed of recent violent oppression in Iran as a large database to be sonified.

To conclude, I will highlight the operative logic of these research-based case studies that by certain convergence of data offer a kind of *encoded* experience that emanates from the interaction of the body with a differential dynamic of information transmission offered by the archival entity. Such forms of documentation, I infer, can serve as what the philosopher Bernard Stiegler calls *anamnesis* to refer to the embodied act of remembering.

Keywords: future archives, database design, critical data studies, embodied experience

^{*}Speaker

Rebellion in 16mm: Expanding Cinema through Animation in 50s America

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Abstract

Gene Youngblood's seminal book *Expanded Cinema* (1970) reflects both the technological and socio-cultural transformations of the late 1960s, when computers helped place a man on the moon and the opposition to the Vietnam war and the fight for social justice amalgamated the youth movement into a dissenting counterculture. Youngblood's paleocybernetic filmmakers benefitted from the film infrastructure and culture created in the late 40s and 50s. After WWII, the wide availability and dissemination of 16mm cameras and, especially, portable projectors, supported the development of a non-commercial **alternative cinema** that rebuffed the theatrical conditions of film-viewing associated with the entertainment industry's circuit of distribution and programming.

In the context of the apparently limitless abundance of the capitalist economy that furthered the consolidation of corporate America, the growing gentrification of cities and the suburban lifestyle in the Eisenhower era, the 16mm was a token of communal engagement. Massively produced and widely distributed in churches, schools, cultural societies and organizations, and workplaces, they supported improvised and inventive modes of presentation that prompted discussion, debate, and social connection. As Haidee Wasson has demonstrated, the 16mm projector could be a dynamic media machine that allowed to stop, reverse, and repeat parts of the film and to change the speed of the projection and the size and brightness of the image. More importantly, the radical growth of portable film technology offered a previously unimagined capacity for programming in all kinds of scenarios as these apparatuses invited "a controlled, creative kind of tecno-cultural performance" (Wasson).

The animations created by Harry Smith, Larry Jordan, Jordan Belson, and Stan Vanderbeek in the late 40s and the 50s were manifestations of the alternative cinema that, bolstered by the small gauge, confronted the film industry and the nascent television culture. Their intuitive, self-taught approach to the animation-making process was made possible by the surfeit and wide availability of 35mm film stock and 16mm cameras. Moreover, their works were conceived as parts of screening events where the films were either integrated into jazz performances or shown at public places where the filmmaker as projectionist had the ability to improvisationally and creatively adjust the film's projection. The animations were also conceived for screening and distribution through the artists' run nonprofit associations and/or cooperatives for the dissemination of art, independent and experimental 16mm film created at this time: *Art in Cinema*, *Cinema 16* and their offsprings *Canyon Cinema* in San Francisco and the *Filmmakers' Cooperative* in New York.

Examining the early works and careers of these animators within the context of the alternative cinema developed in the 40s and 50s by filmmakers who rebelled against the oppressive

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Cold War culture of Eisenhower years, this paper will argue that the 16mm provided the necessary technological conditions for the development of the platforms (both temporary structures and systems for the creation, exchange or sharing of content) that supported the expanded cinema of the revolutionary 60s.

Keywords: 16mm animation Cold War

ELECTRONIC BECKETT Samuel Beckett: Media Art Pioneer

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Abstract

At the beginning of 1958, Beckett went to the BBC's Paris offices to hear the Magee tapes. While observing the operation of an open-reel tape recorder, he understood the creative possibilities of this machine, and he wrote *Krapp's Last Tape*. Beckett focused on language as an object and the velocity of its utterance translated to his microphone texts, stage works and television experiments. His exploration of electronic sound and visual technologies instigated the creation of a whole range of artworks in which the recorded human presence, voice, and body were transformed through technological mechanization. Six years after *Krapp*, Beckett used a phonogène, a machine to create *musique-concrète* at Pierre Schaeffer's studio in Paris. The phonogène enabled Beckett to carry on with his exploration of speed during the reconstruction of *Comédie* as a cinematographic-short. After 1958 Beckett stepped into a period of experimentation in different media. He also began directing his plays on stage and television. He was able to shape an aesthetic with elements taken from the audiovisual media he was working in, especially sound. Beckett was able to generate stage, audiovisual and aural experiments and reconstitute some works from one platform to another. By inspecting the sonic and visual productions made by the author, we find a three-dimensional audiovisual construct that fits into the hyper-technologized arena that is now common in contemporary art practices.

Keywords: electronic art, sonic arts, transdisciplinary practice, radio arts, Samuel Beckett, electronic media, Pioneers Media Art, Media Art History, Memory, Documentation, Preservation, New Technologies

*Speaker

Archiving and Preserving Media Art. Best Practices in Spain: the case of Espacio P and MediaLab Madrid

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Abstract

Archiving and preserving media art practices is one of the contemporary challenges in the digitisation, preservation and dissemination of cultural heritage.

On the one hand, to propose solutions to preserve the digital, which is of enormous complexity, not only for heritage but for all the contents of all areas of knowledge, reaching two problems. One, for analogue documents that are digitised, and the other, for documents that are digital in origin, which implies their recovery if, for example, we are referring to software or a web page, or even if we need specific hardware for this recovery.

On the other hand, archiving involves generating internationally shared practices, languages and procedures to ensure interoperability, sharing documents, optimal localisation and, therefore, guaranteeing their accessibility.

The work developed in the Spanish context in two of the most emblematic media art archives that have had the greatest impact in relation to the artistic practices of media art are Espacio P and Archivo MediaLab Madrid.

In the case of Espacio P, it was essentially one of the first artist-run-space in Spain, but they did develop some artistic practices with the technologies of the time, such as video art. In relation to MediaLab Madrid, it was a genuine, pioneering and innovative space in the practices of creative technologies in the digital context at the beginning of the 21st century in Spain.

This paper aims to expose the work processes carried out for the creation of both archives, their protocols, documentary languages, as well as the challenge of the media art thesaurus.

Keywords: Archiving, preserving, media art, Espacio P, MediaLab Madrid

*Speaker

We must make data ours. Experimental media practices against environmental and human injustice

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Abstract

Following the main arguments from the book *Data Power. Radical Geographies of Control and Resistance* by Jim E. Thatcher and Craig M. Dalton (2022) and their manifesto-like statements about the necessity to possess the data by the owners as a process to become resistant to the system; in our presentation, we would like also to evoke two major methodological concepts. One of them is "slow violence" defined by Rob Nixon (2011) as merging the experience of abuse of humans, nonhumans, and environments. The other concept is the perspectives arising from critical data studies and practices of radical situated data, consisting not only in resistance to normativizing and averaging forces of digital algorithmization (Loukissas 2019), but also on embodying the demands of data justice. We look at collaborative practices carried out in partnership with local communities and employing media tools tailor-made for specific conditions of violence data collection and preservation. We discuss examples of such practices carried out by members of local communities and use new "do-it-yourself" ways to self-collect data, monitor the environment and stand up against illegal practices that devastate the environment. Using examples of the activities of the Public Lab group, we define media practices related to community science in relation to disaster studies (Fortun and Morgan 2015), and by describing drone use projects by indigenous communities in Indonesia and Amazonian forests, we identify processes of bottom-up decolonization of mapping technologies and practices in relation to traditional ecological knowledge (TEK) (Posey and Balick 2006). Throughout these two different examples of practices, the critique of top-down models of knowledge production indicates the potential for simple, DIY media practices to be applied to bottom-up data acquisition and new grassroots environmental strategy design.

From the perspective of our study of media practices emerging in response to environmental disasters, as a practice of community data collection, grassroots mapping, as a radical situating of data in local contexts, along with traditional knowledge and culturally found narratives, becomes a powerful media tool for revealing hidden violence and proving truth. The kinds of media practices very often represent previously unrepresented and invisible data about people and the environment and become a set of curated arguments that help empower marginalized communities. Deconstructed by grassroots collaborative practices, the media practices become a tool for political and economic emancipation and forms of decolonization.

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Keywords: environmental data justice, grassroots media practices, radical cartographies, slow violence

PUBLICATIONS ON MEDIA ART PIONEER SAMUEL BECKETT

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Abstract

From 2014-2021 at the Department of Arts and Humanities of the Universidad Autónoma Metropolitana (Lerma, Mexico), I developed artistic research on Samuel Beckett and his role as a pioneer in media art during the second half of the XX Century. Through the art-research project titled Electronic Samuel Beckett, I explored his sound and visual work, and as a result, I published three books: *Object · Beckett · Sound. Sound in listening productions of Samuel Beckett* (2023), *Sonar. Navigation/Location of Sound in the Artistic Practices in the 20th Century* (2018) and *Electronic Samuel Beckett: Cochlear Samuel Beckett* (2016). Previously I published the artistic essay *The Technological Epiphanies of Samuel Beckett: Machines of Inscription and Audiovisual Manipulation* (2016). In 2018 I founded the curatorial, research, and art production initiative Beckett-Mexico, which hosted academic conferences and performative festivals in which scholars and artists presented their take on Beckett's work. As a new media practitioner, I have extended my explorations to language as a technoscientific machine and environmental urgency, which has a clear Beckettian mark. I propose to present the books I published with Juan Pablos Editor/Universidad Autónoma Metropolitana, and to open a dialogue on how artistic research can introduce new ways of constructing the discourse of New Media Art with practitioners exploring other practitioners' artwork.

Keywords: electronic art, sonic arts, transdisciplinary practice, radio arts, Samuel Beckett, electronic media, Pioneers Media Art, Media Art History, Memory, Documentation, Preservation, New Technologies

*Speaker

From Re-Source” to Pre-Source: The Forgotten Diagram in Coding Early Computer Graphics Using the Example of Frieder Nake

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Abstract

The not indisputable term “computer art” refers primarily back to the 1960s, when our today’s digital culture significantly developed, and (over-)exposes the digital computer as a new element in creative processes. Computer graphics has become an important branch, Frieder Nake is unquestionable one of its pioneers.

Computer graphics as a computer-based image is determined by its technical conditions and thus a historical phenomenon. At latest since the 1990s “code” became relevant in theorisation of digital media in art history as well as media studies; a binary relationship of code and image crystallized (Rottmann 2021).

Wendy Chun (2008) made a good point, when she argued, that focusing on source code doesn’t go far enough, because as a performative entity, it firstly needs to be executed and for it activated, interpreted and transformed (into machine-instructions). Her term “re-source” stands for a back reference and a belatedness of source code and lets the latter become a transfer site for considerations of the dispositif: code refers to (its) context and history and especially to a network of human and non-human actors in the sense of Latour. Surprisingly Chun in her discussion of the code doesn’t take its full making of” – before the machine – into account, on which “re-source” in the end also refers.

This is where my contribution steps in to gain a deeper understanding of computer graphics in the 1960s. I want to deal not only with the machinic-, but the whole production process, which – this is the key argument – actually began *before* the electronic source code, namely with analog media: pre-source.

In such a perspective of aesthetics of production, which includes – following the practical turn – also human activities (of coding), the development of Nake’s computer graphics will be reconstructed, presented and analysed on the basis of my preliminary studies (Rottmann 2021). This will make visible a central medium, but blind spot of art historical research: the flow chart. To answer the underlying question “How happened computer graphics really?”, the diagram’s mediality, operativity and functionality will be treated. Coding reveals to be more than just writing, but as a graphical, diagrammatical practice.

My contribution aims to show a specific artistic practice in a tension of seeing and thinking, which is centered around historical coding including the important role of the diagram. Especially I want to demonstrate how computer graphics was determined by the diagram and

*Speaker

its dispositif as well as the necessity to expand the established code-image-relationship. So the contribution not only helps towards theory of artistic processes and history of artistic computer graphics with a case study in a new perspective, but also opens art history to diagrammatic-theory.

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Keywords: Frieder Nike, computer graphics, diagram, diagrammatics, 1960s, coding, code, media theory, media history

From Computer Art to Prompt Engineering: Towards a New Anxiety of Influence?

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Abstract

In the domain of digital art, artists working with generative AI systems are voicing concerns about their struggle to produce ‘original’ artworks. Specifically, AI artists seem to find it difficult to generate outputs representing art styles that audience would perceive as new or unique. This concern is particularly noticeable for artists using text-to-image AI models that rely on natural language text prompts, such as Dall-E 2. Here, ‘prompt engineering’ is becoming a prized skill of formulating prompts that steer generative systems away from the derivative replication of recognisable styles. In this paper, I consider this struggle as representative of a new type of ‘anxiety of influence.’ I will contrast this concept, which is adopted from literary criticism, with another approach to textual analysis, namely critical code studies, and use both to explore relevant media art historical trajectories. Overall, this frames a discussion of broader questions concerning originality in contemporary AI art and the histories of computer art that precede it.

The concept of ‘anxiety of influence’ was developed by the literary theorist Harold Bloom, who argued (quite contentiously) that a poet’s aesthetic preferences and predispositions makes them liable to produce work that is derivative of existing poetry and literary styles. In Bloom’s view, art history shows that only ‘original’ artistic vision is remembered across the ages, with the result that living artists are haunted by a pressure to demonstrate the uniqueness and originality of their own work. Bloom argued that this is only possible through “creative misprision” – a kind of successful misreading of the canon, which makes new work seem original compared to that which came before it.

While Bloom’s theory (1973) has been widely criticised, it has potential for regaining some purchase in the context of AI-generated visual art, which is frequently derided for its unsanctioned copying of large swaths of existing artworks needed to train new AI models. While the outputs of generative AI models can’t be technically described as ‘copies,’ such models nevertheless have a tendency to invoke the data on which they were trained. Revisiting Bloom’s theories in this context also provides an opportunity for considering the usefulness of other existing frameworks for exploring recent prompt-based AI-generated work. I will touch on two such frameworks: media art historical scholarship that aligns the work of early AI artists (such as Harold Cohen) with preceding traditions of generative art; and critical code studies (eg. Marino 2020 and Soon & Cox 2021).

Overall, this theoretical apparatus allows me to draw critical parallels between the analysis of poetry, computer code produced for artistic purposes, and the production of text prompts

^{*}Speaker

for generative AI systems. To which extent are such textual expressions comparable? Did early computer artists struggle with concerns regarding the ‘originality’ of their work and artistic vision in ways similar to those about which contemporary AI artists grumble? What insights does Bloom’s notion of ‘creative misprision’ hold for our emerging understanding of the aesthetics, ethics, and critical implications of prompt-based AI art?

Keywords: AI art, media art history, creative computation, originality, influence

Can we let it go?

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Abstract

From the destruction by fire of a Harold Cohen drawing, and the destruction of art media in a hand operated mincing machine, to suggestions for extending the conceptual life of media artworks by incorporating them into new visual and performative works, questions are asked and shocking suggestions made in the context of rigorously serious and comical interventions in media art history and preservation.

When all that is solid melts into air, as Marx 'n' Engels predicted of late capitalism, can't we also dematerialise artworks from the last 70 years or so, change them into something else, use them instead of curating and keeping them pristine? Though with an emphasis on enhancement rather than replacement. Can older media artworks be reincarnated in new work? Should they be? What would a painting-by-numbers of media art be like?

Do we need a history as a collection of items? Could it not be fluid, more like a glacier amassing the boulders of media art genius into itself as it flows? And even this will melt.

If we physically destroy art media, by burning, grinding or shredding, where does it hurt? The destruction of various supports and devices may trigger distress.

There are quite a few Cohen drawings around. This one is special, sent over the ARPAnet in the late 1970s and in that sense is unique. It is a single, original work transmitted over a very early 'social medium'. It has an aura, perhaps. Where lies its specialness? If I burn it to show it's not special, does it become special if I do something special with its ashes... or the video of its burning?

Keywords: Memory, enhancement, destruction, transgression

*Speaker

The Power of Performance

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Abstract

This paper will consider how immersive screen-based performances are powerful communicators, empathetically and educationally. It will consist of a comparative look at Virtual Reality (VR) and 360 degree video performances, both live and in non-real-time, with a focus on dance and theatre. The paper will draw on current literature, looking at theories on immersion, audience agency, and the ‘empathy machine’, alongside examples of immersive screen-based performance works such as *Whist* by AE, *Facades* by Displace Studio, and *HomeX* by Kakilang, considering how they elicit feelings of empathy in the viewer. The paper will argue for the importance of immersive screen-based performances as powerful tools for education, by their powerful combination of communication and emotive experiences. The paper will introduce immersive screen-based performances, and how they can be used as an artistic tool to create empathetic experiences for the viewer, and how these empathetic experiences exist inherently within the medium itself, drawing on current literature in Performance and Media-Art. A small section will highlight the power of performance in communicating through expression, movement, music, visuals, and the body, and reiterate the heightened experience of immersive screen-based performances for the audience. A comparison will be given between VR and 360 degree video performances, and between real and non-real-time performances, drawing on theories and performance examples. Following on from this, the paper will establish how immersive screen-based performances can be used as an active agent in addressing bigger issues, such as climate change and other global concerns. It will establish how immersive screen-based performances can promote empathy by encouraging reflection, offering new perspectives, and raising awareness of complex issues. The paper will refer to performance examples to highlight educational elements present in performance works, and identify how performances can offer audiences an entertaining and easily-digestible transmission of information, and calling attention to how performance features are less present in educational settings. The paper will then propose how immersive screen-based performance could be adopted as a powerful tool for education by combining information with emotive experiences, and conclude with a call for more collaborations with educational institutions and immersive screen-based performances.

Keywords: technology, mediated performance, empathy, communication, education, virtual reality, 360 degree video, dance, theatre

^{*}Speaker

A Genealogy of Gesture: What Media Art History can tell us about the coming Metaverse

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Abstract

The recent focus on so-called XR (extended reality) and the "metaverse" suggests that a new paradigm of computer-mediated experience - one which is said will change interaction as we know it" (Nadella 2020) - is emerging. The abbreviation XR is an umbrella term for computer-generated environments accessed and experienced through worn headsets and body interfaces. These environments are either simulated (virtual reality-VR) or overlay and mix real scenes with digital 3D images and sounds (augmented reality-AR). Indeed, since 2012 when the Kickstarter-based Oculus VR headset was launched and later acquired by Facebook (now Meta) for 2 billion USD coupled with major pushes from the commercial gaming sector, Virtual Reality (VR) is experiencing a new "wave" of innovation (Schumpeter 1937) which is entering the popular imagination. This is particularly evident in how human-computer-based interaction has been conceived in VR experiences - as extensions of actions that derive from video game interfaces (e.g., keyboards, hand controllers) which produce constrained forms of bodily interaction. Yet re-examining VR's earlier histories (Sutherland 1965) as well as the technology's "second wave" between 1990-2000 in commercial (VPL, Lanier) and artistic (Moser and Macleod 1991) contexts, it becomes quickly evident that a different set of histories emerges. Such histories of *embodied interaction* within computer-generated environments are less shaped by the commercial imperatives of Meta, HTC or other gaming corporations than by what Century (2022) labels an "alternative technological ethos" - "a common way of apprehending technology as a malleable material, open to revision by artists in use, and subject to both conceptual and functional reimaginings." This presentation takes a media archeological position to develop an alternative genealogy of bodily interaction in extended reality. Starting with Sutherland's argument about the body as a "Kinesthetic interface" (Sutherland, 1968) and carrying through VR's strange histories based on military applications, pioneering work in experimental media arts (e.g., Banff Art and Virtual Environments Project) and California-based corporate counterculture, we explore a different genealogy based from sensorimotor interaction. Developing a history of multimodal (many senses) interfaces, from data gloves (Zimmerman et al 1987) and breath (Davies 1988) to voice (Psotka 1995), we thus construct a different set of embodied epistemologies that emphasize the "augmentation" between bodies and technologies (Viseau and Suchman 2005) in order to comprehend the possibilities and pitfalls of the coming age of the metaverse.

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Keywords: VR, Embodiment, Interface, Augmentation, Interaction, Alternative Technological Ethos, Metaverse, XR

Yes, indeed, the videogames have an authorship.

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Abstract

When in the 1960s the Nouvelle Vague resituated the figure of the film director, it did so by appropriating a concept: that of authorship. With the conversion of the director into *réalisateur* and of shooting into *mise en scène*, the North American industry-centric vision was replaced by a conception linked to the artistic phenomenon. And with it, it was also imbued with its properties: The personification of the creative act, the recognition of the art work, the cult of the creator (closely linked to a sublimated re-mercantilization). The films of actors and actresses and big production majors had someone behind them. And their creations had something recognizable, something persistent: the *stylemes* (constant features characteristic of an author).

The video game industry (or art), much more recent in its mechanical and narrative invention, presents another kind of status. Usually associated with vulgar and popular entertainment, its acquired power lies in an indisputable argument: it leads product sales in the global cultural industries. Gamers remain major consumers of franchises and characters. These same gamers are, in parallel, those who are recognizing - and are beginning to sublimate - the people behind the art works. This euphemism (people behind the art works) is used in the absence of a consensus in the industry (or art) to define their creators. Yes, we find the established figure of the game designer as the person in charge of a project. In the Game Awards, it is "the director" who is awarded, and there are some of them that are framed as developers. This indeterminacy is very evident in the opening credits of Metal Gear Solid V, in which Kojima introduces himself as "Creator and Director". Yes, "director" falls short to define authorship...

Alongside the aforementioned Kojima, we find other consolidated references, such as Shigeru Miyamoto, Hidetaka Miyazaki, Michel Ancel, Tim Schafer, Ken Levine, Neil Druckmann, Josef Fares, David Cage, Amy Hennig, Kim Swift... - yes, the video game industry is under gender discrimination too -. In keeping with the criterion of authorship, our intention is to present in this communication the recognizable styles (*stylemes*) of a selection of video game creators. This would allow us, in the future, to lay the foundations of a bottom-up authorial theory for the field of digital game art. In the preliminary conclusions, we find samples of these *stylemes*, in the difficulty level and the oppression of Miyazaki's gothic-romantic atmosphere, passing through Cage's photorealistic interactive narrative, or Kojima's epic surrealism. In the process, we appreciate how everything in the video game counts in a storytelling sense, including interactivity and connectivity that acquire semiotic values. Indeed, video games have an authorship. The process of recognition from both sides of the creation (creator-player) is taking place, away, in principle, from the epistemological debate. Explicit claims will come. And the avant-garde character of videogame creators and their art works will be recognized in these times of clear tendency towards digitality.

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Keywords: videogame, authorship, art, creators, play

The webdoc is dead; long live interactive nonfiction (?)

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Abstract

In the first decade of the new century, a new way of telling realities and preserving memories was gaining popularity among a whole generation of digital users and storytellers. The webdoc, those new informational art forms, reached its climax with the appearance of blockbusters such as *Highrise*, *Seven Digital Deadly Sins*, *Do not Track*, and a long etcetera, placing companies and institutions such as Upian, Arte Interactive and the NFB of Canada on the international map. These old new forms presented a set of innovative elements such as gameplay, time, audience, responsibility, interactivity, etc. that differentiated them from its audiovisual counterpart. After a brief golden age and the advent of new forms of mass and social storytelling, the consolidation of mobile technology and HTML 5, and after several conceptual debates in between, interactive nonfiction seems to have entered a new phase in the early 2020s. Once again placing itself on the margins, flirting with languages and experimentation, making its way in the clump that is generated between the linearity of the serial audiovisual explosion and the immersive interaction of the videogame. The aim of this research is to determine the main idiosyncratic qualities of interactive nonfiction today (2023). To achieve the objective, a sweep will be made by the main contemporary productions, making a selection under the criterion of subjective sampling by reasoned decision. The technique chosen for the analysis will be the ADM (Multimodal Discourse Analysis), supported by Grounded Theory and the CCM (Constant Comparative Method). As preliminary conclusions, it can be observed that the topics addressed revolve around contemporary issues, rather than historical stories or those linked to the past. With hindsight, this could place interactive nonfiction as a formula for generating new memory. There is also a tendency towards concentration and synthesis, rather than length and layered depth. The interaction with the content no longer pursues so much the rhizome and complementarity but seeks to respond more effectively to the objective of the proposal. In terms of *mise en scène*, no particular pattern is found. The same happens with interactivity, which goes from the classic video game character control to web-style navigation. In most stories, it is difficult to find the complementarity between immersion and inter-action. Finally, it should be noted that particular relationships with recent technologies (VR, AI) can be glimpsed, in an inherited tradition that, on occasions, causes the format to be the one that ends up determining the content. In conclusion, interactive nonfiction finds itself in an identity impasse in the midst of an environment with a gigantic generation and fluidity of content. Its ontological principle of attention to the real and the truth seems, however, of extreme necessity for a state of progressive digital virtualization of human experience, and the proliferation of fakeness.

Keywords: documentary, nonfiction, interactive, digital, media

*Speaker

Orienting the Future Otherwise: Infrastructural Imaginary in Contemporary Art from East Asia

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Abstract

Futurism is a complex concept that allures artists from different periods and generations to envision alternatives. Inspired by the spirit of Afrofuturism, many geographically specific formations of futuristic thinking in art practices have emerged in recent decades: Ethno-Futurism, Gulf Futurism, Sinofuturism, or some names that applied to area-oriented representations such as African futurism, Arabic futurism, and Asian futurism. Most of these tendencies are informed by the developments of technology in which various formats of infrastructural settings are involved, from the hard infrastructure (hydroelectric dams, power plants, weather broadcast system, etc.) to the soft infrastructure (smart city, website, protocols, etc.). In this paper, I discuss two artworks from East Asia that employ visual representations of infrastructure by investigating financial networks such as cryptocurrency and tech trade war. Liu Chuang's three-channel video works *Bitcoin Mining and Field Recordings of Ethnic Minorities* (2019) demonstrate an overlapping map of a decentralized trading model, locations of hydroelectric dams, and inhabitants of ethnic minorities. Wu Chi-Yu's video installation *The LED Future* (2020) speculates a futuristic scenario where natural sunlight no longer exists, but only artificial light, and shows the materiality that bears artificial light from the Camphor industry and celluloid in colonial Taiwan to the semiconductor ingredients and screens from East Asia. By analyzing these two works, I argue that the infrastructural approaches deployed by these two artists challenge the Chinese-centric narratives and Anthropocentrism respectively, and thus pose a critical reflection upon Sino-futurism and Asian futurism within the current discourses.

Keywords: Liu Chuang, Wu Chi Yu, Infrastructure, Bitcoin, Camphor Trade, Sinofuturism, Asian futurism

*Speaker

Modulation in Media Art

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Abstract

The paper will introduce the concept of modulation to (1) analyse the entry of electricity in the arts in the 1930s and to (2) outline the potential of the concept for an interdisciplinary analysis of media arts from electric to synthetic. It does not focus on a particular pioneer of media arts but rather on the techniques of modulation introduced into media art with the emergence of electrically powered artefacts.

The term modulation is used in the fields of electrical engineering and electronics, where it refers to the changing of the character of an analogue or digital signal, and in music or acoustics, where it refers to the varying of the strength of tone and colour of a sound or moving from one key to another. In general, modulation can be thought of as control based on a scale or range, as regulation always taking place within some dynamic range of a given parameter. A trivial example of modulation is the changing of brightness of a computer screen, of volume of sound, of contrast or sharpness of an image, or of saturation of its colour. Although the changes of these various characteristics of an image or screen typically serve to adjust or set them, they provide only a provisional stabilisation of an image that is potentially variable and changeable. It is not a fixed artefact but a dynamic model, an image that is modulated and modulatable.

Within the history of media arts, modulation emerged with projection devices and artefacts powered by electricity. Around 1930, László Moholy-Nagy presented his aptly titled *Licht-Raum-Modulator* and Zdeněk Pešánek made his first light-kinetic sculptures, the theremin was patented in 1928 and in 1931, George Beauchamp produced the first electric guitar. These pioneering works are electric devices employing changes of the intensity or colour of light or sound that introduce a new form of dynamism and complicate the traditional distinction between static and moving images (kinetic or cinematic). In visual arts, these works are typically characterized as kinetic, which is technically inaccurate: modulation is not movement, but the variation of characteristics within their dynamic range and over time. Dynamism, often understood as a particular aesthetic quality, here becomes an actual technical and procedural characteristic of an image.

Drawing especially on the work of Gilbert Simondon and his distinction between formation and modulation, we can understand modulation as defining all electric, electronic, digital and algorithmic media. The concept can also shed some light on the emerging synthetic, AI-generated media. The methods of deep learning are essentially statistical models based on the classification and variation of different aspects of images, on modulating their chosen parameters. In this sense, the generation of content by artificial intelligence can be seen as a new level of automation of modulation techniques, in which it is no longer a kind of modification of the original "raw material", but a probabilistic game with specific visual factors.

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Keywords: modulation, dynamism, electricity in art, electric media, synthetic media

Towards a species-centered approach to biological writing?

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Abstract

Contemporary art is swirling with living beings, semi-living entities, and life-like systems. In light of the post-anthropocentric turn closely related to the climate crisis, more and more artists are exploring the agency of organisms, their cells, fluids, and metabolic processes. Art critics, art historians, curators, and practitioners use diverse strategies to discuss and describe their practices. Among them are the grouping of artworks that would entail or discuss a specific (rather broad) area of technologies and media, for instance, synthetic biology, genetic engineering, artificial life, tissue culture, and biomedicine. Others would focus on specific materials and their metabolic processes, for example, fermentation. Many texts discuss art in relation to concepts from philosophy and science and technology studies. Some works focus on specific ecological niches, topologies, kingdoms (fungi), or rarely specific species. Each approach helps to illuminate specific characteristics of artworks and situate them in the context of related cultural, biological, and socio-political issues.

This paper focuses on the strengths and weaknesses of writing about biological art, focusing on a group of species called yeasts. From a taxonomical point of view, yeasts are unicellular organisms ascribed to the fungi kingdom. Although yeasts are often used as synonyms for baker's yeast, they are diverse and belong to two taxonomic classes of fungi. However, the advancement of identification and classification technology and, subsequently, the re-identification of new species leads to significant revisions in yeast classifications. Moreover, grouping species based on similarity is considered an anthropocentric practice that preserves the vision of universal humanity. If the category "yeasts" is constantly changing in terms of classifications, and the finding of new species can even lead to re-classification, what is the practical usage of this term when writing about biological art with these beings?

This text argues that despite the mentioned above limitations, discussing artworks in relation to a species group is beneficial for unpacking the contexts of artwork production, the usage of technological tools, and the nature-cultural arrangements of yeast themselves. When I am writing about yeasts in this work, I refer not to a fixed category of "yeasts". I instead treat them from a material-semiotic perspective as nature-cultural entities with the notion of yeasts as a constantly changing conceptual framework. From this perspective, I look at yeasts as biological entities, as a dynamic set of knowledge and practices around them, and as entities playing a role in numerous cultural practices.

Keywords: documentation, yeast, biological art

*Speaker

Wen-Ying Tsai: artworks, aesthetics, ideas.

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Abstract

Wen-Ying Tsai (1928-2013), an American artist born in China, is one of the forerunners of cybernetic art, along with Gordon Pask, Nicolas Schöffer, William Grey Walter, and Edward Ihnatowicz. Wen-Ying Tsai's works were shown in Jasia Reichardt's Cybernetic Serendipity exhibition at London's ICA and Pontus Hulten's Machine as Seen at the End of Mechanical Age exhibition at New York's MoMA. In the same year, 1968, an extensive selection of Tsai's cybernetic works were shown by Howard Wise Gallery. However, unlike the cited artists, especially Schöffer, Wen-Ying Tsai's work has not been sufficiently researched and, as a result, is not satisfactorily known in the contemporary new media art research community. Meanwhile, his work not only makes visible and explores the relationship between cybernetic and kinetic art interestingly, extending the latter to include dynamic forms of more traditional types of art, such as painting, but also proposes an interesting and original set of properties that build an original form of cybernetic aesthetics. In Tsai's approach, the essential attribute of cybernetic art - feedback - is combined on the audio/visual plane with other properties essential to his art that define both the structure of the work and its experience, such as, for example, light and stroboscopy, oscillation, vibration, energy, and participation. Together these properties aim to produce the artificial/organic life effect characteristic of Tsai's work. Since, in my opinion, the most important publications on Wen-Ying Tsai date back several decades (e.g., Benthall, 1969), the goal for my paper will be not only to present Wen-Ying Tsai's work and aesthetics but – first of all – to place his work and concepts in the context of the processes of spreading the idea of cybernetic art beyond the traditionally assigned field, looking at it from a contemporary point of view.

Keywords: Wen, Ying Tsai, cybernetic art, feedback art, kinetic art, sound, interface, artificial art

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Theatre of the Archive of Everyday: Studying Documentation Strategies of Rimini Protokoll's City Projects and their Digital Archive

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Abstract

Can Documentation of a time-based artwork be as equal as the original time-based artwork itself or it remains as an architectural/conceptual representation of it? This question is leading to the investigation of the body of work and website of the theatre group Rimini Protokoll in this proposal. Documentation is core in studying the works of this theatre group. In most of their productions, they are playing with the concepts of archiving and documentation, and trying to recreate, redefine, or question them. They use documents as the base or the subject of their works, and in the process of creating their projects, document their performances, in addition to collecting participants'/audience's bodies, narratives, and memories as documents as well. Therefore, documentation is being experimented on various levels within each work. Rimini Protokoll has collected these performative projects into a website, to build a digital archive/ museum, to extend the life and originality of each project into (a) history, from the day the project was performed, to an ever-lasting future. This creates another question: How is it possible to find a strategy or structure to document a performance/time-based piece for the history of art, and for the others who could not be present at the time of the (true existence of the) time-based artwork? Thus, the author here tries to study the relationship between the website of Rimini Protokoll as a digital archive and their archive-based documentary theatre productions to identify documentation strategies of their projects, which are aimed to be performed in various places around the world and in this case, are being re-enacted multiple times as well. These re-enactments of works under one title –the original title of each work- create a network of documents for each city project. Due to the ephemeral character of performative/time-based arts, after each performance, these works cannot be fully documented and even after documentation, cannot be able to manifest the entirety of the work as well. However, by shifting the point of view of documentation from ontology to historiography, a documentation structure for such projects can be considered, in a way that prolonging the existence of these performances over a period of time becomes possible. Hence, by choosing Rimini Protokoll's city projects and website as a case study and looking at the way they showcase documents and data in their works, various methods which ascertain the possibility of a documentation structure for time-based –here performative- media can be explored. Here, the author identifies a structure consisting of different levels within each performance project, which studies the relationship between the subject of the project, its audience, and its re-enactment as documents, and the structure of the performance, as an ephemeral architecture.

^{*}Speaker

Keywords: Documentation, Time, based media, Re, enactment, Digital archive, Documentation structure

Archiving the Unarchiveable: Institutionalizing Anti-Establishment Media Art in Slovenia

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Abstract

During a recent attempt to display work from the 1990s by the Slovenian net artist, Vuk Ćosić, the Museum of Modern Art in Ljubljana, Slovenia ran into some difficulty. Part of a project dedicated to digitizing twentieth-century cultural and musical heritage called Contemporary ASCII, Ćosić's work at the Moderna Galerija instantiated the promise that digital media could be seen as offering institutions responsible for national heritage in the 1990s, namely, a second life to iconic works of art and culture whose pre-digital technical medium-photocelluloid film, magnetic tapes, vinyl records-would otherwise have increasingly impeded their preservation and re-exhibition (Christiane Paul). Putting Ćosić's ASCII project on display in the art galleries was a priority to the Slovenian museum, given that Ćosić had gained recognition as one of the pioneers of digital art (Lev Manovich 1999, 2001) and that he represented a generation of new media artist who had arguably collectively put Slovenia on the map in terms of international art production (Marko Peljhan, Sreco Dragan, Tobias Putrih). As important as Ćosić and other new media artists had become to narratives of Slovenian art history, re-exhibition of their work proved contentious; firstly, because the museum lacked the resources to reconstruct them digitally, forcing Ćosić's work of software art, for instance, to be displayed instead on video. But these technical difficulties also raised questions of artistic intention: to what extent had Ćosić planned for his ASCII project-and its remediated versions of canonical art and culture-to continue to remain accessible? Developed in the sixties, ASCII involved a character encoding system that would already have already been a relic in the 90s, much less in the 2020s. In other words, by the time it was put on show, ASCII was as obsolete as video. As evidenced by ASCII's radical compression of form and its reduction of film stills to 7-bit abstractions, Ćosić had not stopped cultural loss, but instead enacted it at the heart of the cultural establishment. He had coopted the Slovenian heritage institution for an anti-art gesture of dadaist proportions.

This paper examines Slovenian new media artists who, through a tactics of *détournement*, engineered obsolescence, hacking and other subversive interventions, have sought to resist the gate-keeping and canonization that characterize the processes of institutionalization and museification. Connecting Slovenia's first generation of net and software artists to the communities of practitioner who today operate out of a range of independent and counter-cultural spaces, the paper proposes to relate this anti-establishment impulse characterizing Slovenia's new media art pioneers to, firstly, expanded narratives of technology in modern and contemporary art history and, secondly, to the pressing need for reformed policies and protocols at publicly-funded and state-run heritage institutions as they begin to acquire, archive, reconstruct and integrate new media art.

*Speaker

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Keywords: new media art, Slovenia, counterculture, preservation

”Watery Passages: Media, Design, and Liminality in Venice and Beyond”

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Abstract

Liminality is a concept well-explored by scholars of anthropology, religion, and art history. We seek to contribute to the discourse, not only historically by exploring accounts of liminal experience, but also theoretically by trying to understand how conditions in art and media are *designed* to elicit transformative experience. Drawing on artifacts and environments from ancient pilgrimage sites to contemporary mixed reality works, we have been engaged in construction of a taxonomy of kinds of liminality and specific design strategies.(1) Venice is a celebrated site of liminality-located not just at the meeting of land, sea, and sky, but where they interpenetrate, creating a variegated coastscape. Venice’s particular atmospheric phenomena are often noted in criticism of the work of its great artists. At the same time, the very existence of the city’s ecosystem and unique built fabric is threatened by the twin challenges of climate change and large-scale tourism.(2)

For this paper and with Venice at hand, we seek to enlarge our taxonomy of liminality to include the illusory-a particular project of doubling and confusion, in particular perceptual circumstances-as it comes into being in the interaction of light and water. This can be seen in three examples of ”border crossings” which we shall present as a springboard to theoretical commentary on the illusory and the role of light and water:

- medieval border crossings in the form of art materials believed to come from congealed water or perceived to imitate watery effects to evoke heaven on earth, as noted by ”New Materialist” scholars of the Middle Ages(3)
- early modern border crossings in the form of ritual processions over water(4) and fabulous garden designs,(5) creating an illusion of phantasmagoric nature through a mixed reliance on religion/mythology, science, and technology
- contemporary border crossings of desperate migrants from Africa and Asia to Italy and tourist consumers to Venice, both inadequately managed as instances of a yet-illusory political balance between globalism and the preservation of place

Venice provides a remarkable invitation to thematize water in representation, in media history, in symbolism, ritual, geopolitics, and liminal experience. The difficulty for most people of perceiving distance while on the water or the depths of alternately opaque or translucent

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water, and the dynamism of these perceptual challenges under changing light conditions, mean that Venice continues to present an unreal aspect, even as it faces very real pressures.

In turn, media that thematize the illusory and the liminal-the immersive and the transformative-attract, puzzle, challenge, and change the viewer or participant. The pairing of perceptual challenge and affective change is at the heart of the power of these media. To return to our theoretical endeavor, we can expand the investigation of water, light, and media in Venice and test our initial ideas by recognizing the challenges of representing water in a medium like computer-generated animation⁽⁶⁾ and the productive adoption of virtual reality in scientific explorations of oceanographic phenomena.⁽⁷⁾

Keywords: Climate change, design, digital media, liminality

Legacy of Artist-Scientists' Virtual Reality Archive and Educational Center

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²Intermedia Projects Inc – Belgium

Abstract

Intermedia Projects is a 501(c)(3) non-profit founded in New Mexico (2015) by Creative Director Jack Ox. All four writers of this paper serve on the board of directors. Our mission has evolved through the years until today; we realize it through the development of *the Legacy of Artist-Scientists' Virtual Reality Archive and Educational Center*. We are working to create an educational forum available online where teachers can bring their students to meet, learn about, and cite the pioneers who developed the platforms used to build technologically complicated artworks. One of the most critical considerations in this ongoing work is designing a working system for continuing curation and membership in the art-science community, which will define and provide expert criticism and curation. Our project will develop an evaluation method of artworks not functioning well in the auction ratings many appraisers follow religiously to judge an artist's value and, therefore, the works' value. We plan to help right the ship and establish 21st-century art developments using science and technology while applying sound critical theories and aesthetics. We should recognize that venture capital online platforms have been used opportunistically in the financialization of art and its commodification into trading instruments and cultural products like securities, commodities, options, etc. Art becomes products to be acquired and discarded through price manipulation and selling.

The history of art evaluation is worth exploring. Willi Bongard, the 20th Century German art economist, devised a point system to evaluate an artist's reputation. The points are given based on the prestige of exhibitions, appearances in crucial books, etc. However, the art world has given more importance to auctions in the 21st Century. A major problem with relying on the auction system is that what goes up goes down, leaving us to wonder if there is any artwork that has intrinsic value lasting for a significant period. Art is a poor commodity for market trading because its value is entirely based on arbitrary and potentially wildly fluctuating opinions, not on stable intrinsic attributes; this contrasts with corporate stocks and soybeans. Anything can be declared an artwork and assigned an NFT because there are no measurable attributes unless one accepts the opinions of critics and scholars as quantifiable attributes. In the post-war investment art market, the works are appraised by auction history, including another similar artist's standing in a co-environment. Factors such as the authentication of the piece, its provenance, and its condition may affect the appraisal,

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but the appraiser's opinions of its intrinsic artistic merit do not matter.

The Art-Science community is one group within many art worlds. Intermedia Projects will create a system using blockchain and NFT technology to enable chosen crowdsourcing evaluation within a secure, safe system. Our community will increase through the ongoing curation of "pioneers" in the Legacy online archive.

Summary of our objectives: online platform, focus on art/science legacy, innovative NFT structure, documentation of early pioneers, and more recent work creating bridges between both to foster historical and creative insight.

Keywords: Art, Science, virtual reality, digital archive, educational center, NFT, BlockChain technology

ACM SIGGRAPH History Archive Alive: A Journey Through Time

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Abstract

New media art archives are typically collections of artifacts stored physically in a location, digital files stored in a database or information in an online repository. Accessing the information in these archives involves searching through the material with the intent of finding data related to your research. But what if an archive was available as a large physically immersive, interactive experience where the viewer becomes part of the archive itself? This is the case with the ACM SIGGRAPH History Archive. During the SIGGRAPH 2023 conference in Los Angeles, the physical and online archive materials will be presented as the central component of the Time Tunnel, a special exhibit to commemorate the 50th SIGGRAPH conference. Participants traverse the history of SIGGRAPH's art shows, animations screenings, emerging technologies demonstrations and more.

The Time Tunnel is a collaborative effort between the SIGGRAPH computer graphics pioneers, the ACM SIGGRAPH History Committee, the University of California Santa Barbara Allosphere, TransLab and MAT, the York University Alice Lab and the University of Toronto Engineering Department, the Empathetic Computing Lab in New Zealand/Australia, and additional contributors in San Diego, Vancouver and Bowling Green, Ohio. The idea was conceived by Bonnie Mitchell, the History Chair of the 2023 SIGGRAPH conference, and the architectural structure was overseen by Marcos Novak. The content of the Time Tunnel was obtained from the ACM SIGGRAPH History Archive (<https://history.siggraph.org/>) which is co-directed by Bonnie Mitchell and Jan Searleman.

The Tunnel is a 4000 square foot linear space in the Los Angeles Convention Center and has 14 foot walls with projections and surround sound creating a physically immersive experience. Projectors also face downward onto the floor. Also, the archive is exhibited as showcases of physical artifacts, information visualization posters that analyze components of the archive and a robotic AI system that matches people included in the archive with conference attendees. Conference attendees can interact with the wearables in the archives via a "magic mirror" that enables them to virtually wear the T-shirts and hats.

The first fifty SIGGRAPH conferences were held annually from 1974 to 2023. The journey through the Time Tunnel begins with the first conference and allows the observer to traverse and interact with digital representations of the materials in the archive up to the present. For instance, the first SIGGRAPH Art Show was in 1981. When the attendee is

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in the early 80s area of the Time Tunnel, they could interact with the space in a variety of ways such as waving their hands, stepping on pressure sensors or pulling mice hanging from the ceiling to choose between viewing animations, artworks, cultural events and artifacts of the period, or innovative breakthroughs.

The artwork, animation, virtual reality displays and emerging technology showcased at SIGGRAPH over the past 50 years has changed significantly. While it is possible to traverse the archives online to get a sense of the aesthetic, technical and conceptual shifts over time, this physically immersive, interactive time tunnel transforms this important archive into an unforgettable, informative, and visually stunning experience.

Keywords: new media art archives, SIGGRAPH, interactive, physically immersive, experiential

Step-By-Step: Vera Molnar and Early AI

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Abstract

"The computer can neither dream, nor imagine, nor invent." With this statement, the pioneer of computer art Vera Molnar firmly circumscribed the machine's role to that of a "mere tool," leaving no doubt as to the fact that creativity was strictly a human affair. Made in 1981, Molnar's statement anticipated the current polemics around the creative agency of artificial intelligence (AI) by four decades. This paper takes this contemporary polarisation as a starting point to reconsider the dynamic between human and artificial creativity in Molnar's computer-generated works of the 1970s. I take as my starting point the early AI discourses which, from the late 1950s onwards, had triggered a complex web of bi-directional analogies between the machine and the human, oscillating between the computer-as-human model on the one hand, and the human-as-computer model on the other. Molnar's work of this time-period, I will argue, posit a human-computer relationship that is just as nuanced. This paper draws on research conducted in the archives of ARTA (*Atelier de Recherches Techniques Avancées*), a collaborative computer workshop space held in the basement of the Centre Pompidou, to which Molnar participated between 1975 and 1982. Works produced by Molnar in this context exemplify the tension I described above. On the one hand, the computer-as-human analogy features prominently in Molnar's practice of these years, most notably through her use of randomness to bring "human qualities" to the computer's creativity. This comes to light in the computer-plotted works that Molnar produced through the 1970s, such as the series *Tribute to Barbaud* of 1974. On the other hand, some works see Molnar reversing this frame of reference, and modelling human creativity on computer processes. "It may be," she wrote in 1973, that all art is "programmed: ... "When Monet retired to make pictures representing the same haystack at different moments of dawn: he executed a program." Taking the creation process of the 1977 series *Story of I (Histoire d'I)* as an example of this second tendency, I argue that its step-by-step creation process and trial and error method was tied to the AI discursive field of the late 1950s, particularly Allen Newell, John Clifford Shaw, and Herbert A. Simon's conceptualisation of human problem solving behaviour as "program."

Keywords: computer art, Vera Molnar, Artificial Intelligence, painting

*Speaker

becoming slime - mucilaginous apparatuses

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Abstract

Becoming slime is an attempt to use slime as an active agent within our art practice as mediators, teachers and designers to interfere with the rigid logic of machine learning algorithms, the basis of ai. By introducing slime and organic matter as an active intervener in technical structures and machine learning processes, e.g. by sonification, visualisation, programming and through slimy pattern recognition this project attempts to enrich and entangle humans with non-human matter, media and mud.

Anthropocentric views have limited the potential for respect for the nonhuman and led to alienation from symbiotic interdependencies by promoting ideologies of human exceptionalism. In particular, the doctrine of human superiority has become a "dispositive" in capitalist cultures, driving the domination and exploitation of other beings and systems for their 'use value' as 'resources' leading to today's catastrophic events. Instead, humans have always been closely intertwined with non-human material conditions, especially with slime.

Slime surrounds us; it is in us, always and everywhere. Still, unfortunately, we tend to forget this and often associate this phenomenon with pejorative connotations, such as "worthless". But as inhabitants of interfaces and interstices, slimy creatures can interfere with machine learning algorithms and help to transform and enrich our human perspective.

Slime suggests a different logic with strange phenomena and unusual critters. For example, slime mould is called "social amoeba", originally named after the Greek shape-shifting sea-god Proteus (e.g. "Proteus animalcule"), because of its constant shape-changing ability. It is a sack of amoebae encased in a thin slime shell with no distinct form, but behaving in an advanced and intelligent manner despite having neither a brain nor a nervous system. It is an organism that evolves from a seemingly uncoordinated group of genetically identical single cells to a strangely decentered structure with organismic functions characteristic of multicellular species with different tasks, and constant back-and-forth life cycles - a living, changing, identity-shifting, queer organism that can be used to transform human understanding as well as algorithmic pattern recognition of media devices.

In our media art practice, we infuse slime in machine learning apparatuses experimenting with media in an attempt to expand the capacities of media. By thinking through, working with and inseminating slime in our creative practice, we create a dialogue between the different participating parties - media, humans, slime, as well as scientific approaches provoking exploration, investigation and experimental inquiry. Because of the underlying algorithms,

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data, and assumptions of machine learning systems, technical apparatuses are not just tools and instruments, but sociotechnical entities that are subject to specific discourses and materialization processes with social, economic and ecological relations.

In a technofeminist adaptation of the idea of a slime-apparatus as a "speculative tool" infusing "intra-actions" and "agential cuts" in machine learning processes, this proposal attempts to create space for imagination by shifting ideas of inequality, destabilizing relations of power and domination by enriching our human sensorium. Not only human but also more-than-human actors are to be considered, and thus apparatuses of slime-becoming are to be conceived.

Keywords: slime, becoming, media, ai, speculative tool, intra, actions, agential cuts

Creating Future Memories with AI - A New Phase in Museum Transformation

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Abstract

New Technologies have changed the ways in which memories are being generated in museums. The intensive digitation processes and the development of new documentation and archiving methodologies have a significant impact on how the past is explored, experienced and communicated to museum visitors. These changes are part of a more profound transformation in the perception of the museum institution in recent decades: a transition from the perception of the museum as an institution aimed at representing and preserving the values of the past towards a contemporary institution responsible for conveying the challenges of the future. This new approach towards the past, and therefore to shared and collective memories, reflects the current reality in which immediacy and real-time are being prioritized over long-term processes, and a digital ecosystem of dynamic networks and collaborative platforms substitutes autonomous and more stable perception of the museum.

The latest phase in the museum's digital evolution is the inclusion of artificial intelligence (AI) technologies. Although these technologies are currently at their preliminary stages of integration in museums, new AI-based practices are already being applied for archiving and knowledge organization and present new possibilities for creating future memories, change basic museum concepts and affect the museum's overall approach to heritage. It will present the great potential for using AI for research, interpretation and curatorial processes in the museum. Yet, it will also refer to the biases AI systems create and to the ways they encounter the concept of originality through their ability to generate synthetic objects. The paper will explore how these new practices, based on feedback systems and statistical calculations, are reframing and reconceptualizing temporal values in museums.

Furthermore, to understand the profound potential impact of AI technologies on museums concerning the concept of memory, this paper will not only examine the different ways in which AI applications are being implemented in museums and the consequences derived from the way they operate. It will also refer to the infrastructures and mechanisms which allow their operation. Therefore, it will explore the different agents and stakeholders (revealed and concealed) involved in these processes and the power structures that they form. By examining case studies from different museums and research projects, this paper will refer to the manners in which the distinct ecosystem generated by AI industries, governmental and academic funding for developments and innovations in the fields of AI and cultural heritage, influence the ways in which past, present and future are being shaped in museums.

*Speaker

Keywords: Museum, Memory, Artificial Intelligence, Knowledge Organization, Synthetic Objects, Technological infrastructures, Power Structures

A Work of Art in the Age of Network Presentation

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Abstract

I am concerned with the processes taking place in the world of contemporary artistic creation due to the emergence and spread of the Internet as an environment for creative practice, especially the setting for the presentation of art. These processes, which have resulted in the increasing availability of artworks, regardless of their form or medium, on Internet platforms, including in the form of exhibitions or other comprehensive events such as festivals, have recently intensified due to the forced networking of art through pandemics (by this I mean only its transfer to Internet networks). The latter has led to the belief that the two phenomena - the pandemic and the transfer of art to the Internet - are directly, causally linked. However, in considering the situation of art in the COVID-19 era, I recognize that its current perturbations are not caused by the pandemic and the global social distancing it caused. On the contrary, the pandemic has affected the situation of art institutions much more than the art itself. About the latter, it only acts as a temporary catalyst for processes already developing. These concern the greatest extent of the new media arts, their relationship with other creative fields, and the tendencies they trigger or reinforce there. Thus, the pandemic highlights phenomena that have been present in art for a long time, only contributing to their intensification. In turn, the processes I consider here help artists and art institutions effectively face the pandemic's challenges, allowing them to bypass the dilemma: of not exhibiting non-internet works in times of lockdown or exhibiting them in documentary form only.

Here I look with attention at the changes concerning the status of the artwork, as well as those relating to how it is made available to the public. To bring out the meaning of the transformation under discussion and to put it into a theoretical and historical framework, I refer to two concepts: *The Work of Art in the Age of Technical Reproduction* by Walter Benjamin and *The Work of Culture in the Age of Cybernetic Systems* by Bill Nichols. Both authors attempted to consider the transformations in their cultural environment, including the transformations of art resulting from technological developments, while also considering the relevance of these processes to the nature of the work. Benjamin addressed the consequences of the technicization of culture, while Nichols dealt with the results of its virtualization. I analyze the diagnoses of the revolutionary processes presented by both authors and the conclusions they formulate, particularly regarding the status of the work of art. I then juxtapose them with the third revolution. This network revolution is developing, which I present in this text as a continuation of the processes indicated by the authors of both earlier concepts. Finally, I consider the consequences of the contemporary networking of art for its entire system. I also present three concepts of the work of art emerging from the revolutions indicated here: the mediated work, the replaced work and the multiplied work.

*Speaker

Keywords: technical media art, art on the internet, art and pandemic, virtuality, simulation, multiform artwork.

Land(scape), e-scape, Moonscape

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Abstract

The *MoonArk*, a marking planned Mini-Time Capsule of Humankind to survive hundreds of thousands of years on the Moon, is intended to inspire future humans with artistically intertwined visual narratives spanning the arts, humanities, and the most advanced sciences, engineering, technologies, and material science. It consists of four autonomous chambers and weighs around 9 ounces, contains hundreds of pictures, poetry, music, nano-objects, mechanics, and earthy samples interwoven through intricate storylines that blur the boundaries between seen and unseen worlds. The project's creators pushed the boundaries of digital fabrication techniques by creating an object with a complicated structure that might last thousands of years in the harsh environment of the moon. The capsule will be launched from Cape Kennedy in March 2023 on an Astrobotic Robotic Lunar Mission, atop a Space X Falcon 9 rocket, and will remain on the Moon Museum, potentially, for billions of years. Images of two works by visual artist Dr Ioannis Michaloudis were selected to feature in the first man-made sculpture to be permanently displayed on the Moon's surface. Two of the chosen artworks for the *MoonArk* sculpture are the "Bottled Nymph" and the "Noli Me Tangere", sculptures made using of space-edge nanomaterials. These two silica aerogel artworks had been photographed, engraved on a sapphire disk and stored within one of the MoonArk's four chambers. The author/visual artist Michaloudis creates *aer()*sculpture from silica aerogel, an ethereal nanomaterial composed of 99% nothing and 1% of glass. This space technology nanomaterial, silica aerogel, is the epicenter of all MICHALOU(di)S artworks, thanks to its natural sky colors blue & orange (Raylight & Mie scattering phenomena). It is an appealing material for both art and science because its transparency and low refractive index make it a novel medium for visual arts and Design. In this paper the artist/author states his "escape" from planet Earth via two artworks rocketed to the Moon; he is now looking at the sky with different eyes having a dialogue with the moon that says "I have something of you".

Keywords: Moon, space art, Museum, silica aerogel, Michaloudis, artwork, nanotechnology

^{*}Speaker

E. M. de Melo e Castro: Pioneer of portuguese media art

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Abstract

In 1968, E. M. de Melo e Castro (1932-2020) was invited by Eduíno de Jesus to produce an "animated concrete poem" as part of a program on RTP (then Rádio Televisão Portuguesa). This invitation led to the work *Roda Lume*, produced in television studios using a new technique for recording moving images, analogue recording on magnetic tape. *Roda Lume* (1968), which stands out as one of the first video works made in the portuguese artistic scene, was broadcast on the program *Panorama Literário (Literary Panorama)* in January 1968, but there are no records of the program and the original work was lost or destroyed. In 1986, the artist restored the work and gave it a new name: *Roda Lume Fogo*.

The artist Melo e Castro, in addition to being a pioneer in the use of video as a medium for artistic creation in Portugal, was also a forerunner of the Poesia Experimental Portuguesa (Portuguese Experimental Poetry) (PO.EX) artistic movement. In this context he developed a very particular artistic practice known as videopoetry which, in short, explores the relationship between visual poetry and the moving image. In addition, his body of work includes works made on film (notably super-8) and, more recently, works made using digital programs and software. These artistic manifestations thus appear in a progressively richer and extremely experimental and exploratory artistic environment of moving images and new audiovisual and technological media (analog and digital), where we can also highlight the artists Ernesto de Sousa, André Sier, Helena Almeida, Antero de Alda, Julião Sarmento, Silvestre Pestana, among others.

This study seeks to identify and analyze the moving image works produced by Melo e Castro and their different creation contexts, in order to understand the transdisciplinary nature of his body of work and to build new perspectives on the history of the moving image and of the media art. Thus, the PO.EX digital archive is an essential source as it stores multiple works created by the artist between 1958 and 2014, among which stand out works originally made on video and film, as well as works of visual poetry and other graphic works. This study also seeks to examine the aesthetic elements of these works achieved by a unique exploration of the technical components of audiovisual equipment.

Keywords: E. M. de Melo e Castro, Video and film, Visual poetry, Media art, Portugal

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Telecommunications Art and Geopolitics: Bill Bartlett's Media Ethics (1978-1979)

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Abstract

In the late 1970s, artists working with telecommunications attempted to forge a global network for the exchange of images. Following the efforts of Mail artists, they aimed at abolishing physical limitations to the circulation of visual information. Soon, however, the construction of this network faced prescriptive geographic and political realities concerning access to, and regulation of, telecommunications services. In short, economic, social, and technical discriminations prevented rural areas as well as the Global South from contributing to the Global Village promised by sophisticated telecommunications tools a decade earlier. So much so that artists' use of telecommunications eventually became guided by an anxiety regarding its commodification and monopolization by Western states. Soon, aroused issues concerning elitism, cultural imperialism, and what American media theorist Herbert Schiller has named "electronic colonialism." This, I argue, operated an overlooked shift in the history of media arts, that is its geopolitical turn.

Along the development of these new *media ethics*, emerged a strong interest for radically new, alternative, and most importantly low-cost information and communication technologies (ICTs) in the North American media art community. Among those, Slow-Scan Television (SSTV) played an eminent role, crystallizing the aspiration for decentralized, two-way flows of communication of a whole generation of artists, from Liza Béar and Willoughby Sharp to Aldo Tambellini and Sarah Dickinson, as well as Kit Galloway and Sherrie Rabinowitz, Robert Adrian X or Douglas Davis. The Canadian-based artist Bill Bartlett, in particular, was amongst the first to pioneer artistic experimentations with SSTV in order to, in his own words, "alleviate the remoteness of far-flung communities" while denouncing the unfair division of the frequency spectrum between world leaders, thus anticipating critics of the gathering of power that is today made visible with digital trusts.

Working from archival materials uncovered at the University of British Columbia (Vancouver) and the Zentrum für Kunst und Medien (Karlsruhe), I propose an art historical as well as critical investigation of Bill Bartlett's strategies to counteract unequal technological developments and the major obstacle it presented to effective (tele)communication among peoples. To do so, I will study Bartlett's first experiments with SSTV in 1978 and 1979, with a particular focus on *Pacific Rim Identity*, a month-long series of SSTV-performances during which artists from Pacific Rim nations visually interacted across waters, beaming images all over the ocean. As we shall see, this event which occurred from April 20 to May 21, 1979, made use of the Pan Pacific Education and Communication Experiments by Satellite (PEACESAT) to foster artistic dialogues between places such as the Vancouver Art Gallery in British Columbia, the Massachusetts Institute of Technology in Cambridge (Mass.), and

*Speaker

PEACESAT terminals in Honolulu (Hawaii), Rarotonga (Cook Island), and Wellington (New Zealand). Dedicated to the development of an interactive conversation between communities of the Pacific Rim nations, the event aimed at exploring the cultural identity of populations and cultures bordering the Pacific through visual communications. In doing so, they sought to offer a solution to communications problems in relatively isolated and technologically undeveloped areas of the world.

Keywords: Slow, Scan Television, Telecommunication, ICTs, Bill Bartlett, Aldo Tambellini, Globalization, network, electronic colonialism

Tracing Non-Human Perspectives in Iranian Contemporary Visual Art

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Abstract

As global art historians increasingly undertake to advance original and constructive discourse about the ecological crisis in parallel with the activist artists, an Iranian art historian also feels the urgent need to conduct her course of study on a more responsible track, in accordance with the currents presently emerging within the Iranian contemporary art scene. The contemporary visual art scene in Iran is an active and vibrant field with a rich modern background in which an energetic, overflowing young generation progressively expands its audience. These artists take on various artistic media, including painting, sculpture, performance, video, installation, digital art, etc. to address topics as diverse as socio-political issues, personal narratives, or aesthetic undertakings. During recent decades, a significant tendency towards ecological awareness has been emerging among Iranian visual artists. Through a wide range of artistic media and practices, these artists endeavor to raise ecological awareness and trigger changes in the attitudes and mentalities of their society. Their works contribute to the debates on sustainability at various levels, bringing up issues including but not limited to: air pollution, water and earth preservation, biodiversity, animal rights, and the global anthropogenic effects of climate change.

The present paper will aim to document and analyse the currents within contemporary Iranian art that have tried to embrace non-human perspectives. Through detailed and illustrated analyses, it will investigate the themes, narratives, and creative strategies undertaken by these artists in their quest to seek new ways of engaging with the concept of representation and its role in our human-centered conceptualization of the world. It will examine the challenges faced by the artists while trying to get outside of their world to think and feel from another perspective. Some of these challenges include: What does it mean to think with a different body, or feel with different sensory organs? Is it really conceivable to understand non-human perspectives? In what ways might "Corporeal Thinking" be represented in visual language?

Being attentive to diverse ways of life is an artistic strategy that requires a deep and passionate involvement with the lives of microorganisms, animals, and plants. The research finds how the diverse activities of these artists comprise various approaches, from poetic/aesthetic attitudes to socially engaged, activist, and/ or community-based interventions. Their common objective is, however, to promote holistic ecological awareness and contribute to the discourse and practices of sustainability, justice, and respect.

*Speaker

Keywords: Non, Human Perspectives, Iranian Contemporary Visual art, Corporeal Thinking, Ecocriticism

Sisyphus' Burden. The endless turning of fashion images in the digital age

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Abstract

New paradigms of consumption and production made possible by digital technologies have been affecting the fashion industry for several years, accelerating further as a result of, and in response to, the pandemic situation. Within this complex current, one phenomenon has recently begun to manifest itself and grow: various fashion brands have experimented with forays into the world of gaming, a subculture peculiar for its imagery, rules, languages. An interesting case in point is *Animal Crossing*, a gaming platform developed by Nintendo for Switch, a "hybrid" console. The game is a life simulator (in some respects similar to "Second Life") where users act in a media context with personalized avatars. A relevant phenomenon, given the ability to customize avatars, is the production by users of customized "outfits," many of which are inspired by iconic collections of major designers. There are profiles where these digital garments are re-shared, re-mediated, processed, giving rise to dedicated profiles, especially on Instagram. Another sign of cross-fertilization between fashion and digital can be traced in the fashion shows hosted in the medial environment: *Animal Crossing* hosted fashion shows of various maisons. which created, ad hoc, digital clothes and accessories, usable and purchasable directly in the platform, designed to be worn by avatars in the media context of reference.

To address a field such as this, which moves between on and offline making even these distinctions obsolete and hermeneutically insignificant, methodologically a netnographic type of investigation was chosen. A first phase of the research involves an exploratory observation of social networks to identify Instagram profiles dedicated to re-sharing content related to *Animal Crossing*. The analysis will be developed in the form of visual ethnography, both to obtain information inherent to stylistic and aesthetic choices and to find recurrences/dissonances with respect to mainstream fashion imagery. The approach is mixed methods, with the intention of being as faithful as possible to the peculiarities of the field of study.

The paradigms of consumption, production and the creativity itself behind fashion objects seem to be moving out of the traditionally followed trajectories. One of the objectives of the present study is to explore this new reality: how are products perceived, their artistic value? What role do skills and creativity play in the reproduction/creation of fashion objects with these digital tools? What are the innovations and threats fashion, traditionally conceived and communicated as art? And lastly, are the traditional answers provided by the sociology of fashion valid tools for reading the phenomenon?

The interest of the study is focused on both the role of pro-sumers and the role of producers. The fashion supply chain is engaged in a strong change; the possibilities are many

*Speaker

(sustainability, customization, etc.), and many are the threats (artistic value of the product, professionalization of creativities, etc.). The present work could have a dual function: to reconstruct a visual imagery of this fashion co-production and consumption in a media context, a hypothetical "metaverse", laying the foundations for new methodological ideas.

Keywords: digital fashion, art, co production, imaginaries, mixed methods

Right to research knowledge held by museums and other cultural heritage institutions

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Abstract

The knowledge held by museums, galleries, archives and libraries is an important source for the creation of new knowledge. Nowadays, a lot of new knowledge is created with the help of data analytics. This new research method is today essential for machine learning and is fundamental for building artificial intelligence. Text and data mining can be hindered by various obstacles. Among the legal barriers, copyright can be a major obstacle. Countries around the world regulate this area differently. We know regimes where the data analytics represents the so-called fair use, while others allow data analytics based on exceptions and limitations. The European Union regulates this subject with the Directive on copyright in the single market, which the EU member states needed to implement in their national legal systems. The Republic of Slovenia has adopted advanced legislative solutions, which will be presented in the paper, where it will be highlighted why it is advised for other EU members to follow the example and why it is absolutely necessary to regulate these issues globally. These legislation is essential for societies to benefit from knowledge and art that is held by museums, galleries, archives and libraries.

Keywords: right to research, knowledge held by museums, galleries, libraries and archives, copyright

*Speaker

(Re)inventing the Body in Sound Art.

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Abstract

The birth and evolution of the body-oriented sound art (B-OSA) are directly linked to the development of diagnostic medical technologies which allow the identification and measurement of biological signals that evade the range of natural human perception. These technologies contributed to rapid advancements in medicine. However, more importantly in the context of aesthetics and art, they also opened up new perspectives in the perception of the human body. The clinical approach, prevalent in medicine up through the mid-20th century, as Nicolas Rose observes, has been replaced by a "molecular view". Moreover, medical diagnostic technologies have been widely applied outside medicine above all in various forms of new media art. The field of B-OSA is highly diverse. Still, it is possible to identify certain tendencies within it. In this paper I will focus on analysis of artworks by such artists as Alvin Lucier, SENSORBAND, Atau Tanaka, David Rokeby, Myriam Gourfink/Kasper T. Toeplitz, Marco Donnarumma (i.a.) to indicate three main paradigms of B-OSA: biofeedback, control and biophysical.

Historically the first approach, still very much alive today, is one that focuses on the role of biological feedback, dubbed the "biofeedback paradigm". It developed in the late 1960s and early 1970s. The paradigm of biofeedback is contingent on a very direct presentation of the biological activity of the human body by the sonification of biological signals that represent the current mental and physical status of a person and allows deliberate influence of the processes taking place within the body.

The tension between controlling biological signals and exploration of their indeterminate nature is a recurrent aspect of B-OSA. It acquires a special significance, however, in the second approach – the "control paradigm". Although the drive for using biological signals as information that controls musical instruments can be found in the early experiments from the late 1960s, it is only the advent of digital technologies that sped up the evolution of this tendency in the 1980s and since. A breakthrough in the control paradigm was achieved by California-based scholars Benjamin Knapp and Hugh Lusted, who introduced the BioMuse system. BioMuse authors wanted to control biological signals as closely as possible and to link them precisely to the activities carried out by digital musical instruments.

The recent decade has seen a growth of interest in the use of biological signals in art, related to the democratisation of technologies and the development of bottom-up approach in the area of DIY, both as to hardware and software. Another major stimulus was the strong turn towards the body in the humanities. It bore fruit with a number of concepts which offered a new perspective on life, the body, subject, personality, identity, and the interrelations with the environment, which together constitute the "somatic turn" in the humanities. It brought new perspectives for sound art, resulting in the "biophysical paradigm", which

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is characterized by a materialistic perception of the body and a non-deterministic, open, evolutionary and generative approach to the relationship between the acting subject, the body and technology.

Keywords: sound art, the body, bio music, art&science&technology

Glitch Art and Postmodernism's 'Death of the Author'

Andrea Liu^{*1}

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Abstract

Glitch art or 'Dirty new media' is a pioneering avant-garde digital art movement that began coalescing in the mid-2000's at School of the Art Institute of Chicago, rejecting the impeccable cleanliness of digital art and design. Instead it embraces the corruption, sabotage or messy perversion of technological progress through accidents, short circuits, cyber errors, or glitches. Glitch art can be understood as a refutation of the seamless hyper-realism and slick corporate aesthetic of New Media Art.

Given the dense level of art historical theorization around glitch art, we can see glitch art as passionately advocated on behalf of both modernism and postmodernism. By modernism, I refer to cultural production and art marked by heroic gestures, the discourse of historical progress, universal truths, a clarity and coherence of purpose, and an optimism about the future; meanwhile the postmodern condition is marked by a destabilization of signification, a dissolution of certainty and apparency, and the ensuing vertigo in the wake of the fading reality principle. Paradoxically, two impulses which I see as diametrically opposed—modernism vs. postmodernism—have managed to both claim glitch art as their progeny. For instance, Glitch theorist Michael Betancourt invokes Adorno's book *Aesthetic Theory* in discussing how glitch art sabotages the seamless impeccable surface of digital works, supposedly violating what Adorno calls "bourgeois functionalization". Betancourt stalwartly subsumes glitch art under the modernist tradition of rupture. In her highly influential book *The Glitch Moment(um)* (Institute of Network Cultures, 2011), glitch artist Rosa Menkman is almost evangelist in her advocacy of glitch art's critical subversive potential, operating on the assumption that glitch art is something unprecedented. She is modernist in her sanguine optimism that we can still invent "new" forms; as opposed to the postmodernist melancholic resignation that history is "over".

On the other hand, there are those who claim glitch art firmly under the rubric of postmodernism because it destabilizes the myth of linear progress and the search for the 'perfect technology,' it basks in the post-utopian ruined surface, and it heralds the "death of the author." I would argue glitch art falls into the realm of the postmodern not only because of its rejection of the sacredness of authorship, but its rejection of the modernist "monumental work" in favor of process-oriented practices of reshuffling fragments of pre-existent work, quotations, or bricolage. Glitch art is postmodern in its rejection of the (modernist) cult of worship around "originality" or authenticity, as glitch art is made from corrupted or damaged files. Glitch art is postmodern in its politicization of the signifier, or the process of signification itself, as art made from technological errors renders transparent the process of how technology works. How can we understand this paradox where the evacuation of agency

*Speaker

from authorship (as glitch art is made from mistakes) is heralded as a "triumph" of both modernism vs. postmodernism?

I gave a shorter version of this same talk at Kunstakademie Düsseldorf (Sigmar Polke Festival)

in 2021: https://www.anna-polke-stiftung.com/wp-content/uploads/2021/11/KH_Polke_Programm_105x210mm_E

Keywords: glitch art, dirty new media, Michael Betancourt, Rosa Menkman, postmodern death of the author

Mapping the Labyrinth: What the cartography of Chris Marker's CD-ROM *Immemory* teaches us about documentation of digital artworks

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Abstract

Since the first reflections and research on conservation of media art in the late 1990s, it has been widely stated that documentation is a keystone of any preservation strategy for artworks that are strongly dependent on technologies threatened by obsolescence. Especially for born digital art, sustaining the work's legibility over time, and the comprehension of how it was supposed to be experienced on its original equipment, is often primarily achieved by documentation. However, documentation in the context of digital art preservation is a task that covers a very wide range of elements, some of which can be standardized and modeled, thus becoming the most discussed and taught ones, while many others have to be adapted to fit specifically the needs of each artwork, and resist standardization. If documenting hardware and software components can follow a systematic approach, or tracking the material evolution of a work over time by listing each of its iterations, there are also aspects of documentation that can only be achieved after researching into the specificities of an artwork – and sometimes, of an artist's whole body of work. Furthermore, providing in-depth documentation of an interactive artwork's hidden mechanics often adds layers to its legibility and opens new possible ways to approach it, therefore impacting the way it is studied and experienced.

In 2021, a conservation project for the 1997 CD-ROM artwork *Immemory* by Chris Marker was initiated by the Centre Pompidou, in order to bring back online the piece that had been already migrated once in 2013 in a version recoded in Flash. This online version, built as part of Chris Marker's website project *Gorgomancy*, had become inaccessible after the discontinuation of Flash support by Adobe in 2020. Aiming to bring back a visual accuracy as faithful as possible to the original CD-ROM version, this reconstruction of the work in HTML5 was the occasion for a deep dive into its complex structure, revealing how much a detailed comprehension of the labyrinth designed by Marker was essential for its conservation.

To achieve this level of comprehension, a large map of all of *Immemory*'s content was created during the research, in order to represent the connections between the 1500 images of the work as well as the various paths opened by Marker to navigate through it. The resulting document, a 15000x7000 pixels image assembling all of *Immemory*'s images at their native resolution, raises not only questions about the technical limitations of traditional 2D documentation for mapping interactive digital artworks' tree structures, but also ethical questions

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about how far documentation can go in revealing aspects that were constitutively hidden by the artist. As valuable as such a document is for research purposes, it also provides a level of legibility conflicting with the core approach of Marker's digital works: letting the visitor get lost. In that respect, mapping *Immemory*'s cryptic pathways teaches us about the challenges of finding a balance between informing the visitor on an historical piece and remaining faithful to the intended blindfolded navigation experience.

Keywords: documentation, digital art preservation, interactive artworks, CD, ROM, mapping

Intermedia: archipelagic thinking of relations in-between the systems - decolonizing media art

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Abstract

In 1967, Dick Higgins suggested in his Statement of Intermedia that ‘the intermedial approach... emphasize(s) the dialectic between the media’ where “the central problem is now not only the new formal one of learning to use them, but the new and more social one of what to use them for?”. Jack Burnham (echoing Hans Haacke) later observed that intermedia art “...merges with the environment in a relationship that is better understood as a ‘system’ of interdependent processes. These processes evolve without the viewer’s empathy who becomes a witness. A system is not imagined, it is real.” (Burnham, 1968, 10). This shift from aesthetics to communication transforms art into an ontological shifter, enabling a different way of understanding the relationality between media and environments.

We are interested in how intermedia can operate as a metaphor of a different way of understanding the relationality between ‘media’ and ‘environments’, as archipelagic thinking of relation (Glissant 1997; Glissant 2009) and “becoming with others in opaque togetherness” (Eloff 2019). In our paper, we would like to focus precisely on the kind of relationality and in-betweenness that has been developing along recent attempts at the decolonization of media art, and therefore media. Is there a possibility that artistic formats such as happenings and multimedia sculpture (still somehow operating within a theatre of western cultural symbolism) overshadowed a problem even more real than a war and commercial domination, that of the (inter)mediation of the postcolonial milieu?

In our presentation - which could be seen as “unlearning our privilege” (Landry and Maclean 1996, 14) - we would like to attend to non-Western or indigenous media art that subverts, revolutionizes or makes explicit the biases of colonial mindset present (often structurally) in the very concept and / or structure of media as it has been defined from the onset of media theory, despite anthropological background of the Toronto school and McLuhan’s notion of acoustic space. Looking into the instances of ethno-techno methodologies (Gómez-Peña 2005, Mendieta 2001, Welford 2005) and indigenous programming (Laiti 2016; Corbett, Laiti, Lewis, Temkin 2020; Marino 2020), as well as reflecting on artworks such as Jon Corbett’s Cree# language Crow and Guillermo Gómez-Peña’s El Techno-Shaman (2000) or Brian Futta’s Samoan Cyborg (2000), we would like to employ Higgins’ notion on intermedium from entirely different perspective; the one that allows for the postcolonial critique articulated primarily from the positions of subaltern (Spivak 1988) .

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Keywords: decolonizing media art, intermedia, indigenous programming, ethno, techno methodologies

Emerging Futures in Media Arts from a Global Perspective

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Abstract

The role of emerging professionals in the field of Media Art, Science and Technology cannot be underestimated. The newest generation of individuals involved in research, curation, conservation and experiment development today is laying the foundation for what will be the focus on the histories available to the field in the future. They create future memories. What happens when 127 students from 53 countries across the globe are brought to Europe to study Media Arts Cultures as part of an EU-funded Erasmus Mundus joint master degree? What happens when more than 15 years of MediaArtHistories graduates step onto the stage? Not only does Europe benefit, but also the field at large. Over the past decades, an already rich international network of colleagues within Media Arts have expanded and grown the field through teaching and training a new generation of emerging professionals. The students and alumni can be found in Europe, their home countries or pressing even further into unfamiliar places. The formation of this astounding new tribe includes individuals from many disciplines and world views. We can look through the lens of this network into a kaleidoscope of perceptions and orientations possible for the future of Media Arts Research that has emerged and continues to shape the field.

This presentation/paper will include an overview of patterns observed on the assumptions, questions and evolution in thinking by over 150 students from the Media Arts Cultures and MediaArtHistories programs spanning the years 2006-2023. Also included is content analysis of Master Thesis topics and an overview of current positions and activities held by this impressive international group. The organic directions the field is developing, as seen through this unparalleled overview, can provide a glimpse into future memories and future Media Arts Histories. Discussion about research fields, curricular issues and international networking strategies is welcome.

Keywords: emerging professionals, future memories, research directions, curricula, global trends

*Speaker

The Troubling Affair of Born-digital Art Conservation: creative design for computational art documentation

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Abstract

Over the past two decades, conservation in media art has become the focus of many debates, conferences, research projects and initiatives aiming at defining the subject and looking at the best preservation strategies and methodologies particularly for museums and cultural institutions to keep digital artworks alive. By reflecting on the values of media art documentation, and expanding on the idea of audience documentation, the paper, co-authored by a multi-disciplinary team formed by an art historian/curator, a pioneer of computational art and an engineer specialised in digital art installation and preservation, will explore the potentials, challenges and possible new solutions to the still growing issue of computational art preservation, with a focus on those cases that employ models of creativity. The paper will draw upon a case study and will discuss its conservation issues. The paper will conclude by proposing a systems engineering approach to the construction of these kinds of artworks and will show how that could help solve the preservation problem.

Keywords: media art, conservation, documentation, cases study

*Speaker

Ugo La Pietra's Unbalancing System: From Interactivity to Alienation

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Abstract

Active since the 1960s, Milan-based artist and designer Ugo La Pietra's practice encompasses intermedia installations, speculative design projects, performances, films, and publications. The paper presents La Pietra's practice from the 1960s–1970s, a time during which he was associated with the Italian Radical Architecture movement along with fellows such as Superstudio, Archizoom, and Gianni Pettena. According to Germano Celant: "This is an architecture that has no intention of being subservient to the client or becoming his tool; it offers nothing but its ideological and behavioral attitudes." Celant wrote this essay for the exhibition catalog of *Italy: The New Domestic Landscape* (1972) at MoMA, New York. La Pietra's contribution to the exhibition consisted in a living cell-like installation, and photocollages and drawings displaying the functioning of futuristic technologic devices such as the *Ciceronelettronico* and the *Videocomunicatore* that prefigured networked communication systems such as the Internet.

La Pietra's theory of "Unbalancing System," which the MoMA project tried to offer a glimpse into, is at the core of various other projects from the late 1960s and 1970s, all based on speculations on ways of living, with a recurring focus on the definition of public space and the alienating impact of media technology. Examples range from the interactive devices of the series *Immersiones* (1967–1969)-such as life-size spheres or wearable helmets that isolated the user from the surrounding space-to public interventions and urban structures such as the *Commutatore* (1970)-a wood platform, tiltable at various angles, that allows the user to observe the cityscape from unusual viewpoints. Still overlooked, La Pietra's hybrid media production of the 1960s–1970s anticipated issues of domestication, alienation, and social distancing, in reference to media technology, heavily discussed today in connection with the COVID-19 pandemic and related restrictive measures.

<https://ugolapietra.com/en/home-2/>

Keywords: intermedia, radical architecture, Italian art, media art, 1960s, information age, networks.

*Speaker

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Towards a Sonic Theory of Posthumanism

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Abstract

Posthumanism is a movement within philosophy dealing with the destabilization of the human subject as the center of knowledge, history, or thought (with canonical thinkers like Rosi Braidotti, Cary Wolfe, Katherine Hayles, Kodwo Eshun, etc.). Posthumanism has many heterogeneous factions and splinter groups, not all of which comprise a compatible set of theoretical positions. The cybernetic post-humanists are preoccupied with transforming bodies into information, where the boundaries of the autonomous subject are up for grabs and the human is fused with intelligent machine. The Critical Posthumanists rail against the hollowness of the claims of "universalism" that underlie the Western European canon and Enlightenment philosophy; rejecting anthropocentrism (humans as center of the world). The Radical Eliminative Posthumanists envision a world without humans or where existing modes of human life are no longer possible. The Transhumanists are the worst of all worlds, ridden simultaneously with a Silicon Valley-like techno-fetishistic infatuation with "human enhancement", how to extend biological human life and stave off old age through capital-intensive technology (bordering on a soft eugenics), coupled with the hubris of an archaic humanism that views humans as triumphant and transcendent. The last few years has seen a rise in influence of posthumanism-Pact Zollverein held "IMPACT 20: Interplanetary Alliances," engaging posthuman perspectives, Haus der Kulturen der Welt held "Driving the Human" and the Postnatural Independent Study Program launched its 5 month posthumanism school.

As David Cecchetto (author of *Humanesis: Sound and Technological Posthumanism*) observes, Sound Studies has been relatively absent from the discourse of posthumanism. Posthumanism poses a challenge to sound art and Sound Studies, because sound by its very definition is anthropocentric and will not readily mesh with theories predicated upon the disappearance of the human subject. As Jonathan Sterne observes in *The Audible Past*, the claim that sound reproduction has "alienated" the voice from the human body implies that the voice and the body existed in some prior "pure" state; i.e. sound essentialism. Sound has been ridden with religious biases about the positive role of hearing in salvation and transhistorical essentialist idealizations of hearing as a type of "pure interiority," rendering it obstinately tethered to romantic notions of the "human". I propose instead of going into the future (as posthumanism is often associated with futuristic fabulations), we should instead go back to the past, to the mid-1800's, where we find the first blueprint of the "posthumanist listener." Johannes Müller's 1856 theory on listening eradicated distinctions between internal and external sensations, resulting in a mechanical ground for sensation. It was antithetical to "humanist" notions of inner perception configured as a coherent human subject immersed in a world of sensuous experience, and instead embraced the posthumanist assumption of "human as an arbitrary system to be assembled and disassembled," a switchboard though which an amalgamation of perceptual events (connected to both internal and external stimuli) are

^{*}Speaker

transmitted. This essay critiques "Sloppy Posthumanism," the lazy assumption that any digital art using an "avatar", an alterego, or a modified cyborg voice is qualifies as "posthuman".

Keywords: sonic arts, posthumanism, sound art, sound essentialism, Jonathan Sterne

Interfacing with atmospheric attunement to foster environmental awareness.

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Abstract

This article presents a review of a case of environmental sound with embodied and pervasive media in an interactive installation called Augury - Atmospheric Attunement. It ponders on embodied technologies to potentially augment our sensorium across scales of perception and awareness. The project combines ancestral and modern ways of sensing and perceiving our atmosphere, wherein technologies create an orientation towards attuning perception through experiments with ubiquitous media and environmental computing. Turned into datasets for immersing the audience into the complexities of multiscalar weather sensing stations.

Technologies for sensing and measuring the atmosphere as we know it today arose from ancient methods that transfigured into modern meteorological developments. Arguably, ancient meteorology moved from mythological to empirical-scientific, in order to explain and predict weather events (Taub, 2003). This article considers that hypothetical transition as potentially recursive, using contemporary weather sensing technologies to understand and predict intuitively atmospheric processes.

The installation employs a multichannel sound instrument created to generate soundscapes from atmospheric processes. This instrument takes inspiration from ancient cultures to create sensing media to extend the perception of the performer, who also then becomes a listener of atmospheric processes. The interface channels dynamics found in the atmosphere: wind's force and direction, air quality, atmospheric pressure, and electromagnetism. These sources are translated into sound by mapping sensor data into a multichannel sonification composition. The paper outlines the artistic context and expands on its interaction overview.

This exploration is based on recent years of research around environmental sound, centered on atmospheric processes, such as the wind and the electromagnetic spectrum. This tendency started by exploring generative and indeterministic methods in music and sound-making. This sonic exploration set off at creating soundscapes related to elusive and often complex atmospheric phenomena, such as the air and wind. These media experiment series combined sound and the environment to ponder their ecologies, their affinity across technology, and their augmented perception of surrounding processes driven by the invisible forces of the atmosphere. Some of the activities concerning my artistic research focused on composing multichannel spatialization of sound, the notion of weather forecasting, and the meaning of performing with sound from a south-hemisphere perspective.

Keywords: atmospheric attunement, environmental computing, hybrid sensing, multiscalar atmospheres, divinatory interfaces

^{*}Speaker

HYBRID IMAGES. On Transformations of the Pictorial in Mixed and Machine Generated Realities.

Svetlana Chernyshova*¹

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Abstract

Morphing, fast, sometimes shrill, sometimes surprisingly haunting: in terms of media history, mixed reality formats and GPT can be seen as marking, if not a radical change, at least a decisive paradigmatic moment. Virtual, but above all augmented reality formats (once again) fundamentally question what can be understood by an image and what can generally be associated with imagery. While the mixed reality forms in art particularly address the issue of how images are sensually and materially shaped and what shifts they initiate with regard to our perception and experience, the implementation of artificial intelligence (or machine learning) brings new processes and practices into the field. And it is precisely on those practices and processes that this article proposes to take a sharpened look. Drawing on the work of contemporary artist Pascal Sender (*1988, Switzerland), who, as a trained painter and self-taught programmer, engages with online collective processes, augmented reality layering, and AI image generation, the paper would focus on the question of what readjustments are occurring with regard to modes of production, circulation, and reception of the pictorial against the backdrop of the current techno-medial condensations outlined above. The article is thus literally interested in a re-sourcing and asks which sources, which links, which trajectories and stabilization mechanisms accompany the image. How can reference structures be dealt with when no reference chains are made visible at all (openAI)? How to deal with blackboxing processes that shift references into latency? What ethical, political, but also aesthetic implications arise from this?

Following on from media-historical and image-analytical studies, the article proposes to foreground the current 'metamorphic moments' of the pictorial in order to pursue from there - with a critical-ecological rallying gesture - the question of which effects and conditions allow the 'hybrid' image forms to emerge. What can be identified as the source when images result from a concatenation of prompts? But which resources are simultaneously claimed in the course of this?

The aim of this contribution is to explicitly ask how images that show themselves as hybrid entities circulate in the artistic context and which assemblages they make use of on the one hand and allow to emerge on the other. How can images be produced that not only follow the flood, but also enable critical positioning? And what role do both technical-media ensembles and discursive formations and practices play in this?

Keywords: Augmented Reality, AI, Image, Hybrid

*Speaker

Satellite projects: "Experiments in Art and Technology" in Central America

Andrés Burbano*¹

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Abstract

"Experiments in Art and Technology" E.A.T. was founded in the late 1960s in New York by the artists Robert Rauschenberg and Robert Whitman and the engineers Wilhelm Klüver and Frederick Waldhauer; it was "a non-profit organization to promote collaboration between artists and engineers." The diverse initiatives and activities of the group and, in particular, the role of "Billy" Klüver (1927-2004) have been decisive in defining the field of interaction between art and technology in North America in the XXth century. Recently, the trajectory of E.A.T. has been thoughtfully considered by art historians and historians of technology, such as W. Patrick McCray in his book "Making Art Work" (2020). The extensive archives of E.A.T. hosted at the Getty Institute in Los Angeles, California, show the team members' diverse interest including particular attention to the art and cybernetics scene's activity in South America. There is also intriguing documentation on a series of initiatives that E.A.T. in conjunction with experts from the Institute for Communication Research at Stanford University, considered conducting in Central America, particularly in Guatemala and El Salvador. More than artistic projects, these initiatives explore the creative uses of audiovisual and even computational technologies in pedagogy under the conceptual umbrella of "The New Educational Technology." Among the most outstanding projects is the implementation of a communication satellite focused on Central America for educational purposes. The available documentation clearly shows the progress of a series of development threads of said projects that consider the acquisition of affordable satellites and adopting audiovisual technologies from different parts of the world, from India or Australia, for example. In addition, there is abundant material on the technical prospectuses of antennas for signal reception to be hosted in educational centers. This essay outlines a framework for understanding the group's activities outside of North America in particular "The New Educational Technology" project and the potential impact of a creative vision on education in Guatemala and El Salvador, exposing the limitations and socio-cultural tensions typical of countries that received support through "Alliance for Progress" and that to the once operated as agricultural suppliers to the U.S.

Keywords: E.A.T, Central America, Billy Klüver, Guatemala, El Salvador

*Speaker

Comparing Contemporary Art and New Media Art: On the Division Between the "Duchamp Land" and the "Turing Land"

Marianna Charitonidou*¹

¹Marianna Charitonidou – Greece

Abstract

The key argument of this paper is that computer-based art or new media art was developed shaping a new perspective that was initiated by the happening and performance art movement. This new perspective characterising computerbased art or new media art was related to a reconceptualization concerning the relationship between art and space, on the one hand, and the relationship between art and the concept of participation, on the other. This means that, in order to grasp what is at stake in the case of computer-based art or new media art, it is important to comprehend the shifts its emergence provoked as far as the interaction between the audience and the artworks is concerned. These shifts are also related to the transformations of the concept of artistic action. On 19 June 2010, a debate entitled "Contemporary Art and New Media: Towards a Hybrid Discourse" was held within the framework of Art Basel. This debate brought together French curator and art critic Nicolas Bourriaud, Austrian post-conceptual artist, curator and new media theoretician Peter Weibel, and Michael Joaquin Grey, an artist whose work has bridged the boundaries between art, science, media and the imagination. The theme of the aforementioned debate was the division between mainstream contemporary art and new media art. The discussion was coordinated by Edward Shanken. Ernest Edmonds, Lizzie Muller and Matthew Connell have related Nicolas "Bourriaud's rejection of art delivered through new technologies...(to)...a frustrating history of division between contemporary and computer-based art". More specifically, they have interpreted this rejection as an outcome of the division characterizing contemporary art scene "between 'Turing land' (inhabited by the computer-arts) and 'Duchamp land' (inhabited by post-modern conceptual art)". Certain art theorists, such as the pioneering theorist of digital culture and media artist Lev Manovich, who oppose the "Duchamp land" against the "Turing land", tend to argue that artists belonging to the latter "lack irony in their critique of art mediums", in contrast to the artists of the "Duchamp land". Instead of interpreting the "Duchamp land" and "Turing land" as opposing realities, we could understand them as the outcome of an inevitable and continuous exploration towards a dynamic understanding of the dynamics between space, technology and experience through participation, immersion and other forms of manipulation of reality. The paper aims to analyse closely two exhibitions that are of great significance for understanding the tension between "Duchamp land" and "Turing land" are *Software: Information Technology: Its New Meaning for Art*³¹ and *Cybernetic Serendipity: The Computer and the Arts*. The former was curated by artist and critic Jack Burnham and was held at the Jewish Museum in Brooklyn, New York City between September 16 and November 8, 1970, and the Smithsonian Institution, Washington, DC between December 16, 1970 and February 14, 1971. The latter

*Speaker

was curated by Jasia Reichardt, in collaboration with technological adviser Mark Dowson and musical adviser Peter Schmidt. It was designed by Franciszka Themerson and was held at the Institute of Contemporary Art (ICA) in London from from 2 August to 20 October 1968.

Keywords: new media art, Nicolas Bourriaud, Peter Weibel, Michael Joaquin Grey, Art Basel, Duchamp Land, Turing Land

Abraham Bar Hiyya in the long travel of the Algorithm

Andrés Burbano*¹

¹Associate Professor – Spain

Abstract

One of the essential tasks of the present is the historicization of the algorithm concept; it is crucial to understand the current world to have a clear idea about what an algorithm is and which algorithms are part of our lives; therefore, an archeology of the notion of Algorithm and its history is very necessary. It is known that the English word Algorithm and the Spanish word "guarismo" make direct reference to one of the sages of the Arab renaissance: Al Khwarizmi (780-847). He was an influential Baghdad-based Persian mathematician who contributed substantially to mathematics at the time and influenced subsequent centuries. The translation of his books on algebra and the intake of his knowledge to the Christian European world has been studied, but a higher level of granularity is needed to understand the process. It is clear that translation was necessary to introduce algebra to medieval Europe, but the way in which this process happened still has many information gaps. One of the groups of intellectuals that operated between the Christian and Muslim kingdoms in Europe were the Jews, who knew Latin and Arabic and could translate treatises. Among these scholars, Abraham Bar Hiyya (1065-1145) stands out because he made one of the first translations of geometry from Arabic in Barcelona. Abraham Bar Hiyya, also known as Savassorda, was a Spanish polymath who spoke four languages and translated some of the works of Al Khwarizmi, introducing some fundamental concepts of algebra and arithmetic to Jewish and Christian Europe. Still, above all, he is responsible for popularizing the so-called Arabic or Hindu Arabic numerals. The introduction of these fields of mathematics and numerals that better-facilitated operations were one of the most important scientific revolutions in Europe in the 11th century; some of the wise men of the time who learned to do operations with the recently introduced numerals from the East were called "algorists." Later on, in the early 1980s of the 20th century, the term Algorist was used again by artists who were beginning to work with computers, such as Roman Verostko (1929) and Jean Pierre Hebert (1939), who referred to their experiments with visual art and technology in those terms. However, despite seeming distant, there are conceptual connections between the practices of these "algorists" and some of the intellectual debates of the Middle Ages that came from the times of Savassorda, Fibonacci, and Llull.

Keywords: Algorithm, Al Khwarizmi, Abraham Bar Hiyya, Jean Pierre Hebert, Roman Verostko

*Speaker

From first festivals to institutions. A cultural history of media arts institutions - preliminary identifications

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Abstract

What do institutions dedicated to media say about media art? What story do they spin, what are they silent about, what are they forgetting? The cultural history of new media art institutions demands a voice and its due place in the pages of contemporary art history. Their activity challenges the hegemonic nature of the artistic mainstream, building an alternative narrative that echoes the language of exclusion and marginalization of the contemporary art world. From this perspective, new media art can be considered an example of institutional criticism, which, far from the contemporary art world, has developed its own separate system, another art circuit.

In my presentation, I focus attention on the institutional aspect of new media art, which is inextricably linked to the socio-cultural and political context of its development. My paper will be a presentation of the results first Phase of my ongoing research on the cultural history of new media art institutions in Europe. Based on study visits conducted in 2022 centered around the history of the first new media art festivals organized in the 1980s by ZKM Karlsruhe, one of the most important and largest institutions dedicated to new media art (Multimediale 1-5), and by WRO Art Center, a small center located in Wrocław (Sound Basis Visual Art), I will try to present the genesis of the emergence of these two institutions, which co-create an alternative line of development in the field of contemporary art. In my explorations, I point out that New Media was a key concept in the economic policy of the 1980s and 1990s, which also had its continuation in the state cultural policies of Western and Central and Eastern European countries, where New Media became for about a decade a central concept in the discourse on the legitimization of cultural policy. This enabled the rapid development of an institutional environment for New Media-related art forms and practices.

Looking back at the past, I will simultaneously look at the current situation of new media art institution from the perspective of the challenges and threats it faces in the contemporary art world. I will consider to what extent media art is present in the contemporary art field and how its presence affects traditional institutional strategies. Low visibility of new media art in the field of contemporary art threatens "cultural amnesia" of art practice based on rapidly aging technologies.

Pierre Bourdieu's field theory, Arthur Danto's conception of the art world(s), George Dickie, Howard S. Becker, Alexander Alberro's institutional criticism, Hans Haacke, Peter Vergo's new museology and Jonas Ekeberg's new institutionalism play an important role in the analytical tools of my research.

*Speaker

Keywords: new media art, institutional definition of art, art world, institutional criticism, cultural policy, ZKM Karlsruhe, WRO Art Center, festivals

The Massification of Computation: New Methods for Knowledge and Culture

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Abstract

I'm going to argue for a knowledge paradigm shift in response to the massifying of computation. Methodologically, science has grown to deal with more complex rationalism and a more generalized empiricism. This will be demonstrated in the work of Barabasi, Strogatz and Brodie where in each respective case systems of memes and networks replace more humanly intelligence mathematical constructions. In turn, their empirical breadth becomes more generalized, applying formal ideas across social and epistemological domains. Turning to skeptical writing and cultural theory, I will argue that the increased dynamism, impressionism and irony of writers such as McLuhan, Haraway and Baudrillard are discursive cases of this broadened empiricism and complexified rationalism. The media-centric approach to cultural creation is arguably the most responsive to this methodological shift, and cases of technological art both popular and gallery-oriented will be analyzed as test cases thereof. Barabasi will be critically revisited, taking his ideas of the bedrock of social capital for high art luxury economy, and offering an alternative basis for the system in considering the growth of popular new media art, as evidenced in gaming culture.

Keywords: systems, paradigms, games, networks, memes

*Speaker

Reconstruction of New Media Artworks: Preserving the Conceptual Framework

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Abstract

The paradox of new media art is its essential property of being new, which presents a complex dilemma for a museum or an artist who wants to preserve a new media artwork for an extended period of time. The new technologies have earned the title new because they strive for constant development, however this brings about the swift obsolescence of current solutions: the more a technology evolves, the faster its today's state becomes unusable tomorrow. New media art exists at a fragile moment of becoming possible. It reflects the changes in society by shaping new communication models that are emerging with the imagination and implementation of new technical solutions, which may become widely used in the near future. The authors of this paper have been involved in the creation of new media artworks by Srečo Dragan, a pioneer of new media art in Slovenia, and the later retrospective exhibition of his works that span over six decades. For the exhibition at the Museum of Contemporary Art Metelkova in Ljubljana in 2016 many of the works had to be reconstructed on new technical platforms, while others were exhibited on their original media (such as video tapes). Dragan, the author, was looking also at possible ways of transcoding the analog conceptual artworks from the seventies, most of them were performances and happenings, with the use of augmented reality, virtual panoramas and online participatory interaction. A different approach was used in reconstruction of more recent new media works, that had to be emanated on new systems, but many of them were programmed from scratch following the artist's concept. In this situation we are faced with the necessary decision about the use of technological solutions of the present moment that didn't exist at the time when the artworks were conceptualized and first realized. Together with the artist we had to consider which parts of the original project have to be kept intact and which parts it is reasonable to implement using new and different technical solutions. One case of a reconstruction is a techno-performance that used gait recognition in 2006, while in 2022 the algorithms for gait recognition are completely different in their design and performance. Since the original work thematised a then new and developing technology, we followed the spirit of the work and used the now new and developing technology, and reflected on the overall message of the reconstructed artwork in the social context of today, which necessitated an additional scrutiny of the context from fifteen years ago. In the paper we will describe the procedure and the theoretical model behind the work of reconstruction, which can be applied also to other cases of new media artworks. Last but not least, we will address the versions of open-sourced artworks that the artist has provided the students with to experiment, create new

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interpretations, integrate into new remixes, translate into other media. The artworks were broken down into separate parts and aspects and we observed the integration of these parts into new projects.

Keywords: new media art, pioneers of new media art, reconstruction, museum, archive, interpretation

Arts and design strategies to address climate emergency and action: the case of electronic waste in Accra, Ghana

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Abstract

This contribution situates the role of public media art, critical making and reappropriation techniques as sociopolitical vehicles for enhancing climate actions and awareness in contexts of technological inequalities and electronic waste in Accra, Ghana. Our article expands from two case studies in order to inquire how ecological literacy and activism is developed through design by Ghanaian arts and design communities; in reaction to climate emergency and the production of electronic waste.

Our contribution's introduction will explore how arts and design practices of technology making and literacy can be combined with critical thinking in order to question, expose and research on the sociotechnical entanglements and issues of computing. We will moreover contextualise our contribution through Hertz and Parikka "zombie-media" (2012) methodology. Placing here the emphasis on the planned obsolescence regime and on the critical re-appropriation of discarded electronics, this framework will enable us to underlie the importance of design practices evolving around e-waste and technological pollution in Ghana (and Africa); as active forms of ecological media activism, literacy and awareness.

Drawing from this context, we will then expand on the Agboghloshie Maker Space Platform (AMP), a collaborative space operating from the iconic commercial district and dumping site of Agboghloshie, Accra. This case study will enable us to state the potential of participatory design methods as tools for collective literacy and awareness; situating such frameworks as crucial agents empowering and positively impacting the landfill's local community of scrap recyclers and dealers. We will also connect these initiatives to the work of Ghanaian media artists repurposing the materiality of discarded computers in order to support media literacy through critical thinking and debate. Zooming at the level of Akwasi Bediako Afrane, we will then investigate here the making of his "TRONS" (2022); assemblage-shaped robots acting as "platforms and media for reflection, engagement and interactions". In dynamic with Hertz and Parikka, these will enable us to conclude on the importance of arts and design methodologies as crucial vectors empowering local communities through climate actions that critically address the planetary ecological intertwinement of computing and technology.

References:

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Hertz, G. & Parikka, J. (2012). Zombie Media: Circuit Bending Media Archaeology into an Art Method. *Leonardo*, 45 (5): 424–430. https://doi.org/10.1162/LEON_a_00438

Case studies:

The Agboglobshie Maker Space Platform (AMP): <https://qamp.net/>

Akwasi Bediako Afrane's "TRONS": <https://www.gameoftrons.com/>

Keywords: Electronic waste, Arts and design strategies, Discarded electronics, Ecological media activism

Memory through New Media Art: From implantation to remembrance in a Posthuman Society

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Abstract

This paper deals with the progression of permanent and mutable memory through Eduardo Kac's 1997 performative BioArtwork *Time Capsule* and M. Eifler's 2020 AI artwork *Prosthetic Memory*. Through a methodology of critical analysis, this paper breaks down the antithetic and analogous dynamics between organic and synthetic memory. Using BioArt and AI art as points of posthuman observation, we explore Kac's and Eifler's use of invisible networks to dematerialize human presence as a substitute for the physical body. The artist's use of digital human prosthetics situates New Media Art History as a vital fixture of contemporary cultural and scientific change surrounding corporeality, enslavement, and augmentation. Comparative analysis between *Time Capsule* and *Prosthetic Memory* reveals mutual outcomes in which body and memory become issues of corporeality, bodies, and technology highlight enslavement, and technology and memory evolve through augmentation. Consequently, memory becomes the binding agent leading to an expanding transdisciplinary and multifaceted approach to art history.

In *Time Capsule*, Kac pioneered the genre of bio-art by implanting an RFID microchip into his ankle and registering himself in a remote database. In a prescient and symbolic gesture, Kac's action signified a transcendence of physicality by existing simultaneously as virtual and organic in real-time. By outsourcing physical memory, *Time Capsule* signified progression in the face of rapid contemporary cultural and scientific change. Twenty-three years later, virtuality extended past bodily memory into the neurological. In 2020, M. Eifler received the Ars Electronica S+T+ARTS Prize for their AI work, *Prosthetic Memory*. Eifler, who lost their ability to form long-term biological memory, created an artificial system that stores, processes, and recalls their information as part of a total experience. In a performance of preservation, *Prosthetic Memory* demonstrates the fragile temporality of memory in the face of an infinite and rapidly developing information production. Together, Kac and Eifler progressively situate their artwork on a cyclical timeline that traces memory's evolutionary consequences through action, media, and material. From BioArt to AI art, *Time Capsule* and *Prosthetic Memory* present a holistic evolution of digital memory to include the entirety of the body and mind.

In 2020, total virtual existence was vital to the sustainability of our civilization. Social distancing requirements during the covid-19 pandemic converted entire societies into digital; concepts once thought to be theoretical anecdotes of science fiction are now necessities of modern survival. All aspects of human interaction were outsourced digitally and remain intact within the internet. *Time Capsule* and *Prosthetic Memory's* use of hosts, technological extension, and Cyborg Theory present theoretical outcomes of these evolving dialectic relationships between technology and organic bodies. The issues raised in our analysis of

*Speaker

these artworks, augmentation, corporeality, and enslavement, highlight how New Media Art can shift the conversation about human evolution. Through those who experience these artworks, *Time Capsule* and *Prosthetic Memory* are active examples of networks archiving the growing indivisibility of organic life and virtual data. One from the dawn of the internet and the other to the posthuman condition's cusp.

Keywords: BioArt, post, humanism, implant, bioethics, cyberculture, cyborg theory, memory, archive, prosthetics, telepresence, interactive art, AI art

Perspectives of Archiving Media Art in Croatia (1988-2008)

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Abstract

In this presentation, I will analyse the main problems regarding archiving and preserving media art works from Croatia in the period 1988-2008. *New Tendencies* movement (1961-1978) was the beginning of the media art practice and visual research in the art connected with technology in former Yugoslavia and Croatia. *New Tendencies* in art history has been well explored and there is a significant number of texts and books devoted to this topic, some of the researchers who dealt with this topic were Ljiljana Kolečnik, Darko Fritz, Armin Medosh, Ješa Denegri. In the late 1980s, the development of media art continued but this time in a different context regarding the rapid development of the digital technology and the new social and political circumstances. Today, this period from 1988 to 2008 in media and digital art history still needs more exploration, analysis and presentation to the public. The decision to explore the history of multimedia and digital art in Croatia in the period from 1988 to 2008 was created for several reasons. There is no chronologically mapped and classified review of authors, artworks with complete attributes, styles, exhibitions, symposia and events related to digital and media visual art for a given period in the form of a digital archive or publication. Key texts, artworks, examinations, and events with the topic of digital and media art in Croatia are available on the internet thanks to the personal efforts of individual authors and curators. In this presentation, I will describe methodology as well key findings of my research for my dissertation. There are two main analytical approaches in this research. First, is to collect data on authors, artwork, curators, key exhibitions, festivals and institutions related to visual digital and multimedia art. Addition to theoretical research methodology involves deep interviews with artists and curators who created in the mentioned period. The collected material is classified chronologically and regarding of the means of expression and the thematic entities. Research will also include influences of other artistic surroundings on the Croatian authors who have been studying abroad. The literature, particularly emphasizes the influence of German and Dutch cultural movements on Croatian artists. If soon curators, artists, and researchers don't agree about concrete measures in media art preservation and conservation, numerous media-art works will be lost future generations.

Keywords: archive, Croatia, art history, media art, preservation

*Speaker

The Museum as a map. From panorama to enriched deep zoom. A combination of IIF framework and VR360 for digitized art collection.

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Abstract

The March 2020 pandemic not only caused the temporary closure of museums around the world but also interrupted museum in-site visits. The response to this scenario is the increased development of virtual exhibition programs and online tours (Kaplan, 2021). Institutions acknowledged that virtual tours play an essential part in museum education, by enabling those who are unable to reach an art museum and those who want to have a different perspective of this place of art. The adoption of a cross-disciplinary approach to improving academic and professional skills is crucial for the promotion and preservation of cultural heritage. Innovative, generative processes of high-resolution 360° spherical photographs can play an important role in creating an information container in the form of a virtual tour to allow an interactive fruition (Antinozzi, di Filippo, Musmeci, 2022).

Such a spherical environment, sharing the spectacular and pedagogical function of the panoramas of the 18th century, could integrate the application of the IIF framework to facilitate the knowledge of the art collection. This set of applications and viewers allows users to describe and enrich the spatial locations of the museums, providing online visitors with a layered path to deepen their knowledge. The re-enactment in the participation and experience (Modena, 2022) moves a step forward beyond mere storytelling efforts.

This is more effective in those museums, such as the Galleria Borghese in Rome, with a distinctive aspect characterized by a peculiar decorative apparatus through which the collection of sculptures, paintings, and furniture is displayed. This is a challenge when describing each item digitally. In this context, the spatial component plays an important role in highlighting the decorations, stucco, marble, and tiles around the artwork. The paper will compare the undertaken digitization campaign by museums in order to make the complexity of their spaces, to create virtual navigable patterns of rooms. In Borgehese's case, the IIF ecosystem has been adopted to fit into this model, describing each museum room that was taken with equirectangular photographs. The images were treated as if they were maps to investigate and comment on, guiding the user in an amplified modality of the virtual tour. Thus, the paper aims to compare two strategies in the VR360 museum experience: the narrative-gaming interaction, and the descriptive, and in-depth path.

Keywords: VR360, IIF, Digital Museum, Virtual Realty, Virtual Tour, Gaming

*Speaker

resilient terra – decolonizing geoengineering

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Abstract

This contribution introduces a curatorial research project called *resilient terra*. The project explores what decolonizing geoengineering means within the framework of what Françoise Vergès defines as racial capitalocene (2017). This inquiry, particularly relevant in the context of Venice, is built on polyphonic encounters intertwining media materialities; artistic, curatorial and literary practices; and theoretical resources addressing the role of technology within the climate emergency. Media Geology contributes here to articulate the agency of technology across deep time temporalities (Jussi Parikka) to begin to grasp technofixes' effects on planetary scales. Inspiration also comes from ecomedia's considerations on ecotopia and western extractivist practices on indigenous land (Sean Cubitt). Discourses on geoengineering developed from the science fiction trope of terraforming (Benjamin Bratton) – and the links between colonialism, racial oppression and the environmental crisis commonly found within it – are aligned with propositions to reframe geoengineering projects within the frameworks of climate justice and climate realism (Holly Jean Buck), at moment in time when binaries ideologies may not be an useful instrument for resilience practices to emerge in the midst of the environmental emergency.

This research project curatorially frames these theoretical inputs in relation to the work of artists working with and/or addressing media technologies and their impact on contemporaneity. Of particular interest are those artists that are challenging the techno-positive and ecomodernist agenda tied to neoliberal practices as well as those that propose speculative imaginaries centered on the various possibilities associated with technology and its role, not merely sensing and mediating it, but also shaping Earth's contemporary condition. A starting point, in this context, comes from Benjamin Bratton's re-orientation of the stack, or the planetary computation cognitive organism able to produce planetary perspectives through data collection and analysis on which our grasp of the global planetary crisis is built upon. Bratton argues that, if re-oriented away from surveillance capitalism and neoliberal agendas, the stack can be used to supporting long-term practices for maintaining earth-like habitats on our planet, triggering a shift towards less anthropocentric views of Earth while also including social and climate justice discourses in the geoengineering debate.

With a constant attention towards the multiple materialities of technologies that artists have embedded and/or addressed in their work, decolonizing geoengineering from a media art perspective can begin. The project's methodology is inspired by Édouard Glissant's archipelagic thinking and is built on ideas of mondialité by Glissant and Karen Barad's intra-action. These concepts support the relational nature of the project at multiple levels and allow *resilient terra* to emphasize climate justice issues within a politicization of geoengineering practices. *resilient terra*'s objective is that of engage the wider audience with concepts of geoengineering, racial capitalocene and climate justice, in order to create a space

^{*}Speaker

for socio-political debate that encourages transformation and speculative thinking on multiple 'larger' futures.

Note to the organisers: This is a project in the process of finding alliances with interested researchers, artists and creative practitioners from different fields to move forward as a set of collaborative, intersectional and relational initiatives.

Keywords: curatorial research, geoengineering, media materialities, planetarity, terraforming, racial capitalocene, climate justice, ecotopia

Media art as a mediator of scientific uncertainty

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Abstract

Art changes perception, and just as it is difficult to grasp the concept of art, it is equally difficult to exclude adjacent fields. Design is such a term, and when it comes to architecture, traditionally commonly referred to as a discipline between art and science, but in fact at least as much between applied technology and engineering, the transitions become increasingly fluid. In the case presented here, we are dealing with an expansion of the term design into the interdisciplinary area between the architecture that conceives and finds form and the humanities disciplines of archaeology, historical building research and art history. The fact that the results of these highly fruitful collaborations are essentially concretised through the use of new media, and that they neither correspond to the mainstream nor can be adequately received without some degree of openness to abstract art as well, makes them appear as media art in this respect. The key to archaeology, however, lies in its scientific nature: not only is archaeological knowledge fragmentary, but here this becomes particularly evident. The interpretation of finds in the sense of a spatial hypothesis of an architectural structure on the basis of a few fragments is a generation of knowledge that is inevitably based on conclusions of varying firmness and on analogies. These are hypothetical, but precisely scientifically based and by no means merely speculative. Generally formulated verbally, entire cities that have long since disappeared are described in this way within the limits of what is scientifically justifiable, but just usually only described, not illustrated. It is often conceded that too little is known to visualise it. The misconception lies in the practice that archaeological hypotheses are often visualised in a form familiar to the film or games industry, namely photorealistically and thus highly speculative. But if the objective of visualisation is to visualise the actual scientific hypothesis, to translate the verbal hypothesis as faithfully as possible from the text into the image, then visual translation cannot avoid translating those abstractions that are completely natural in language into the image as well. But this act, the creation of visual artefacts, abstract in form and content, is a creative act of design, as is inherent in all formally creative disciplines from architecture to design to art. It is perhaps more of an applied art, but this term is also already occupied and falls short here. In the end, the visualisation of scientifically based hypotheses of archaeology is a phenomenon that the authors call visualisation and uncertainty, a kind of media art whose content is a transferred, if not subtle, mediation of architectural intentions. This initiates a development that opens up a new field of activity for media art and thus contributes to the creation of future memories. The paper illustrates this method by means of selected projects that have been created in close collaboration with research and cultural institutions and have been exhibited in renowned museums, including Cologne Cathedral, Bern Minster, the Palatine in Rome, Pompeii, Pergamon, Jerusalem and more.

*Speaker

Keywords: knowledge, uncertainty, archaeology, architecture, design, abstraction, virtual photography

Archiving as a dialogue: insights from the digitization of Cultivamos Cultura collection

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Abstract

This paper discusses a series of practical and theoretical challenges related to the digitization, documentation, conversation, curation and exhibition of the Cultivamos Cultura collection - a series of projects that represent different contemporary experimental art practices, with a focus on biomedica.

This research process is a reflection on the knowledge acquired and systemized during the investigation within the project Arc-Hive, an European project founded by the European Commission and carried out by six institutions working in NGO and museum sector, publishing, IT and audiovisual field, with the purpose of developing a feasible and tailor made digital solution to some of the issues fundamental to various cultural agents working with biological and living materials, following principles of open culture and information sharing in all project phases.

Emphasizing the importance of ongoing communication between researchers, artists and curators, this paper questions the role played by the researching team as the gatekeepers of an archive platform, who ultimately filter and decide the information that becomes available and public.

These agency issues become more evident throughout the creation of a Digitization Protocol, that could be adapted to the immense variety of materials, techniques, and languages of contemporary art. Raising philosophical questions regarding the ontology of art and establishing the underlying purposes of this digitization approach and their inherent limitations, this protocol focused on three-dimensional digitization practices, including the modelling of three-dimensional objects based on reference images, capturing photogrammetric models, and the treatment of digital objects.

Therefore, the researchers conduct in-depth investigations into the content, context, and, in conjunction with artistic knowledge, attempting to comprehend the significance of digital artefacts as representations of physical art pieces. On the other hand, the understanding of the historical, cultural, and artistic significance of the artworks being digitized and archived is also facilitated.

Their knowledge and experience help to shape strategies for organizing and presenting digital content in meaningful, practical and user-friendly ways that can appeal to a wide range of audiences. They also identify key themes and connections between different artworks, which can be used to create compelling and informative exhibitions. Additionally, researchers can contribute to the ongoing evaluation and improvement of digital curatorial practices, providing insight into how different digital mediums, formats, and designs can be used to document, preserve and instigate contemporary experimental practices.

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In summary, the article aims to ponder on the challenges and opportunities presented by the digitization, archiving, conservation, curation, and exhibition of contemporary art practices. It highlights the importance of a constant dialogue between practical and theoretical knowledge, as well as the role of researchers on improving digital curatorial practices.

Keywords: Archiving, Digitisation, Contemporary Art, Digital, Biomedica

Telehaptic: simulated spaces and simulated experiences

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Abstract

The paper is aimed at creating historical account of telematic artwork with the focus on telehaptics. Notion of telehaptics contains the idea of sensual perception of the objects that are not physically present in the observer's sensorium. Theme of telehaptics was re-actualized by the pandemic two years ago, today it may be thought of as simulation of remote spaces or situations that have been lost due to the new geopolitical order. The paper will investigate telehaptic art from 1970 till 2020s from the perspective of strategies the artists use for creating either *total* or *fragmented* sensory experience. The first can imply mapping either the body or the space for the communicators and the second is usually presented by means of wearable or implanted technologies augmenting one (or more of the bodily sensations). Broadly speaking, telehaptics can be seen in the context of the ideas of multiple presence characteristic of transhumanist thinking. Marvin Minsky in 1980 defined telepresence as a necessary state of technology that "emphasizes the importance of high-quality sensory feedback and suggests future instruments that will feel and work so much like our own hands that we won't notice any significant difference" (Minsky, 1980). This brings forth an image of a multiple limb entity with a vastly extended body capable of *multiple presence*. However while in the text Minsky refers mostly to telepresence as a precondition for the variety of inhuman conditions (mines, moonwalking, nuclear reactors, etc), the virus brought telepresence to the center of contemporary social life, making it a mandatory condition for being with people and placing physical public spaces in the periphery. Two points mentioned by Minsky in the text emerged as an urgent issue of the post pandemic structure of feeling: telepresence as existence in multiple places simultaneously and what it takes for telepresence to feel as real presence. In other words these questions can be formulated as the search for the consequences of intimacy without proximity and the ways these intimacies can be imagined or realized in artistic practice (David Bowen, Stelarc, ::vtol::, and others). And the second question would be what are the implications of this multiple presence, or, better to say, multiple and partial absences of "fractal and phantom flesh and bits of bodies spatially separated, electronically connected bodies" (Stelarc, 2020) and whether that causes changes in understanding the thinness of the nature of an individuum, or dividuum, whose parts of personality are safely stored on remote servers (Cassou-Nogues, 2019) in the meanwhile. Postpandemic sensuality can be characterised by the remorse absence: we are neither all here, nor all there, but partly here and partly there at other times. This discreteness is not unusual in microbiological terms as in this case a human as such is a multispecies community of organisms in constant flux (Scatter Surge, Rinaldo), rather than a sole entity. Continuing at the nano-scale, we can think of remote operation inside the body as investigated by Rinaldo (Enteric Consciousness) and Stelarc installations.

*Speaker

Keywords: telehaptics

Building a post-pandemic gallery: narratives of mutation and adaptation

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Abstract

As news and popular media lament the consequences of climate change on the species inhabiting planet earth, narratives of survival and adaptation are often suppressed in favor of narratives of loss: we often don't hear about the species whose resilience has allowed them to adapt and survive in polluted and radically transformed environments (e.g., urban animals, marine animals finding shelter in human-produced artifacts, organisms thriving in toxic environments). In addition, great emphasis often lies on the loss of charismatic megafauna and very little attention is dedicated to other less crowd-pleasing or less known organisms (for e.g. lesser-known insects and wild bees, whose work as pollinators easily exceed the one performed by more popular insects such as honeybees).

How could silent stories of loss, survival and adaptation be given attention, accounted for, and narrated? How can prevailing views revolving around human exceptionalism and anthropocentric interpretations – views that establish hierarchies and priorities of what ought to be narrated, or to be preserved, or named etc.. – be disrupted? Could the arts help find new ways to communicate new narratives across disciplines, as well as across species?

My goal is to create a series of interdisciplinary dialogues between artists, scientists and the general public revolving around life as it thrives and survives pollution and climate change. To achieve this dialogue, I invite these individuals to interact with and through a mobile gallery featuring a curated collection of artifacts, scientific specimens, and documentation evoking interdisciplinary narratives of survival and adaptation. As they interact with the mobile gallery, participants are invited to explore and take note of multiple stories built through layered and disparate practices of knowing and to engage with each other's perspectives.

Part art and science (sciart) installation and part science communication project, the mobile gallery was designed in early 2021 at the height of the pandemic, thanks to a collaboration with interior design Lorella DiCintio (U Met), and interdisciplinary artist Kavi (York U). The choice to create a mobile gallery came from necessity and opportunity. The pandemic allowed us to think beyond the gallery's walls and to merge art with the streets, giving the floor to a diverse public and to the living beings, the trees, the infrastructures populating and sustaining the city. Instead of displaying a collection of artifacts in an enclosed space delimited by four walls, this gallery moves within and across communities, adapting and interacting with its more-than-human surroundings.

For MediaArtHistory, I plan to turn my presentation of the mobile gallery into an open session: I invite artists and art historians to reimagine how their own research and experiences of survival and adaptations can be presented within this space. This mobile gallery is not

*Speaker

just as a container but a space of engagement with different individuals and locations, which respects, and works with, different positionalities, thus leading to new narratives. Practicing empathy and "becoming with" the non-human and more-than-human may lead to abandon the hegemonic "god's view from nowhere" so popular with current anthropocentric knowledge systems.

Keywords: mobile gallery, adaptation and survival, resilience, exhibition spaces, more, than, human

Transforming in the Making Reflections on WangShui's Practices

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Abstract

This paper will center two contemporary artworks of the New York-based studio WangShui- the mixed-media installation *Gardens of Perfect Exposure* (2017-2018) and video installation *Weak Pearl* (2019).

Gardens of Perfect Exposure-as the title suggested-is a bright installation hanging in the center of its exhibited spaces. The installation resembles an exquisitely designed habitat in which silkworms feed, move, and defecate, and slowly wait for their moment of metamorphosis. The habitat is made of cheap artificial fixtures, roof repair fabric, laminated hair, translucent glass stones, and selfie lights, but has a suspended field-live projection of the habitat onto surrounded walls, where the transformation of silkworms is excessively magnified. Viewers will accidentally find themselves on the flatscreen when they step into this artificial habitat. In this live video installation, WangShui attempts to connect ancient cultural metaphors with contemporary material reality. Soft organic bodies and cold industrial objects are assembled into a sort of temporary "symbiont." The conflict between the natural and the non-natural, between life and technology, is exposed in the form of live streaming, where power and cultural relations are integrated into a new media ecosystem. WangShui uses translucent LED components to create a flexible screen for *Weak Pearl*. The disorienting light of this installation draws viewers to step closer; however, the image wavers on the "surface" could be viewed clearer by farther distance. The main application of translucent LED screens is urban skyline billboards, but here, its function of creating a landscape has been eliminated and replaced by the materiality of a new type of digital image. The waterfall-like image takes on the form of mollusk-like bodies, composed of pixelated dots that derive their vitality from the bionic power of the new material.

While *Gardens of Perfect Exposure* represents an industrial dispositif, which raises the discussion of exposing and exhibiting violently as well as the haptic experience of projection is brought about, the use of LED screen in *Weak Pearl* could be viewed as an installation display format questioning how moving images are used in an installative environment. In examining two works from WangShui, I intend to raise questions how transformative force, not only alluded by the metamorphosis of silkworm, but is enabled through the thinking on display and dispositif, surface and screen, human and non-human, culture and contemporary technology; how the organism combines with technology reality, how nature in conflict with the media environment; how the power structure and culture works in a media ecology system, which brings about the thinking on intersectionality.

Keywords: Display, Exposure, Surface, Transformation, Intersectionality, Projection, Media ecology

*Speaker

Machine vision in media art and the making sense of earths ecologies

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Abstract

Machine vision, understood as "the registration, analysis and representation of visual data by machines and algorithms" (Rettberg et al. 2019, 1) has drastically changed our understanding of earth and beyond. Sensorial devices like microscopes, satellite images, infrared and ultraviolet vision in combination with AI powered perception is used to make sense of nature, animals, organic life, natural phenomena, and climate change. Likewise, there are several examples of how media art uses machine vision technologies to make sense of earths ecologies in the Database of Machine Vision in Art, Games and Narratives (Rettberg et al. 2022a) which is an outcome of a digital humanities project called Machine Vision in Everyday Life. By analysing a dataset of 190 digital artworks exported from the database this paper examines how media art uses machine vision to explore topics such as 'nature', 'animals', and 'climate change' (Rettberg et al. 2022b). What kind of machine vision technologies are used in media art that explore these topics? What are the dominant attitudes towards machine vision in these artworks? Do attitudes differ when machine vision is used in artworks which deals with other kind of topics? These questions are explored by analyzing network visualisations using exported datasets from the database findings are further discussed through example artworks.

Rettberg, Jill Walker, Marianne Gunderson, Linda Kronman, Ragnhild Solberg, and Linn Heidi Stokkedal. 2019. 'Mapping Cultural Representations of Machine Vision: Developing Methods to Analyse Games, Art and Narratives'. In *Proceedings of the 30th ACM Conference on Hypertext and Social Media*, 97–101. HT '19. New York, NY, USA: Association for Computing Machinery. <https://doi.org/10.1145/3342220.3343647>.

Rettberg, Jill Walker, Linda Kronman, Ragnhild Solberg, Marianne Gunderson, Stein Magne Bjørklund, Linn Heidi Stokkedal, Linn Heidi, Gabriele de Seta, Kurdin Jacob, and Annette Markham. 2022a. 'Database of Machine Vision in Art, Games and Narratives: Archival Version in HTML and CSS', May. <https://doi.org/10.5281/ZENODO.6514729>.

Rettberg, Jill Walker, Linda Kronman, Ragnhild Solberg, Marianne Gunderson, Stein Magne Bjørklund, Linn Heidi Stokkedal, Gabriele de Seta, Kurdin Jacob, and Annette Markham. 2022b. 'Representations of Machine Vision Technologies in Artworks, Games and Narratives: Documentation of a Dataset'. *Data in Brief* 42. <https://doi.org/10.1016/j.dib.2022.108319>.

Keywords: machine vision, nature, climat change

*Speaker

The "Ice-Time" Project: The Space-Time of Climate Change

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Abstract

The Ice-Time project is a series of media artworks created in response to the precarious state of Earth's ecosystem. It enacts the accelerating space-time of glacial ice. Glacial ice encompasses a four-dimensional hyper-view into time and space. The ancient ice provides an 800,000-year chronicle into Earth's climatological past and the future uncertain outcomes of rising temperatures. The project engages interdisciplinary methodologies that include a polar expedition and collaborations with scientific experts to create significant aesthetic experiences exploring momentous environmental challenges – challenges framed by the concept of the Anthropocene, the idea that humanity should now be considered a geological and terrestrial force.

The Ice-Time project uses immersive moving image forms that include multi-channel video installation with spatial sound, 360°-cinema, ultra-high-resolution hypercinema formats, and virtual reality to create embodied, proprioceptive experiences of the changing timeframes of polar ice. This essay will focus on two works from the series, Ice-Time and TesserIce.

The six-channel video installation Ice-Time is an immersive cinema mediascape. In the installation, the beholder experiences the time of a different form of matter as a somatosensory experience. The images in the series are hyper-realistic views of ice taken at all scales of space, from the microscopic to the planetary, collapsing the sensory distance between the body and the ice. The sound recordings draw one acoustically near the ice, recorded on the ice using contact microphones and hydrophonics.

TesserIce is a four-dimensional VR mediascape that allows participants to enter the 4D space-time of glacial ice. The perception of the four-dimensional tesseract from three-space relies on motion, lending it an inherently cinematic nature. Virtual reality's use of stereoscopy in a 360° viewing field is uniquely positioned to visualize a four-dimensional, cinematic space. TesserIce constructs an embodied mediascape examining the effects of climate change in which participants propel themselves through the dimensions of the space-time of Earth's polar ice, providing an opportunity to experience higher-dimensional landscapes and acoustic, cinematic environments from within the fourth dimension.

In each of these works, the stark imagery of ice serves as a distinct access point into the overwhelming complexity of climate change and its ramifications, creating an embodied, participatory experience of climate change's time, scale, causes, and effects that imbues the spectator with a deep awareness of the environment and the cultural implications of ice.

Keywords: Anthropocene, polar ice, immersive cinema, embodied perception, hyperspace, tesseract

*Speaker

The Moon as Subject and Form

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Abstract

This essay presents a series of innovative media artworks by the author investigating the poetics of lunar artifacts. *Moonwalk*, the first feature-length experimental fulldome film, *MetaBook: The Book of Luna*, *Pericynthion*, *who knows if the moon's a balloon?*, and *Big Moon Hong Kong*, created for the world's largest video screen, are unique medial investigations of humanity's epistemological, ontological, and poetic knowledge of the universe via the Moon. These cinema-installations take on the Moon as both their subject and the determination of their formal realization, engaging the audience with the sensuality of tangible metaphors. These cinematic moons are made up of collected fragments of songs, films, poems, stories, and scientific data – haptic, archival data – assembled into immersive films that explore the poetics of materiality. Realized in formally diverse spatialized projections, the cinema-installations manifest as peripatetic films, a notion developed by Sergei Eisenstein that is broadened here to establish the concept of somatic montage, the expansion of the cinematic experience into an architectonic, navigable space that connects the body to the cinematic. The use of spatialized projections in the cinema-installations is compared to the poetic functioning of graphic design in concrete poetry, establishing a notion of cinema architecture as a concrete metaphor. The films presented here disrupt the division between image space and architectural space. They occupy domes, spheres, and skylines, merging with and engendering psychic ecologies that echo the Moon's original form or returning our perception of our singular satellite to the sky as a tangible experience of the poetic as inseparable from the real.

Keywords: Moon, cinema, installation, spatial projection, fulldome, tangible poetics

*Speaker

Transformation of the author in media art: Regeneration as a microorganism from the "Death of the author."

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Abstract

In the history of media art, we have been exploring the question "how can technology augment our creativity?" The pioneering work of Masao Kohmura^{*1} (CTG^{*2}) (1968), the co-author's former teacher, produced multiple plotter-printed drawings by silkscreen and other methods. He was one of the earliest artists in the world to use computers to draw pictures. He often quoted Roland Barthes' "The Death of the Author." In the next generation, the works of Kazuhumi Oizumi^{*3} produced drawing machines, and the artist declared that he would "delegate drawing to the machine".

Such replacement of human creativity with technology may be furthered by the recent second-by-second advancement of artificial intelligence through diffusion models since last summer, which continues to generate literal 'drawing without a body' at ultra-high speed.

On the other hand, the Cambrian Game^{*4} by Toshihiro Anzai and Rieko Nakamura is an attempt to explore an alternative possibility of a relationship between the human and the machine. It is a multi-participant online artwork inspired by an old Japanese Renga, in which images are linked to generate a collective story. The Cambrian Games, held annually between the end of the year and the beginning of the new year, started in 2003, and this season marks its 20th anniversary. The images that filled the map of the Cambrian Games 2003 were mostly drawn works, strongly reflecting the Renga style. Later, with the spread of digital cameras and camera-equipped mobile phones, the style of using photographs as reefs evolved, and in recent years, a style that links people's everyday walking space in the works has also emerged.

This time, the rules of the game have been changed, and for the first time, images generated by artificial intelligence are now allowed. Until now, the submitted image was bound to be a photograph. This time, AI-generated images are explicitly positioned as "photographs" taken by pointing a word (prompt) at the object instead of a lens. The boundary between the author and the audience was blurred in the initial version of the Cambrian game. By introducing AI this time, the AI intervenes in the creative process within the author. It

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seeks to blur the boundaries between human and technology, author and tool. This may seem to diminish individual authorship, but each individual's contribution will be global, both physically and virtually, in the creative process in physical and virtual space. Doesn't it look like a small slime mold (microorganism) spreading its tentacles to survive and grow bigger?

We may call this an ecological approach to media art. In this approach, the boundaries between many agents (human, machine, and environment) are blurred so that each agent can spread its creative potential globally.

By comparing early computer artworks, kinetic media artworks that followed, and current Cambrian game practices, we hope to discuss the relationship between word and image, and drawing and performativity. Can AI help us cross the boundaries we have created in our society and discover our creative potential?

*1) <https://j-mediaarts.jp/en/award/single/komura-masao/>

*2) Computer Technique Group [https://collections.vam.ac.uk/search/?q=Computer Technique Group](https://collections.vam.ac.uk/search/?q=Computer+Technique+Group)

*3) <https://aichitriennale.jp/en/artists/oizumi-kazufumi.html>

*4) <http://cambrian.jp/>

Keywords: CTG, AI, "Death of the Author", Roland Barthes

A coiled rattlesnake: pre-Columbian cosmovisions and technologies reimagined through media arts

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²Waag Future Lab – Netherlands

Abstract

The precolonial past is always present in Latin America; the specter of its presence looms and prowls through the bodies and collective minds of the peoples that currently occupy and inhabit those territories. Thus, not surprisingly, reference to its heritage (whether nostalgic, celebratory, critical, or otherwise) continues to appear and reappear in different artistic practices across the continent, notwithstanding the burden of the "mighty civilization"-the Mexico, the Maya, the Inca-often in contrast to the jarring realities of marginalized Indigenous communities today. How do these imaginaries come about in contemporary artistic practices? How do artists, in particularly those working at the intersection of art, science, and technology, reclaim and recuperate narratives of the pre-Columbian past? This paper offers an exploratory methodological approach to address the ways in which media artists make references to the pre-Colombian past, from ecocritical romanticism to technological futurities. We analyze the works of artists such as Rafael Lozano-Hemmer, Tania Candiani, and Paola Torres Núñez del Prado, among others. The rattlesnake, an important critter for many Mesoamerican and pre-Columbian cultures, often depicted as a knot or a coil, serves as a symbolic figuration for the reiterative and continuous presence of prehispanic cultures in contemporary media arts.

The representation of Mesoamerican and pre-Columbian cultures in media art takes on various forms and interpretations. On one hand, particularly in regard to ecocritical issues, artists may idealize and romanticize the rich cultural heritage of the civilizations of Mesoamerica, Central and South America utilizing media art as a means of preserving and honoring their legacy. On the other hand, some artists may take a more critical and analytical approach, exploring the cultural and historical significance of pre-Columbian ontologies, cosmovisions, and technologies, in search for different ways to envision emerging futurities through non-Western knowledge systems. These works may challenge popular narratives and misconceptions about the past, offering new and nuanced understandings of these cultures. Furthermore, artists may also reject the myths of loss and decline of these civilizations, utilizing elements of the past to address more contemporary political and social concerns affecting these communities, or the nation states that have engulfed them.

Following a broader drift towards an ontological plurality of "a world of many worlds" (de la Cadena & Blaser 2018), we argue that some media artists look for inspiration into the pre-Columbian past to speculate on future visions and imaginaries, exploring the potential of pre-Columbian technologies and cosmovisions in our current condition. By blending historical knowledge with contemporary technologies and materials, these artists create innovative and thought-provoking works that challenge conventional notions of time and history.

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Keywords: media art, preColumbian civilizations, technological past, ontologies, futurities

The Lomax's Global Jukebox Project and its Untold 150 Year Story

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Abstract

Alan Lomax (1915 – 2002), the prolific collector of folk and traditional songs from around the world, had an even greater mission almost unknown to the public and even his following, and he spent the better part of his last four decades using his song dataset, along with related datasets on the diversity of traditional societies, to develop what he believed was a "unifying theory of culture." At least that's what he told me when we first met in 1988, after he sent a "cold call" letter to Apple Computer about his vision for a "Global Jukebox" and it trickled down to me, a young founding member of the Apple/Lucasfilm Multimedia Lab. The story begins in the 1860s with Alan's father John and made news last November, 2022, when Alan's daughter, 77-year-old Anna Lomax Wood, announced that the Global Jukebox was publicly available (1). In 2017, when a preliminary version the Global Jukebox was announced, the New York Times ran a story entitled "The Unfinished Work of Alan Lomax's Global Jukebox" (2).

I had the privilege of working with Alan Lomax through the 1990s; helped him secure funding from Apple and later from Interval Research, Microsoft co-founder Paul Allen's long-term research lab; produced his first and only video demo of the Global Jukebox in 1998; and remain an advisor-at-large on the project.

In addition to its epic timeframe - certainly in contrast to today's tech with its quarterly myopia - it's a story of promoting cultural equity (not without challenges), constantly incorporating newest media technologies, and connecting the dots between global arts and planetary health.

It's also a colorful tale that includes real cowboys, the US Library of Congress, and the BBC; Eleanor Roosevelt, Margaret Mead, Jelly Roll Morton, Hoodie "Leadbelly" Leadbetter, Mick Jagger, Lennon and McCartney, Pete Seeger, Woody Guthrie, and Bob Dylan; and US President John F. Kennedy's Science Advisor and MIT Media Lab Co-Founder (with Nicholas Negroponte) Jerome Wiesner.

(1) <https://phys.org/news/2022-11-global-jukebox-arts-database-publicly.html> (Feb 15, 2023)

(2) <https://www.nytimes.com/2017/07/11/arts/music/alan-lomax-global-jukebox-digital-archive.html> (Feb 15, 2023)

*Speaker

Keywords: longterm, vision, global

Media Art and Structures of Care

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Abstract

In this paper, I argue for the importance of situating media art in the context of care. Heidegger views care as fundamental to Dasein, to our being. Absorbed even to the point of being lost in a world of everyday concern, care is also what returns us to our temporal existence, creating futures that acknowledge past and present. Structures of care reveal our orientation and relation to the world, but care is also an active thing that requires us to tend to our world and to shape it.

In *Matters of Care*, María Puig de la Bellacasa describes care as a "concrete work of maintenance", along three dimensions of labor/work, affect/affection, and ethics/politics. Aesthetics is interwoven through all these dimensions, and media art in particular enables a re-imagining of the relationship between computational technologies and care. Our world and our being are increasingly structured by computational systems that instrumentalize care, whether in the form of AI companions or social media metrics. What would it mean for computation to be radically reoriented towards care, towards an "as well as possible" world? Media art offers a vector, a "critically disruptive doing" within the forms of computation to both imagine and to enact alternatives.

Media art history returns us to tending to technology. In order to imagine possible futures, we must pull from the past(s), even those outside the grand narrative arc of progress. What does it mean to tend to computation? To look back critically to the ways we make meaning from computation and technology?

Bruno Latour talks about care in the materiality of more-than-human things, the structures of care that technologies and infrastructures produce and call for. This is the central concern of media art archiving, even more so than in the case of everyday machines, as any archive of media art is an archive of the obsolete and of bespoke technologies.

As we find ourselves in a moment of ecological disaster, war, and pandemic, we are called to care for both human and non-human worlds. Care is concern and worry, and also a nurturing. Care is labor, sometimes an industry and sometimes invisible, and often gendered. As technology is increasingly instrumentalized, pushing us further away from defining our own future potentials, what media art history does is to instead open possibilities through reimagining structures of care.

Keywords: care, computation

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Inventores rerum-Inventors of things: politics of invention through art and technology

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Abstract

In his monumental "Natural History," Pliny the Elder refers to the mythical first artists as "inventores," inventors of the arts of painting and sculpture. These "ur-artists" created new modes of being-the arts-which emerged through intellectual, emotional, and material experimentation: Kora of Sicyon invents painting by tracing the shadow of her lover; her father, Butades, invents sculpture by casting a mask off the traced shadow. The relationship between creativity and material concreteness joins forces in the invention of the arts. Similarly, works of art and technology can be approached through the conceptual framework of "inventiveness." Invention is usually associated with technical and scientific development, which in turn is often presented as the linear progress of machines and media that build upon and improve on previous systems and technologies. Technical invention, however, can be understood more broadly as material experimentation that, depending on external circumstances, unfolds into media, artworks, useless tinkering, appliances, or useful machinery. The similarity between art making and invention is often framed through the concept of individual creation, which Simon Penny states are "at root, almost indistinguishable" (Penny 2008). Works of art and technology, often refer to as "(new) media art," share many similarities with technoscientific inventions and prototypes. I argue that these works highlight the creative drive behind technical invention as well as the purported autonomy of machines and their relationship to labor. Invention-like artworks, understood as integral, wholesome devices, are different from technical systems, which propose networks of relationships instead of self-contained mechanical beings. By approaching media artworks through the lens of technological innovation and inventiveness, I argue that the processes of technical invention and artistic creation share roots that later become negotiated and stabilized into more solid categories of "technical device" and "artwork."

Keywords: media art, invention, creativity, technological development

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Fernando Palma's energetic robotic sculptures

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Abstract

Since the late 1990s, Mexican indigenous artist Fernando Palma has created robotic effigies carefully handcrafted with a mix of low and high technological devices, organic objects and found items. This paper presents some examples of Palma's work in which different forms of energy (electrical, metaphysical, kinetic, hydraulic, thermal) collide. All intrinsic to the artist Nahua identity. The study on Palma's work is part of a larger paper that will be published in a forthcoming publication edited by Professor Douglas Kahn and Dr. Pia Van Gelder.

Keywords: energies, robotic sculptures, environment

*Speaker

Eco(Systems) of Hope: A Case Study on Curating Media Art in the Face of the Climate Crisis

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Abstract

This paper focuses on the discursive and research-creation practice of curating media art in the face of the climate crisis. In particular, it focuses on an exhibition I curated titled *Eco(Systems) of Hope*, which was held in Montreal at Anteism Books in October 2022. *Eco(systems) of Hope* featured Canadian and international artists exploring the present ecological moment and creative imaginaries for the future. Some of the selected works investigated these issues through speculation, while others invited us to take action. They all fundamentally questioned what hope means individually and collectively; the differences between the "I" and the "Other(s)." Artists in the show included: Gilberto Esparza (MX), Ludovic Boney (CA), Sandrine Deumier (FR) Gali Blay and Leila Zelli (IL/US; IR/CA), and Theresa Schubert (DE). The exhibition mobilized a discursive formulation to take climate responsibility, to seek equity, and to act with care today. It posed an invitation to reorient our (human) actions, consumption habits, policies, and technologies. From the macro decisions governments and global corporations make, to the micro actions each of us perform (including curating and art making), we must reduce consumption, energy use, pollution, and waste. We must think collectively and see the big picture, taking responsibility for ecosystems that we touch and often damage. The formulation was inspired by the animals and plants that made their way out of the wilderness and into our urban milieus in Spring 2020, as lockdown measures to limit the spread of COVID-19 were implemented globally. These stories made me realize that life went on in spite of our confinement, and that even if we were to disappear, new life would grow, modifying human-made spaces, flourishing, growing. I had hope, except that my approach to hope transcends human and capitalist-centered desires; even humanity. I believe the pandemic reminded us that moving forward, we had a chance, we had hope, but only as long as we were to act beyond ourselves. The artworks in the show mobilized these ideas. As for the curatorial approach, the driving idea for the exhibition design was to evoke the infinitely large and the infinitely small in order to move away from the Anthropocentric idea that the human scale is the measure (and center) of the universe. The paper examines how research-creation methods of curating can inform how we think and act with regards to climate change.

Keywords: Curating, climate responsibility, equity, research, creation and interdisciplinary methods, exhibition design, public outreach.

*Speaker

Notation, Gesture, Transformation: Lillian Schwartz and the Art of Morphodynamics

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Abstract

Lillian Schwartz, the artist at the center of this investigation, both metaphorically and actually disassembles and reconfigures the affordances and limitations of computational machines. Through collaborations with resident scientists and engineers at Bell Labs, Schwartz revealed how the technological systems they designed, from lasers to light pens to programming languages, could undergo radical transformations beyond their intended use-value. For Schwartz, mediums are not isolated or stable; instead, they are like chemical elements that take on new properties combined into mixtures or compounds.

Although Schwartz's prolific contributions to Bell Labs Acoustical and Behavioral Research Center spanned more than three decades (1968-2002), it was not until 1986 that Bell Labs executives were alerted to her status as unpaid "resident visitor" and offered her a salaried contract as a consultant in computer graphics. Anecdotally, in the early 1970's, center director Max Mathews assigned her a (still unpaid) role as a specialist in "morphodynamics." Soon after, in the mid-1970s, Mathews developed the algorithm that would underpin the MAX visual programming language, in which spatiotemporal forms morph dynamically in real time. This paper will examine Schwartz's possible influence on the emergence of visual, spatial, and gestural computing in light of Mathew's emergent fascination with and recognition of the morphodynamic properties of Schwartz's work.

Despite the indeterminacy of Schwartz's position within the corporate structure of Bell Labs, she embraced her institutional, artistic, material, conceptual in-betweenness, using it as a springboard to reveal the porousness of (artificially imposed) boundaries separating "technological" and "non-technological" media. Schwartz was recognized by her peers as instrumental in demonstrating how artistic conventions and mediums could reframe the ways scientists viewed and interacted with their own technological inventions; throughout her career, Schwartz was and is not particularly interested in making arguments about whether computational technology "is" or "can be" Art. By deftly interweaving early programming languages, newly engineered devices such as laser pens, and tools and materials used traditionally in the production of "fine art," such as paintbrushes, pencils, and paint, Schwartz shows that computers function not merely as calculating machines, but rather, or also, as engines of transformation.

Keywords: notation, computer graphics, analog and digital, visual programming, MAX MSP, computational art, sound art, visuality, code, languages of art

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Speculative Forms: Visual Futurisms and Data Operations in New Media Art from the Middle East

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Abstract

This paper traces the epistemological radicality of the documentary specter in the Middle East and its transcultural references. It delves into new media (art) practices, and their research-based digital methods that synthesize technologies and human life worlds in an attempt to showcase the epistemological radicality and ecology of the documentary specter in a speculative aesthetics of geocultural zones of crisis and post-oriental identity in the Middle East.

Egyptian-German artist Sameh El Tawil's work explores the complex and multilayered geopolitical contemporaneity of the digital realm amidst the material realities of migration, slavery, and revolutionary beginnings. He works at the intersection of performance art and digital media in a transcultural zone of animatronics', selfography', and audiovisual digital operations in live performances that create augmented realities of the moving image. His visual alterations, signal experiments, and soundscapes produce meta-music-date visuals in real-time rendering and live performance.

In this paper, we will shed light on the layered forms and operations of El Tawil's new media art works in relation to live performance that make the reflexive state of the images, their sonic dimensions, underlying data operations and epistemological postdigital forms visible.

This research-based practice explores the potential to visualize and perceive the multitude of data - their visibilities and randomness - and contingencies of history in radical ecologies of speculative images and their documentary futurisms.

Keywords: futurisms, 2D/3D visual/s, digital sculptures, visualization of data, sonic data, Middle East, speculative aesthetics, new media art

*Speaker

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nPARADIGMS rD™ ArtScience Creative Problem Solving Applied Transformative Curatorial rD™

Emanuél Cooper Jr.*¹

¹E G I Euphrates Gallery Inc – United States

Abstract

nPARADIGMS rD™
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Creative Problem Solving

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"Museum As Classroom: Art Education; Technology & Interactive Exhibition Design" ("A Thesis Presented in Partial Fulfillment of the Degree Master of the Arts in Art Education ('Conferred with Honors') in the Department of Art Education of the Rhode Island School of Design, By Emanuél Cooper Jr. BFA· Rhode island School of Design 1994 (RISD Providence, RI)) serves as ongoing atypical bridge research to "Neighborhood As Museum:

Transforming Local Global Communities" since circa 2000.

nPARADIGMS rD™ (Nascent Paradigms Research + Development) is an E G I ESG Values rD™ (Euphrates Gallery Inc, Environmental Social Governance Values research & Development) ArtScience™ Creative Problem Solving Applied Curatorial rD™ Social Cultural, Cultural Education, SocioEconomic, CrossCultural™, CrossDiscipline™ Full Spectrum Local Global Diversity in Audience Development SocioEntrepreneurial venture. nPARADIGMS is a emerging cultural heritage research product conceptually conceived by Emanuél Cooper Jr while conducting "Environmental Design & The Built Environment In Relationship to Human Behavior" independent research at the Architectural Association (AA), Bedford Sq, London, UK circa 1977·1978. AA Environmental Research was made possible by Emanuél Cooper Jr.'s mentor Victor Josef Papanek (Author of "Design for the Real World: Human Ecology and Social Change;" Former student of Frank Lloyd Wright; Also ref: Victor Josef Papanek, J L Constant Professor, Emanuél Cooper Jr letter of reference: The University of Kansas, School of Architecture and Urban Design, "April 11, 1994").

nPARADIGMS rD™ expresses the urgency in establishing transformative Environmental Design Nascent PARADIGMS of research & Development for a "Dynamic Real World" concerning Anthropocene Obligation of Stewardship to the quality of the Human Sojourn through a Curatorial rD™ lens of the "Evolving Museum + Society.

*Speaker

Keywords: nPARADIGMS rD™ ArtScience Creative Problem Solving Anthropocene Obligation Stewardship Human Sojourn Environmental Design Museum + Society Social Cultural Cultural Education CrossCultural™ CrossDiscipline™

MEDIA ART INFORMATION

LANDSCAPEdrift through a non-linear history of 60 years

Tjebbe Van Tijen*¹

¹Imaginary Museum Projects – Netherlands

Abstract

this proposal is visual in the first place see PDF uploaded

The scroll in the mockup picture on the floor is just a grey pane, as it will be a new work planned to make for this occasion. Over five decades I have developed several ways of animated history telling, using sequences of images, often merged, sometime sharply divided with sets of visuals that contextualise each other. The visuals guide the spoken or written word and the other way around, with iconological research as basis of collage.

‘Media Art’ is a somewhat tautological term, not used in the time of the ‘pioneers’. ‘Situation’, ‘event’, ‘happening’, ‘environment’, ‘installation’ and terms like ‘expanded cinema’ and ‘non object art’ were used. It was not only the link with ‘science and technology’ that gave rise to the idea of ‘Media Art’ but ‘social issues’ were essential as well. In the year 1967, I proposed together with art history student Robert Hartzema, the founding of a center to stimulate and document collaboration in the fields of ‘art, science, technology and society’. Enhanced liveability of the urban environment and new forms of ‘recreational’ activity, and the role of art in it, were on the agenda. What often started as house happenings, soon spilled over on the streets, where art mixed in with political activism, public space, more adventurous than the reclusion of art gallery and museum.

This is only the outline of a prosal for a ‘stroll scroll event’ which will show a multitude of often momentous or inpromptu events over decades in the crossover field of Art Action and Academia. Not only glamorous and glorious examples of high end art & technology in prestigious venues, but also creative acts that sprang from very limited resources, leading to resourceful improvisations with endearing clumsiness and unintentional discovery.

In 1973 I did get the opportunity to set up a new documentation center as part of the University Library of Amsterdam... it became the Documentation Center for Modern Social Movements and existed for almost thirty years. The scope of documentation was much wider, it included all kind of emancipation and dissident movements: cultural underground, esotericism, environment, third world activism, neighbourhood and squatting... I kept also collecting experiments in the field of ‘media art’, with a changed perspective: ‘art as social movement’.

Started as an artist studying sculpture, early sixties, collaborating on events with expanded cinema and inflatables, moving away later from practising the arts. Became involved in urban activism, ecological movement and the like, both as an activist and collector/archivist.

*Speaker

Working early on with computers in an academic institution, led to programming my own databases, beyond the restricted institutional standards. This brought me to re-enter the art scene in the 80s, combining both skills, founding 'Imaginary Museum Projects' with as aim "to dramatise history with low and high tech interactive interfaces".

Keywords: information landscape, pre, history of notion media, art, art action academia, media, art archiving, visual narrative method, databasing, digital preservation

Archiving Cans: Historical Ethnographies of a Rural Film Festival

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Abstract

This paper focuses on the methods used in creating a history of Festival de Cans, a picturesque film event that takes place in Cans, a rural hamlet in the heart of the West Galician province of Pontevedra, Spain. Festival de Cans is particularly atypical as some of the most well-known festival traditions and rituals have been parodically deposed: barns, workshops, basements, cellars, and stables serve temporarily as film venues, altering the high-ranked film festivals' cinephilic standards, excess and etiquette (Vivar and Suárez-Canedo 2020). Via the hybridization of classic film festival traditions with rural celebratory traditions, Cans has consolidated its position both in the Spanish film festival circuit and the Galician film industry, becoming a must-attend event among Galician media professionals and personalities. This conference paper discusses some of the research methods involved in the reconstruction of the "fleeting moments" of the festival. Drawing on previous research on archiving small film festivals (Peirano 2020, Lee 2016, Zielinski 2016), the paper presents some of the archival and ethnographic approaches used to orchestrate the oral and visual memory of this yearly event. By assembling fragments of personal interviews, audio-visual material and written material, the paper explores how the reconstruction of living memory of the event can be a means to understand how both communities of viewers and networks of media professionals are formed in geographically disperse areas. Since Galician cinema mostly operates within alternative film circuits like Cans, this piece of research proposes festival ethnographies as a methodological approach that can be used to build a history of Galician "small cinemas". This paper, which presents early findings of a work in progress, is tied to an ongoing institutional project to create an archive that will serve as a living memory of the event.

Keywords: Key words: Rural film festivals, audiences, archival research, ethnography, Galician film industry, small cinemas.

*Speaker

Allan Lomax and its Global Jukebox

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Abstract

Alan Lomax's Global Jukebox, now partly on the Internet, is a clear forerunner of interactive documentary capacities for reflection and collaboration between creator and spect-actors (Weissberg 1999).

Musicologist Alan Lomax spent over fifty years collecting recordings of music and folk songs in the United States, the Caribbean, and Europe. In the early 1980s, long before the current possibilities of transmedia and cross-metadata analysis, he designed the Global Jukebox, an interactive audiovisual navigation, and social-cultural data analysis device. The Global Jukebox contains over 17,000 audio clips, totaling over 5,000 hours of sound recordings, 400,000 feet of film, and 3,000 video clips of dance, song, and testimony. For Alan Lomax, it was about preserving a part of our humanity: "The dimension of cultural justice must be added to the human continuum of liberty, freedom of speech and religion, and social justice." (Lomax 1972). According to Lomax, the particular conditions of a society's daily life, of subsistence and protection, shape the nature of social relationships, which are expressed, among other things, through song and dance.

Through interactive exploration of a world map, the Global Jukebox allows users to compare the formal characteristics of songs and dances and to evaluate the extent to which the characteristics of folk cultural expressions are a consequence of social-economic context or position (L'evi-Strauss 1964). My presentation will summarize Alan Lomax's approach, from the first recordings of folk songs made in 1933 with his father, John Avery Lomax, to the recent publication of the prototype online. I will show excerpts from the Global Jukebox documentary I participated in some twenty years ago and will demonstrate the new device now available on the web.

Global Jukebox. Gideon D'Arcangelo, 1998. https://www.youtube.com/watch?v=Bx_hUrevOdw

L'evi-Strauss, Claude. 1964. "Mythologiques - Le Cru et le Cuit". Paris: Plon.

Weissberg, Jean-Louis. (1999). Retour sur l'interactivité. *Revue des sciences de l'éducation*, vol.25 (1), 167-199.

Keywords: music, dance, culture, Lomax, interactive, data, analysis

*Speaker

Stephanie Strickland - Technopoetics Pioneer

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Abstract

The purpose of this paper is to illuminate the complex and multifaceted relationships between art, science, and technology that are present in the creative practices of Stephanie Strickland, an acclaimed artist who is considered one of the most prominent pioneers of media poetry. A co-founder of the Electronic Literature Organization (1999), Strickland has been working across multiple media and technologies since the NEH Summer Seminar "Literature in Transition: The Impact of Information Technologies", organized by N. Katherine Hayles in June 1995. She has made a significant contribution to the field of electronic literature, not only as the author of its canonical works (True North (1997), multi-part project V (2002; 2014), slippingglimse (2007), Sea and Spar Between (2010)) but also as an influential critical thinker, who has rigorously developed a new theoretical framework for understanding poetry as it evolves in the bio-techno-logical realm (Zawojski, 2016), discussing emerging issues with such luminaries of the Art & Science approach as Eduardo Kac, Diane Gromala, Victoria Vesna, and others (the importance of the TechnoPoetry Festival she produced and curated in 2002 while Artist-in-Residence at Georgia Tech cannot be underestimated).

Strickland's works evince a constant awareness and unflinching examination of how art and science, technology, and ecology are mutually imbricated.

My talk will attempt to reconstruct the multi-stage and collaborative creative processes from which Strickland's digital poetry instruments/poietic* systems emerged. Through the analysis of source materials, drafts, sketches, correspondence I trace the theorems and scientific concepts that Strickland drew upon, showing how they were not only encapsulated in poetic phrases, but more importantly, served as the basis for the structural organization of particular artworks (e.g. the concept of chreods introduced by biologist C.H. Waddington, extended to mathematics and catastrophe theory by topologist René Thom, and employed in slippingglimse to organize and animate text generation). My key examples include, but are not limited to, the aforementioned slippingglimpse that Strickland co-created with video artist Paul Ryan and Cynthia Lawson Jaramillo, and multi-form V, resulting from poet's collaboration with writer, voice actor, coder, and performance artist Ian Hatcher. As I reconstruct the processes of creating slippingglimpse, I also propose to consider this piece as one of the first e-lit projects that predate non-anthropocentric art/literature (Kluszczyński, 2022)). The second example, the 'differential text' V, and the reconstruction of the processes of its migration from the Macromedia Shockwave web environment to the realm of Apple platform will, in turn, allow me to illuminate the dualistic relationship between art and technology that is characteristic of Strickland's practice. Both reconstructions are based on

*Speaker

archival research conducted last November/December at the David M. Rubenstein Rare Book & Manuscript Library of Duke University, which houses a collection of Stephanie Strickland's Papers.

While introducing neologism 'poietic' Strickland refers to poetry and poesis equally, understanding by this "writing that actively includes its productive-formative features in the experience of readers/writers/players"

Keywords: technopoetry, technopoetics, media poetry pioneer, poetry, science, electronic literature

TOWARD THE BIOCYBRID RITUALS IN ENACTIVE AFFECTIVE SYSTEMS AND THE NATURALIZATION OF TECHNOLOGIESⁱ

Diana Domingues*¹

¹ Toward the Biocybrid Rituals in Enactive Affective Systems and the Naturalization of Technologies –
Diana Domingues, CNPq, University of Brasília, University of Campinas – Brazil

Abstract

Since the 70 and 80s, I developed electronic and multimedia art, evolving to Digital and Interactive Media Art . Nowadays , toward the enactive affective systems in Art and Technoscience, I work on transdisciplinary topics in Leonardo's teams . The focus is the magnitude of life's phenomena and challenges for reinventing or re-engineering the ways of living in disruptive innovation. We "naturalize" our devices every day, every minute of daily life . I coined the term Biocybrid (Bio+cyber+hybrid) to define human condition in the 21st century. The limits of the human and the natural are exceeded, by copulations of organisms and technologies in daily narratives. Body, ecosystem, urban life in artworks provoke the end of "nature itself" and the emergence of naturalization of technologies. The repercussion of inquiries attempt feature positions with thousands of mentions. Historically, I am founder member of MediaArtHistories , invited by Grau, Cuomo, Italy and REFRESH. The creative work, from "fine arts", went to mechanical and electronic language such as litooffset, video, different photomechanical processes, videography, neon and light, medical imaging, mixed to a variety of devices such as stethoscopes, microcontrollers, presence and physiological sensors, everyday objects, native sound instruments, electrocardiograms, ecographies, in repertory of things and performative interactive processes. Network installations with animals, (snakes in a remote serpentarium), telerobotic systems (Ins(h)ak(r)es) explore metaphorical themes of ouroboric perception embodiments and immaterial cultural heritage. Rituals, re-propose the Afro- Brazilian beliefs and values, experienced in installations, "between trance and algorithm",

(Couchot), ("Trans-e, My body, my blood", 1997) .The NTAV Lab team developed specific software/hardware for the artworks. In 2004 , it was built a CAVE (immersive virtual reality) for artistic experimentation,("Heartscapes" and "Trans-e)" (talks Grau and Ramesh Raskar).

The emergent states and autopoiesis principle of life in complex systems phenomena implied into neural networks, artificial intelligence, physiological sensors, wearable and mobile technologies,

*Speaker

remote ubiquitous sensing, virtual reality and augmented reality, social interactions, dynamics of online social networks. ("I myth: zapping mobile zone", "Latin American Memorial, "Living Tattoos", "Firmamento)". The position of National Visiting Professor,(2010) culminated into the foundation of LART with Biomedical Engineering team, FGA UnB. Actions shared with Socio-Enactive Systems Project, FAPESP UNICAMP. Facing the risks and challenges for our life, the projects deal with health and well being, diseases, environmental problems and biomes and the infirmity of the landscapes (Pantanal, Cerrado, dengue mosquito), calling for social and civic media. "Innovation Seeds Grant" CNPq/MIT-MediaLab, Camera Culture, informed Ph.D Thesis, in Human-Computer Interaction, Media Art, Engineering, Mobile, and Ubiquitous Health, covering artistic, aesthetics, cognitive sciences, physiology, environmental and social topics. Facing the challenges of the world, technologically depended, the enactions with affective systems and coupled organisms (Varela, Noé, Thompson, Tikka, Kaipainen) contribute to the embodied cognition, by configuring the naturalization of technologies in biocybrid daily rituals for a healthier future.

Keywords: BIOCYBRID RITUALS, ENACTIVE AFFECTIVE SYSTEMS, NATURALIZATION, TECHNOLOGIES

Living Artworks

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Abstract

Living Artworks started as a collaborative project to open-up conversations on climate art, community participation, and working together to make forestry actions, environmental education and climate learning accessible to everyone. .. The group worked together over 18 months to co-create a series of climate earth observation artworks using native tree saplings to form the shape of community-led designs. The artworks were purposefully used for teaching on the ground and monitoring in Google Earth. Importantly, the creation of these 'living artworks' visually reinforced the critical nature of earth systems used by communities with limited digital infrastructure to self-monitor climate action on their mobile phones and to observe how native flora plantings can increase and restore local ecosystems. As the project moved towards its conclusion, it was further supported by NASA as an education partner. The project highlights that it's possible to seed public arts collaborations addressing climate challenges from land rehabilitation to satellite monitoring, whilst being driven by community learning and contemporary art delivery.

As part of this proposed paper, Living Artworks will be examined through a series of lenses:

- (1) Adopting and pioneering an under-utilised observation media channel, Google Earth, as citizen infrastructure for climate monitoring and as a platform for contemporary art.
- (2) Understanding how a community can be part of a public humanities initiative through arts learning, such as the use of drawing and measurement tools in laying out and scaling the earth observation artworks.
- (3) Understanding the importance of living systems with the help of amplification through the arts. For example, understanding how trees support ecosystems is amplified through satellite-monitored living artworks bringing us closer to experiencing the positive impacts of restoring native flora and fauna.
- (4) Applying arts practices in creating climate artworks that frugally re-adapt current technologies thereby enabling communities to adopt more sustainable climate and biodiversity monitoring and observation tools.
- (5) Creating sustainable and climate-resilient communities. To date, Kofele community members continue to create living artworks to improve soils and animal habitats.
- (6) Sharing cultural learning. Each community adapted their living artworks by communicating, learning and sharing outcomes of the project. The artists have also supported a new network of living art projects using Google Earth for monitoring local ecosystems.

*Speaker

Keywords: climate action, climate art, community participation

Archiving electronic literature: between (re)construction and emulation (the case of Kate Pullinger's digital fiction archive)

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Abstract

The goal of the proposed paper is to characterise specificity of preservation and archiving of electronic literature and to discuss strategies used in such a process in the broader context of preservation of interactive/new media art as well as in the context of creation of various literary archives. Crucial questions discussed encompass differences between strategies of (re)construction of digital literary work and its emulation, the importance of media-specific perspective (including platform studies and interface-focused research in context of literary works), and usefulness of the previous experience with preservation of new media art or with archiving other than classics forms of literature (e.g. visual one) in developing the methodology of preservation of e-lit.

The paper will be based on results of an on-going research project focused on the creation of an archive of digital works by Kate Pullinger, realised by University of Łódź in collaboration with Electronic Literature Lab at Washington State University Vancouver and Bath Spa University. Pullinger, apart from being awarded print-based novelist, is a canonical e- literature writer and pioneer in many innovative e-literary genres (e.g. ambient literature or literature that uses biofeedback); in 2021 she was awarded the Marjorie C. Luesebrink Career Achievement Award for lifetime achievement (the most important award in the field of electronic literature). Most of the author's acclaimed works are inaccessible now, due to liability of the platforms or used software (many of them were at least partially created with Flash). The goal of our project is to bring them back to the readers and researchers and - in the broader perspective - to develop strategies useful in creating future e-literature archives.

First stage of the project (to be finished till July 2023) is focused on the creation of Pullinger's collection in the largest electronic literature archive in the world: the Electronic Literature Organisation's The NEXT (<https://the-next.eliterature.org/>). For this, the project team applies methodology developed in ELL, based on a long tradition of preservation of e-lit works (including prominent project "Pathfinders" or ELMCIP database).

*Speaker

The team's work encompasses: reconstructions (or emulations) of works that can be reconstructed/emulated (e.g. "Luke's Message" or "Ebb&Flow"), re-reconstructions of works that are not working correctly despite of having been reconstructed (e.g. "Flight Paths") as well as documentations of works that for various reasons - like its specific technological or ephemeral character or copyrights restrictions - cannot be reconstructed (e.g. traversals of "Lifelines", description and documentation of "Memory Makes Us") and preparing of a description of work, formal description of all accessible copies of it and visual/audio-visual materials for each collection's entry. We will discuss the preservation of the most problematic of Pullinger's works: "The Breathing Wall" (work partially created with Hyper Trance Fiction Matrix, an experimental software that allows the story to respond to the reader's rate of breathing, whose creator died and cannot help in reconstruction of the work) or "Jellybone" (story for mobile phones created with oolipo platform, completely inaccessible after closure of the start-up behind the platform).

Keywords: electronic literature, digital fiction, archive

Exhibiting electronic literature: from multimodal digital stories to XR literature

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Abstract

Proposed paper is focused on problems of exhibiting electronic literature. Although the latter can be thought as interactive art (however it is not obligatory interactive), there are additional problematic issues while exhibiting it, e.g. how to create a space for reading, not only looking at the work).

Exhibitions of e-literary works accompany many of conferences focused on new media literature/storytelling or interactive art (e.g. Electronic Literature Organisation conferences); works of e-literary characters are also exhibited at interactive art festivals (including Ars Electronica Festival). Despite this, the successful strategies of exhibiting e-lit works seem still to be developed. At the same time, the pandemic resulted in observable increase of on-line exhibitions of e-lit, which are frequently disappointing as they take the form of simple descriptions of works, accompanied with links.

In my presentation I propose to test the usefulness of narrative exhibition strategy for exhibiting digital literature and ask how we can tell a story of e-literature (particular genre, one author's work etc), with or without use of new media tools.

The case studies discussed in my paper will be:

1. On-line exhibition of Kate Pullinger's digital works that I am co-curating with Leszek Karczewski (to be opened in July 2023). This exhibition's project is part of an ongoing research project focused on the creation of an archive of digital works by Kate Pullinger, realised by University of Łódź in collaboration with Electronic Literature Lab at Washington State University Vancouver and Bath Spa University as the exhibition is planned to accompany the opening of Pullinger's collection in the Electronic Literature Organization's The Next, the largest electronic literature archive in the world. Regular on-line exhibitions of e-lit works are part of regular activities in The NEXT virtual space, however many of them have very unattractive form.

2. In-situ exhibition of VR literature that I am co-curating with Lucy English for the MIX conference to be held at the British Library in July 2023. The general idea for such an exhibition was born from the research project on VR/AR as literary platforms I conducted at Bath Spa University within Amplified Publishing programme, part of the Bristol and Bath Creative Industries Research Partnership, funded by the UK's Arts and Humanities Research Council. Main challenge in creating this exhibition is to create a safe reading space and to deal with high technological requirements.

*Speaker

At the same time - despite being highly limited by the number of works that we are allowed to showcase, also due to the space limitations - we want to tell a whole story of possible romances between VR and literature.

3. Experience of exhibiting creative writing students' digital projects which were created at the University of Łódź under my supervision during the last decade - in various forms, e.g. electronic publications and in-situ exhibitions/performances (experience in exhibiting of "analogue", material non classical in its form e-literary works is also important here). I would like to emphasise the need of including the topic of exhibiting e-literature in courses focused on digital storytelling.

Keywords: Exhibition, electronic literature, multimodal digital stories, XR

Intensifying the Beauty in Early Czech Structuralist Media Art

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Abstract

The outset of art interrelated to digital technology in the Czechia (Czechoslovakia) and its early works found itself to be authored in very difficult socio-economic conditions. Totalitarian political regime dominated over all communication and information technology means, so for any individual (artist) attempt to acquire such a technology was at the frontiers of illegality (shadow imports). Only limited number of exemptions related to such a media art production may be traced in academic sector for example, as Zdeněk Sýkora's (first Czech media artist acquired by Centre Pompidou) works on his constructivist art calculations, or restricted (pirate) experiments with new media in the labs of state television company ČST.

Almost zero accessibility of new media technologies has led brave experimenting artists to very specific focus of its artistic utilization when compared to the activist development in the Western countries.

Under described societal conditions, none of the artist would consider to take advantage or even misusing of this new media to communicate social or political contents and contexts.

Also, in this collectivist period, to dissipate new media to psychosomatic analysis been also considered as too self-centred up to egomaniac.

With this regard, main endeavour of media artists moved towards application of very specific alternatives of new media utilization. We would like to mention the pioneer of Czech video art Radek Pilař remark on media art focus to pursue the Intensifying the Beauty of a Moving Image”.

Keywords: Czech Media Art, Czech Video Art, Internet Media Art, Media Art Practice in Totalitarian State

*Speaker

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Epistemic and Practical Value of Modeling: Zoöp and Ecosystem Services Estimation

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Abstract

Recent years have seen new developments in investigations of the interconnections between the fields of art and Science and Technologies Studies (STS). This is evidenced by the publications, such as "Dialogues between Artistic and Science and Technologies Studies", ed. by Henk Borgdorff et al. (2020) and "Routledge Handbook of Art, Science, and Technology Studies", ed. by Hannah Star Rogers et al. (2021). The key lines of comparison explored by the contributors to these volumes include the emphasis on sociomaterial assemblages, experimentation as an epistemological tool, non-verbal means of making claims, embodied skills, etc.

In this presentation, I will build up on these approaches and will concentrate on modeling as a philosophical category and an epistemic tool used in both scientific and artistic projects, with a special focus on its role in the studies of ecological relations and social responsibility. One of the epistemic functions of a model implies offering a sense of an alternative or potential scenario of a system's development. It is something both real and not ('virtual' in a Deleuzian sense). In environmental sciences modeling serves as a useful instrument to predict dynamic behavior in complex systems, especially where natural factors increasingly come in dependence of the human activity. Raising awareness about social responsibility and calling for action has been a consistent approach to environmental crisis within the arts. I will analyze two cases that complement and challenge this approach by stressing the entanglements of the ecosystem services with very concrete economic and legal frameworks. "Life Support System" (2020) by Disnovation.org does that by featuring a tangible model of the amount of energy, water and nutrients needed to cultivate a 1 square meter of wheat under controlled conditions. When calculated in monetary value (specific to a geographic location), natural service acquires a different type of significance and the contributions of the biosphere, habitually taken as 'free', become more palpable. The second example, Zoöp, is a curatorially conceived legal framework for institutions and organizations that implies an inclusion of a representative for the living on the decision-making board. The New Institute in Rotterdam is the initiator and a testbed for this proposal.

Analyzing these projects, I will refer to STS methods to demonstrate how legal, economic, and cultural underpinnings can be included in the design of new relationships with the ecosystems and what kind of structural changes can be instigated by (seemingly) speculative models.

Keywords: modeling, art&science, ecosystem services, STS, epistemic tools

*Speaker

Vasulka Live Archive: re/sourcing media archive using AI

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Abstract

The contribution will introduce the set of applied outputs of the unique interdisciplinary research project Media Art Live Archive: Intelligent Interface for Interactive Mediation of Cultural Heritage partially supported by the Technology Agency of the Czech Republic (Project No. TL02000270, 2018-2022). The main output of the project is web Vasulka Live Archive (URL: <https://vasulkalivearchive.net/>). The website serves as an interactive epistemological tool for searching for recurring audio and visual motifs in the database of artistic videos by Steina and Woody Vasulka, pioneers of video art.

The design of the web-interface integrates two specially trained software, for content-oriented retrieval of visual and audio objects. The performance of the software is synchronized in the web interface, to serve as a multimedia tool of audio-visual artwork analysis of the artistic videos. VasulkaLiveArchive.net may (a) assist in the intertextual structural analysis of videos; (b) provide a quantification of the degree of ambiguity in these works; and (c) help determine the extent to which the video embodies a tendency toward abstraction and noise. All of these are properties corresponding to the character of the genre of structural video, of which the Vasulkas are the main representatives.

The project represents a unique contribution to the field of applied artificial intelligence (machine learning) in humanities and in media art history and curatorial practice in particular. It expands the field of AI usage in art historiography, usually focused on older historical periods, towards experimental and conceptual art of the 20th and 21st centuries. In 2022, the project was presented in a format of an exhibition in the Brno House of Arts under a title Vasulka Live Archive / Interfaces. In the same year, it was also accepted into the program of Ars Electronica festival, where it was shown as an example of good practice in the field of eco- logically conscious approach towards preservation of cultural heritage. The project gained MUNI INOVATION AWARD (2023) too.

The value of the project lays in its original contribution to the current boom of AI applications (machine learning and the artificial neural networks) and in a unique solution for re/sourcing of media art archives it provides. The web-epistemological tool Vasulka Live Archive contributes to the development of interdisciplinary research within the digital humanities with a focus on art sciences.

Keywords: artificial neural networks, web, epistemological tool, digital humanities, web interface

*Speaker

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Grain studies: artistic forensics of global hunger

Daria Parkhomenko*†¹

¹LABORATORIA ArtScience Foundation – Russia

Abstract

How does grain affect our world? In our hyper-technologically-mediated world we are still dependent on the smallest of things: a grain of wheat/rice. Human relationships with grain precedes history and quite possibly even our species. It still drives economies, international collaborations and conflicts, cultures, and our thinking itself.

An interdisciplinary interspecies natural history of the anthropocene can start with (a) grain. Grain can tell us more stories than about economy, agriculture, or food safety. However, these stories are often obscured by specific disciplinary frameworks. Huge natural objects with wide and varied effects and connections (hyperobjects, as Timothy Morton would say: grain, microbiome of soils, climate change, solar radiation, algae ecosystems, human economy) can be treated as environments with their own computational properties, autographic analog computers (). Connecting research from various fields of science and artistic vision, we can model our futures together with hyperobjects.

My presentation will demonstrate how technological art can be used to help society to perceive the complexity of huge invisible natural phenomena lying behind the pure data. This concept was implemented by the author in the exhibition New Elements and is a continuation of it (<https://laboratoria.art/en/new-elements/>, <https://vimeo.com/730241787>).

Grain studies relevance: The contemporary grain crisis began in 2020 with the pandemic and is now getting worse due to military conflicts, according to U.N. figures, the number of severely food-insecure people has doubled in the past two years, from 135 million pre-pandemic to 276 million today, and the numbers are growing. We are witnessing large-scale disruptions of supply chains in the globalized economy caused first by the pandemic and now by the wars. It seems urgent to bridge the gaps between various fields - ecological, societal, economical, political, and artists are in a unique position to do that.

The main goal is to apply artistic vision to transdisciplinary research of global hunger, putting together a combination of political, economic, social and natural phenomena, military conflicts, climate change and loss of genetic diversity, to find possible solutions.

Core principles of my presentation:

Biodesign: the strains of grain we use today are a product of millenia-old biodesign. Now it is accelerating, we can design more productive grains etc., but they can harm the ecology: desertification, biodiversity, transport carbon footprint.

Ethics of biodesign: biopiracy, patents on new strands of grain, dangers to biodiversity, colonialism.

Solving global hunger vs solving climate change: contradictory? Synthetic food: our future? Can natural local food become a luxury?

*Speaker

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Grain mapping: soil quality, climate and biodiversity across the world and trade routes. How climate change and politics affect food safety across the world. The methodology of my research: big data forensics, design of neural networks, satellite image analysis, climate data analysis, research on biodiversity etc. A wide variety of collaborations with local communities and farmers, environmental activists, data scientists, geneticists, economists, earth scientists.

Keywords: grains, interdisciplinary interspecies, hyperobjects, society, data

Forgotten Pioneers of Media Art: Laboratory of Presentation Techniques

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Abstract

In the mid-1970s the artistic group Laboratory of Presentation Techniques (LPT) was active at the Academy of Fine Arts in Katowice. The LPT prominent representatives included Grzegorz G. Zgraja, Jacek Singer and Jadwiga Włodarczyk-Singer. The artists conducted experiments and formal searches, exploring the potential of film, performance and a new medium: video. LPT was active for three years (1975-1978), being the first in Silesia, the second in Poland and one of the first artistic groups in Europe dealing with video art. The group's fate reflects the life of artists behind the Iron Curtain: political and economic struggles as well as emigration. Only Zgraja continued his artistic research afterwards: he emigrated to Germany, where at the Academy of Fine Arts in Braunschweig, he developed his multimedia language by combining video art, performance, teletransmission and visual music. Looking at the artistic path of Grzegorz G. Zgraja, the last of the artists, as well as Jadwiga and Jacek Singer's works, the paper analyzes the most important artistic achievements of the group and the cultural context of their activity. Based on the anthropological interviews and archival research, the author shows the reconstruction of LPT's artistic contribution to European media art and the reasons these pioneers of media art were forgotten.

*Speaker

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