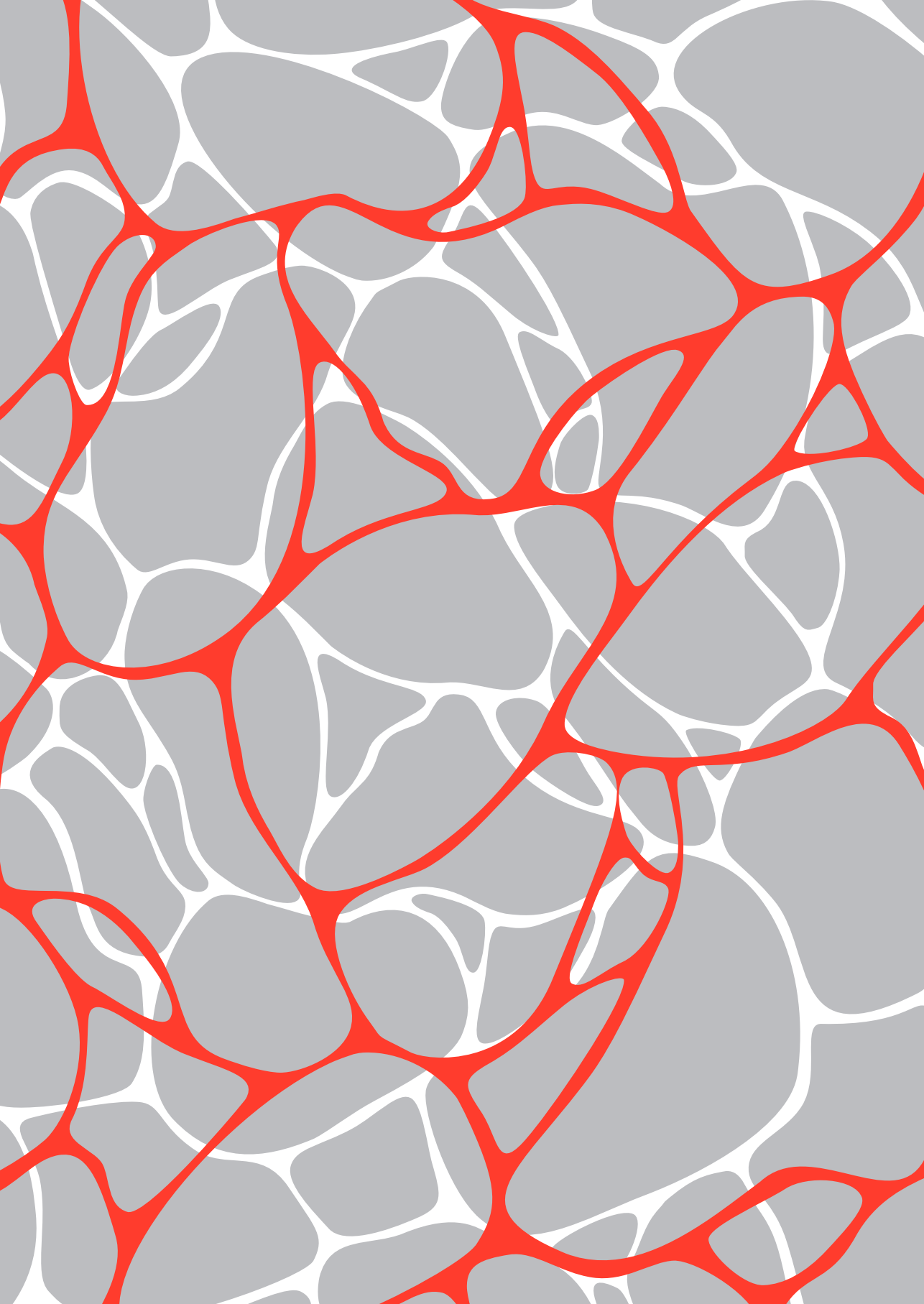


**ARC-  
HIVE:  
CASE  
STUDIES  
AND  
LIFE  
AS AN  
OBJECT**



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ARC-  
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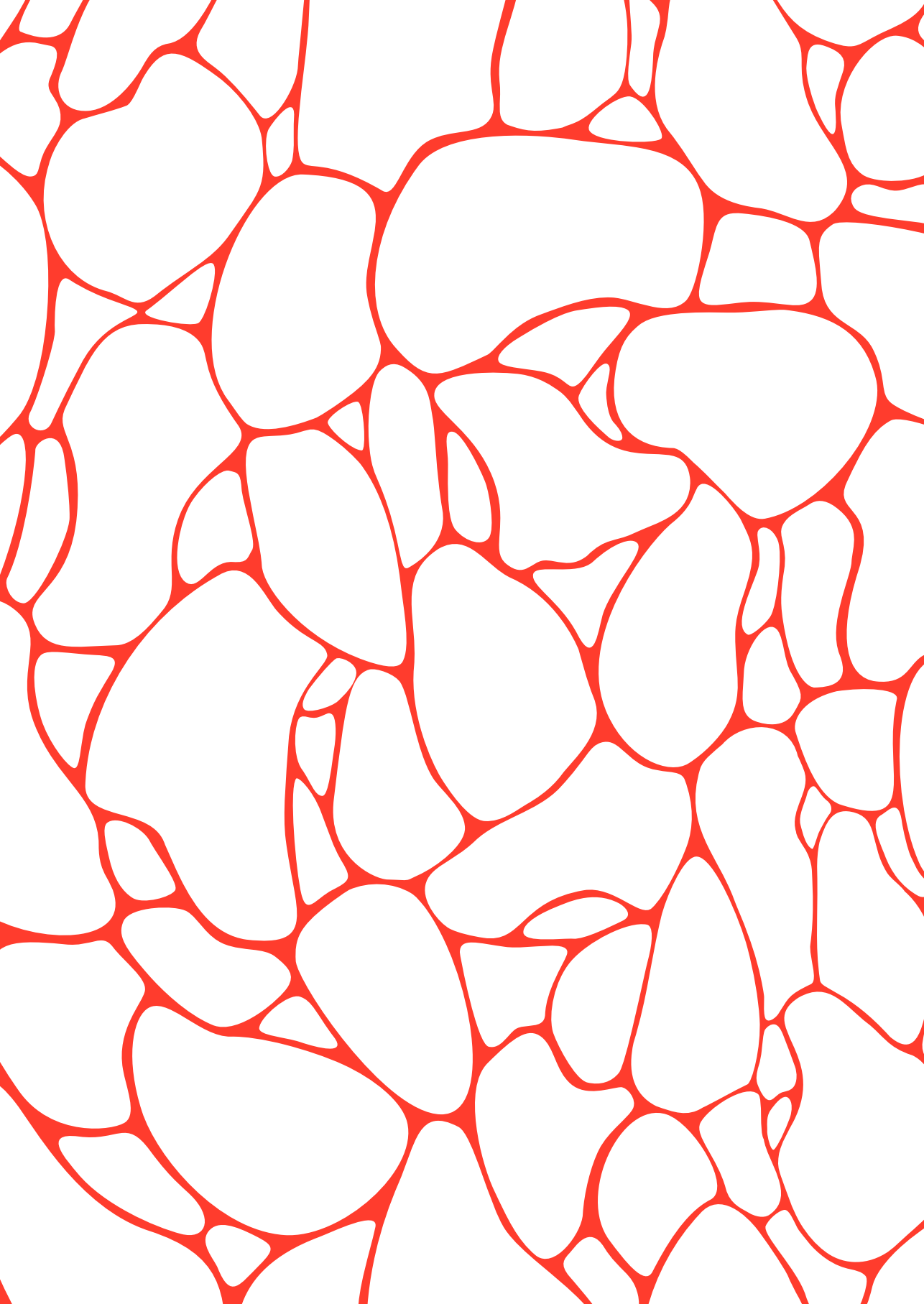
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CASE  
STUDIES

# ARC-HIVE: CASE STUDIES

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# Introduction — Case Studies

Jurica Mlinarec, Luja Šimunović

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As a complex field consisting of artistic and cultural practices of working with biomaterials and living matter, since the 1990s bioart has become globally recognized as a significant part of contemporary culture and a heritage worth our attention. These artistic practices locate themselves in the gray area between art and science (Hauser, 2020). A specific methodology arises in this grey area (Radomska, 2016):

In bioart – as it is described by both artists and critics – it would not be possible to articulate the artistic ideas without engaging with scientific procedures, protocols, and operations. Whereas scientists tend to be more goal-oriented, artists focus on the process, on that which “disrupts” the planned scenario, on unexpected (and supposedly unproductive) alterations, on clashes in methods.

From live tissues and bacteria to biohacking and daring sustainability theory and practice, bio-art employs and transforms a wide array of scientific processes, ranging from biochemistry to genetic engineering. In the words of bioart pioneer, artist Eduardo Kac (2007), its approaches can be described as:

1) The coaching of biomaterials into specific inert shapes or behaviors; 2) the unusual or subversive use of biotech tools and processes; 3) the invention or transformation of living organisms with or without social or environmental integration.

Given the vitality of bioart and its complex (and typically interdisciplinary) methodologies used in processes ranging from pre-production to preservation, the notion of archiving the field so heavily dependent on constant transformations of living systems remains puzzling. Beyond the notion of keeping the work *alive* during the production and exhibition stages, and the organizational, logistical, and financial practicalities arising from the process of doing so, bioart’s transitory quality conceptually informs the

fundamental character of the field. Thus, encountering the main question of whether and how to translate bioart into the digital realm, the consortium of six European partners — Cultivamos Cultura (PT), KONTEJNER (HR), Zavod Kersnikova (SI), Hangar (ES), SOLU / Bioart Society (FI), and RBINS - Royal Belgian Institute of Natural Sciences (BE) — opened up Arc-hive as a testing ground, a trial to devise the criteria and protocols that could catalyze future conversations. The Arc-hive project is, therefore, an effort to gather trailblazers in the field of bioart (cultural workers, curators, artists, theoreticians, producers, as well as professionals from the IT and natural sciences) to create an open-source digital platform bringing to the fore practical responses to challenges in exhibition, pre-, and post-production protocols, and the theoretical and philosophical implications of preserving, digitizing, and archiving artistic practices that are based on work with living matter.

In devising this publication, our concern was to bring forth the practical and theoretical implications of archiving and digitizing bio-media, specifically through commissions that delve into the practical challenges and explore the polyphonous discussions that have arisen during these short months. This is one of the two-partite divisions, this one entitled “Case studies” and generated by new commissions as the result of partner discussions and proposals. In this process, the editorship is devised not only by us, but by all the partners who had brought forth ideas and authors. The second part of the publication is the result of a cross-sectoral symposium hosted by Kersnikova in February of 2022. Divided into two chapters — Caring for the field and Learning from others - the symposium brought together prominent bioart actors, as well as professionals from fields experiencing similar challenges in capturing, presenting, and preserving mutating presences.

Our starting point are the commissions brought forth by Cultivamos Cultura, the lead organization that brought into this project an impressive collection of over 150 artworks as a testing ground for developing digitization, conservation, and archival protocols. We begin with the text by Dalila Honorato, *Digital Semiotics for Biomedial Art*, which in many ways serves as the backbone and introduction to the questions of digital transition/translation and the important educational and cultural repercussions of the project. She had been part of the whole process of the project, knowing its difficulties and intricacies — and also providing us with invaluable advice throughout the editing process. This reflection on the project, and many others conceived with Cultivamos's founder, Marta de Menezes, opens threads which authors throughout the publication explore through specific case studies. One of these is the text *Unstill Life: Biomedial Art Archiving in the Ephemeral Permanent Collection* by artist Adam Zaretsky, who takes us on the journey of his recent revisiting of his work donated in 2010 to the permanent collection of The Finnish National Gallery's Museum of Contemporary Art Kiasma in Helsinki. The work, which explores DIY processes of hybrid DNA extraction and isolation, has spent 12 years in the Finnish museum's archive, with biomedial monoprint being its centerpiece. Stating that biomedial has an “a-digital stance,” depending on an existence that is not programmable, but wet, fleshy, and made of slime, Zaretsky tells us about flesh resistance, biomedial's inherent refusal to be archived. Here, codes, software, or traditional digitization processes and archival protocols do not suffice, they do not stimulate the living and transforming nature of biomedial.

The question of digitization put in practice has been exemplified with the partnership with RBINS — The Royal Belgian Institute of Natural Sciences (Belgium), that, along with running a vast museum space, has an exemplary expertise in digitization, conservation, and archiving of natural specimens, as well as conducting educational activities in the field. One example is their recent “Handbook of best practice and standards for 2D+ and 3D imaging of natural history collections,” which has served as a starting point for defining bio-art digitization protocols in our project. Here, RBINS's Aurore Mathys and Cultivamos Cultura's Nuno Sousa collaborate in the text *Identifying the Challenges and Solutions for 3D Digitization of BioArt*, which explores exactly this: how to deal with



digitizing artworks that escape traditional understandings of natural, historical objects? Artworks that reflect, that are transparent, that change, evolve and decay come to play through a series of case studies run throughout the project. Far from a simple practical question and development of a how-to, this text poses the very question of the nature of an artistic object — at which point is it present, and when does it escape us?

The two texts commissioned in collaboration with SOLU / Bioart Society explore the following of a geological layer containing early Cambrian trace fossils in Northern Finland, an expedition of a small group of artists and scientists. In Judith van der Elst's *Tomorrow's Fossils*, the expedition is used to trigger contemplation on scientific knowledge production, disciplinary boundaries merging, and reflection on future human traces left on the planet. Utilizing Charles Sanders Peirce's theory of signs, Van der Elst considers meaning translations and transformations, the acts of collecting, storing, and archiving as matters of mediation. The second text, *Stones in Boxes — Collecting Fossils from Finland's North and Beyond* by Björn Kröger, Judith van der Elst, and Leena Valkeapää is the result of the same expedition in Northern Finland. Considering the notion of archiving and displacement of natural and cultural materials, and its colonial relation, this contribution stems from an interdisciplinary dialogue connecting art, science, and the humanities. The text explores digital heritage practices, such as 3D digitization, to eschew the dislocation and disturbance of different communities, allowing us to reproduce and digitally store materials.

In our final segment, in collaboration with the partner Hangar, we delve into two distinct approaches. Hangar is an organization bridging artistic fields with vast technical knowledge and digital skills, ensuring the development of the open-source project platform. Put on a global scale, as a process of web platformization, it is what is critically put forth in Efrain Foglia's contribution *Platformization in Today's Hyper-connected World*. Looking at platforms as systems whose content is imbued and conditioned by its invisible structure of power and politics, the context of artistic production is thus embedded in these power dynamics. Here we are opened to a conversation on the necessity of smaller scale, open-source platforms with alternative and (perhaps) visible structural principles which would challenge these dominating principles of platformization. Opening these speculative processes, we are left with Helen Torres's text *Open arc-Hive* — an archaeological speculative contribution at once launching us into the future and taking us back to an overview of the accomplishments and questions posed by this project. Here we find a site of excavation of the platform, where our very human ideas of mortality, reality, virtuality, nature, and culture are put into question by a very alien, outside view — through this, shining light on the material, phenomenological implications of art that deals with living matter and its transmission to a digital context.

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# Digital Semiotics FOR



# BIOMEDIA ART



*California -  
New York  
New York*

# Digital Semiotics for Biomedial Art

Dalila Honorato

with the valuable collaboration of  
Marta de Menezes, Claudia Figueiredo  
and Diana Aires

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Dedicated to the development of bonds between the local community and the contemporary art world, Cultivamos Cultura, led by bioartist Marta de Menezes, is located in the village of São Luís, 200 km south of Lisbon, formally hosting resident creators, for periods up to 4 months, since 2009. For more than a decade Cultivamos Cultura has developed an archive with works produced by its temporary, and many times returning, residents which reflect the link and interconnections between the global space and local place. In the introduction to the book *Documents of Contemporary Art: The Rural* (2019) edited by Myvillages, Kathrin Bohm and Wapke Feenstra, the authors propose the use of the term critical rural art “to emancipate art from its urban hegemony, and to introduce a new dialectical dynamics into the current consideration of cultural production.” In its own right Cultivamos Cultura is a place for decolonization of urban art practices: through its in-place contribution to increasing rural art practices as well as its role as an agent for the revitalizing friction between the rural cultural space and the nomadic and temporary rural lifestyles. In a more symbolic way it can be said that Cultivamos Cultura is a node celebrating, as rites of passage, the fair exchange between what is generously given and what is openly and mindfully received.

In a continuous effort to develop critical rural art through the experimentation with curatorial methodologies and documentation practices, Cultivamos Cultura, in the midst of a world pandemic, in 2020-2022 has led a project co-funded by the Creative Europe Programme of the European Union. This project is entitled Arc-hive and it brings together as partners five other institutions: KONTEJNER (Croatia), Bioart Society (Finland), Kersnikova Institute (Slovenia), Hangar (Spain) and the Royal Belgian Institute of Natural Sciences (Belgium). The consortium envisions to create an open source digital platform dedicated to the dissemination of qualitative and quantitative data related to contemporary art creation with emphasis on biomedica. Arc-hive aims to support users' accessibility independently of their demographic distribution or sociocultural environment; a platform that practices the aggregation, preservation, publication, distribution and contextualization of material information, knowledge and documentation without the limits that characterize the physical world. Arc-hive is a fluid crossroad for enrichment, a place beyond space, capable of converging a potential extensive variety of cultural agents interested in providing research resources and in developing a body of research; interested in accessing a search engine optimized in an unorthodox systematic way to enable diversity and heterogeneity; interested in auto-ethnographically sharing a body of work within an empathetic network of peers; interested in finding support for experimental and conservative methods in art education. Common denominator to all end-users: the intentional exploration of topics related to biological and living materials from within a digital environment. Practically, during its development the project's main task was the dialectics of input: finding the tricks behind the digitization protocol, synchronizing the items constituting the technical form for adequate biomedica documentation and instigating new questions in art and science concerning the controversial aspects between art conservation and the natural live spam of bioart.

Somehow, in a poetic way, Arc-hive project may be a time capsule containing codes of life and chemical formulas disguised as technical documentation structured in Characteristics, Digitization, Storage, Installation, Shipping and Long-term care that almost seem to dissect a work with elementary references. What is an artwork's *Characteristics* beyond its title, author, date, summary, extended description, keywords, size, length, breadth, height, weight, volume structure and state, raw material(s), glossiness, color, transport, status [stable, unstable, living, dead (fixed or decaying), inert]? How accurate is *Digitization's* status, protocols, creators, contributors, rights and tags? How to *Store* and box an artwork according to its inert parts and the fragility of its materials; according to the living organisms that form it (and yes, there is a catalogue of life), to how they interact, to their bio-safety level requirements, to their need to be revived for installation or to be kept alive between installation events; according to whether there is documentation on the work, perhaps a history of exhibitions + documentation as well as any publications of the work? And what about its *Installation*, what dimensions, time frame limitations, live material source; what are the work's assemblage, light, humidity, temperature, maintenance, bio-safety level, technical and audiovisual equipment requirements; can it be shown as in a documentary form, as a posthumous display, as a living installation? What are, after all, the work's *Shipping* requirements for inert parts and living materials (source?); does it need special packaging and/or temperature requirements; and how many crates, how large, how heavy, how voluminous? In storage and on display how to *Long-term Care*: what is the live material source, what can be done to replace the living organisms; any time frame limitations (days, weeks, months, years?), any bio-safety level or special packaging and/or temperature requirements; does it need a hardware or software update/maintenance? How tactile can digital data be and how effective is the resuscitation of an artwork from the depth of a physical archive?

Arc-hive would be just an interesting project if it hadn't been for the pandemic. The limitations brought in many countries by the lock-down experiences were also deeply felt in the lack of direct access to art space providers by art audiences, aggravated by the heavy duty of carrying out an exhibition with biomedica in the age of bio-phobia.

Cultivamos Cultura was in a position to lead the project not only because of its art archive but also because it already had experience in partnership with Arte Institute with the nomadic Festival of Art & Science Transdisciplinary and Transnational, which since 2017 promotes Portuguese contemporary art creation abroad, and due to the pandemic it staged its international collaboration with an all-year online events in 2021, with the support of institutions and curators located in Canada, United States, Mexico, Greece and China. This transition was based on the experience acquired through the organization of multiple online events in 2020 by the FEMeeting network coordinated by Marta de Menezes and myself since 2017: Teapot Chats (weekly meetings with members of the FEMeeting community), FEMeeting Praxis (well-being activities shared by the community), FEMeeting Antibodies (a video and podcasts event in partnership with Annick Bureaud, Kathy High and Branda Miller), Ars Electronica Festival 2020 – In Kepler’s Garden and Sister Labs in 2021 (where FEMeeting members address at the community of women in art, science and technology an invitation to their lab spaces). A similar hybrid model of interaction between the local and global, between the digital and physical, was experimentally practiced, at the level of online artist residencies, with the Biofriction project by the consortium composed of Cultivamos Cultura together with Hangar (Spain), Kersnikova Institute (Slovenia) and Bioart Society (Finland), with the support of the EU program Creative Europe. Biofriction, which started as being committed to supporting bioart and biohacking practices, ended up adapting, during its first year, to the limitations of a world lock-down, setting up a series of working groups and online events entitled Braiding Friction to instigate discussion and speculative fiction scenarios. Invited by Cultivamos Cultura, I had the honor to coordinate a group dedicated to the co-writing of a collaborative ergonomic narrative exploring issues such as art-spaces, contagious, bio-terror, animism, more-than-human relations, bio-security, ritualized sterilization and artists/art workers as essential workers during the pandemic. Needless to say that beyond fiction, in 2020-2021, Cultivamos Cultura kept their artist residencies program open with the required safety precautions and the limitations imposed by international travel restrictions. Against all odds, its physical archive kept growing with bare eyes in more directions than the digital dimension.

The Arc-hive project developed as a scholastic process of experimentation by trial and error due to the challenging variety of media to be digitized and the curatorial eye imposing aesthetic quality: biological media, metal, prints, art installations, ceramics, drawing with minerals, 3D spatial structures, video installations, acrylic, glass, petri dishes, among others, in need of background contextualization besides the void of the digitization process. The project includes the digitization of more than one hundred works, among these 13 series, created by 52 artists, integrating the physical archive of Cultivamos Cultura. The list is extensive but credits are due and given to:

- *Interfaces and Patterns of Communication*, a series of 2 artworks by Ada Gogo.
- *Kami, the embodiment of vegetal thoughts*, a series of 9 artworks, *The New Sculpture*, and *Soil Theater, homage to what is hidden* by Alan Tod.
- *Evolutionary Cloth* by Ana Baleia, Felipe Shibuya, Marta de Menezes, and Jude Abuh Zaineh.
- *Pollen, Spores, Aside, Revere, Lymphatic System, Both Ways, and Lymphatica*, a series of 6 objects (stencil watercolors) by Andrew Carnie.
- *Drosophila Titanus* by Andy Gracie.
- *Refúgio* by Ânia Pais, Diana Mordido Aires, and Tiago Costa.
- *A Crosta and Air* by Anna Isaak-Ross.
- *Shade Shadows*, a series of 3 objects, *Dreaming of a Butterfly*, and *Blue in Heaven* by António Caramelo.
- *Uma Arqueologia do tempo presente*, a series of 20 objects, *Becoming*, *Sem Título* by Carla Rebelo.
- *Tinkering Life* and *Re-Culturing* by Carolyn Angleton.
- *Terra Batida*, series of 3 objects by Christina Gruber.
- *Lips I & II* by Dalila Honorato.



Permian Collection — book launch at SOLU Space — Helsinki (27<sup>th</sup> April 2022). The Royal Belgium Institute of Natural Sciences prepared a Digitization Workshop, in Brussels (6<sup>th</sup> – 8<sup>th</sup> September 2021) and Kersnikova organized the Symposium “Life as an object”, at Kapelica Gallery, Ljubljana (17<sup>th</sup> – 18<sup>th</sup> February 2022). Finally, Hangar is in charge of the technological supervision of Arc-hive platform and KONTEJNER is responsible for the edition of the final publication about the project including text contributions from partners and their collaborators.

At the end of this remains an important question: where to go next? Following the dialectics of input it becomes clear there is need for the systematic reasoning of its output. Therefore, as part of the research methodology, Cultivamos Cultura addressed the artists whose work had been digitized, requesting their consent and further information concerning text editing and addition of documentation material. Most of the responses were brief, either proposing changes in descriptions or simply sending a positive thumbs up. Extremely helpful for the further development of the Arc-hive project were the replies by two international artists who have a strong presence in the collection of Cultivamos Cultura. Kira O’Reilly proposed a closer involvement with the process of data input and more details about the possibilities concerning design presentation: “Something that we should discuss is the understandings and conditions of exhibiting works so that everyone is really happy and content, there are no surprises and so that we can all help realize the collection and its future.” Alan Tod introduces a further technical challenge concerning the digitization of large scale dimensions: “I would love to show some land art work, like the ready wild or some garden sculpture. I believe the most important thing in my work is the forest itself or large scale work and I would love that to be more visible in the future.”

The immediate future of the Arc-hive project is connected with the intensification of its users’ activity, starting from 1) the content providers, such as artists, collectors and museums, 2) the content intermediaries, such as curators, exhibitors and dealers, and 3) the content revisers, such as researchers, critics and educators. Each one of these types of users has different reasons to address the platform. Imagine you are an independent artist interested in promoting and managing your work information and making it available for art curators and contemporary art historians around the world. Imagine you have to manage an art collection and you are interested in keeping an art inventory and exploring the potential of online exhibitions. Imagine you are trying to set up an exhibition on a rooftop in a deserted city, within a time frame as tight as your budget and that you still have a vision: to explore the potential of ocean bacteria. Imagine you teach art theory anywhere around the world with access to limited biomedicine art resources and you are willing to make a difference in the life of your students. Arc-hive may be the answer. As an end user I see tangible opportunities to explore Arc-hive’s content from the point of view of an effective search engine: at the speed of light. In order to reach the full potential for content intermediaries’ and content revisers’ activities, the interface of the platform has to present a dynamic filtering and sorting system. Besides a search engine able to recognize Author name, Artwork title and Tags, categories and options that could be relevant to these users are Filters such as: Work location (Continent/Country/Region), Date creation (Min./Max.), Insurance (Min./Max.), Value (Min./Max.), Availability (Min./Max.), Dimensions installation (Min./Max.), Bio-safety levels (Min./Max.), Medium (List), Color (List), Artwork subject (List), Type art (List), Documentation (List), Living organisms (List), Special requirements for storage/installation (List) and Status (stable, unstable, living, dead — fixed or decaying, inert), as well as a Sorting system based on Date creation (recent to early/early to recent), Value (low to high/high to low), Availability (recent to early/early to recent), Author name (alphabetical order), Date archived (recent to early/early to recent) and Average user preference (low to high/high to low).

One could say that, in many ways, an art inventory platform is not so different from any online commerce software or a dating website, but Arc-hive is not about selling

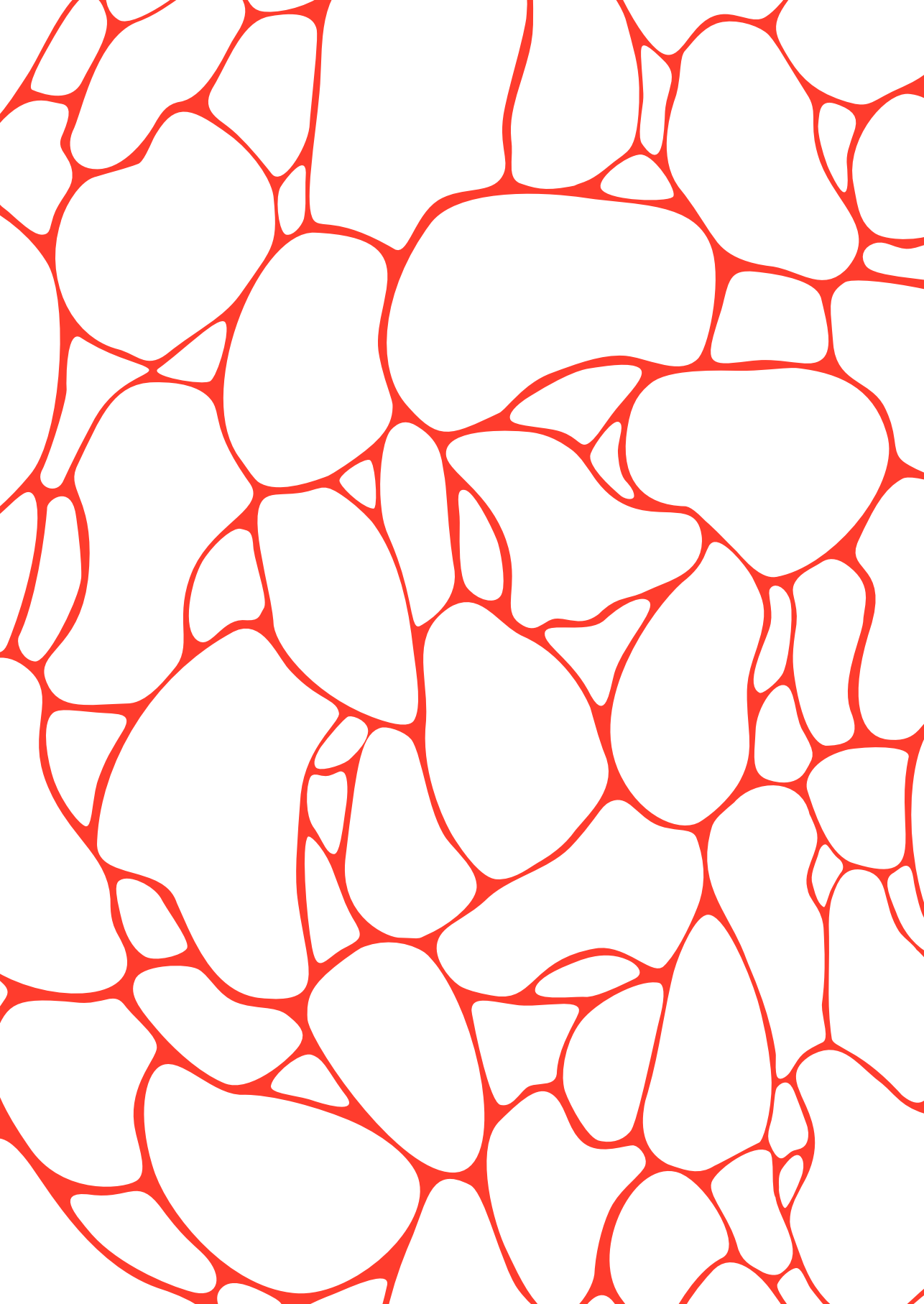
or charging. Arc-hive is about sharing knowledge aiming for a deeper understanding. There are a few art management software examples in the market, easily found through a quick online search. Nevertheless, probably due to the particularities of biomedica, Arc-hive distinguishes among these for its information on bio-security, conservation and storage. Fields that have been emphasized in scientific collections such as preserved plant specimens (Yost et al, 2018:p.2): “herbarium specimens are rich with additional information regarding plant health, reproductive condition, and morphology that is generally not captured in current digitization workflows (Nelson et al., 2015). Because the utility of specimens for research is accelerating, it is essential that we structure digital data collection in ways that best facilitate longevity and integration across data sources.”

At this point Arc-hive is already diversifying the types of documentation provided with each art piece. Besides the imaging of the artwork, art reviews and exhibition catalogs, studies done by artists before proceeding to the completion of the final piece are also incorporated in the platform. This form of documentation provides a wider angle on the artist’s creative process allowing for a deeper understanding of the work by the researcher and the curator. In the long term the future of Arc-hive could be connected with exploring bioinformatics data (like what is the molecular structure of an artwork?) and including in its technical documentation other characteristics able to provide information beyond the visual, such as the sense of smell. Because the question is not what is an Arc-hive? The real question is what is not an Arc-hive? An alternative representation of the past (Foucault, 1972), a place (Derrida, 1995:pp.1-2), an aspiration (Appadurai 2003:p.16), remains, debris and talisman (Mbembe, 2002:pp.22-25), “the end of a certain kind of creative innocence, and the beginning of a new stage of self-consciousness, of self-reflexivity in an artistic movement” (Hall, 2001:p.89); “It is not enough for the sciences of the archive to store information; they must also invent ways to use it” (Daston, 2012:p.175).

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- Dalila Honorato**, Ph.D, is a facilitator of safe spaces for hosting the interaction of ideas around liminal issues in the frame of Art&Sci. Her research focus is on embodiment, monstrosity, the uncanny, and the acrobatic balance between phobia and paraphilia. She is an Associate Professor in Aesthetics and Visual Semiotics at the Ionian University, Greece, and a collaborator at the Center of Philosophy of Sciences, University of Lisbon, Portugal. She is the creator of the Taboo-Transgression-Transcendence in Art & Science conference, co-developer with Marta de Menezes of the FEMeeting network, and a member of the editorial organism of *Technoetic Arts: a Journal of Speculative Research* since 2020.





# VINSTILL LIFE:

*Biomedica Art Archiving in the Ephemeral Permanent Collection*



# Unstill Life: Biomedica Art Archiving in the Ephemeral Permanent Collection

Adam Zaretsky

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On March 27, 2010, I donated a biomedica artwork to the Ephemeral curator's section of the permanent collection of The Finnish National Gallery, Museum of Contemporary Art Kiasma, Helsinki, Finland. Kiasma acts a subsidiary of the final owner, the State of Finland. It took two years; the donation, started in 2010, was completed in 2012. The preservation of the hybrid DNA-extract new media "mashup" has been archived for over 12 years! According to the DONATION CERTIFICATE, the Museum of Contemporary Art, Kiasma holds the ownership and control rights to the donation. The biomedica is firmly in conservation in the permanent collection. The Full Name of the bioart and new media workshop was: "DIY-Hydroponic HYBRID DNA ISOLATION Skill-Share Lab: How to Extract DNA from Anything Living in the Laboratory or in your Kitchen: A Compare and Contrast Vegetarian Laboratory and Hobbyist Workshop." This bioart, vivoarts, hands-on wetlab workshop was part of the Herbologies & Foraging Networks of Pixelache Festival (co-curated by Andrew Gryf Paterson & Ulla Taipale) titled *Hybrid DNA Isolation*. The donation number is N-2010-168: A- and it includes video and photo documentation as well.

To introduce and broaden the concept of the donation, here is an excerpt from the article: 'Kiasma preserves hybrid DNA-extract new media "mashup" for over 6 years!', 13 April 2016, [Andrew Gryf Paterson](#): "It's time to go overground and make a special Pixelache announcement. Time to recognize persistence of the DIY bioart imagination, and in particular, [Adam Zaretsky's](#)... During his [Hybrid DNA Extraction Workshop](#) that took place on 27<sup>th</sup> March during the Pixelache Helsinki 2010 Festival, he proposed that what the participants were making - new media based on new DNA organic combinations - could be donated to the

Kiasma Museum of Contemporary Art collections. It took a while to negotiate the donation and make it a priority, but it has been a quiet fact since January 2012. Kiasma has been looking after, caring for, and preserving what we understand is its first bioart work, as part of the Finnish National Galleries Collection: Look at the archival entry in the database, view the donation certificate and check out the excellent video documentation and rest of the photo documentations to get a sense of what happened, and what was archived or not. Kiitos paljon Leevi Haapala, who at the time was curator, and now is the Director (!) of Kiasma for helping to make it happen, and agreeing that now is a good time to publicly make an announcement. In the past 6 years, the Finnish Bioart Society has also developed nationally and internationally from strength to strength. ... we hope that the Finnish art-loving public and international visitors can appreciate sometime the effort involved to make new bioart 'media', but also the effort involved in keeping it from getting further invested in bacterial-mould. Pixelache is delighted to finally get this 'secret archive work' off its collective chest, and wishes to celebrate the occasion in arranging a visit to the preserved artwork in the Kiasma archives ... – Andrew Gryf Paterson & Ulla Taipale, 14.04.2016."<sup>1</sup>

### Explanation of the lab is as follows:

"This was a hands-on lab and bio-political discussion, led by renowned bioartist Adam Zaretsky (US), on the difference between whole plant preparations and purified, 'isolated' extracts and risk assessment of intentional release 'utilisation' of Hybrid DNA. Participants were encouraged to bring samples of fruit, weeds, trees, nuts, seeds and roots from urban foraged plant-life. We threw all samples into the mix.

DNA (deoxyribonucleic acid) is found in all living cells. Cells are a part of all whole organisms: plants, fungus, bacteria, protozoa, animals. Some viruses have DNA in them too. Varieties of living samples can have their DNA isolated together in an admixture. Hybrid DNA can be isolated from a collage of various food, pets, pests, human bodies, laboratories and free or not so free living portions of the outdoors."<sup>2</sup>

The goal of this hands-on lab is to demystify DNA by showing its materiality. The lab shows participants how to extract and isolate hybrid DNA in a non-scientific context with household materials. The net effect is meant to aid in public understanding of the relationship between DNA and food by positing DNA – of mostly edible origin – as an art material for new media production. The relationship of DNA to food also accentuates the GMO debate without referencing it explicitly. Intentional steps are taken to gain access to the unnamable and to inspire public debate on the risk benefit analysis of artistic DNA insertion into the life world.

The lab produced DNA from many sources at once. It was hoped that the range of DNA sources gave the participants a feeling of continuity between the being of AOL. AOL are conjoined by nucleic acids, base pairs and amino acid triplets. Secondarily, life's

- 1 Paterson, A. G. (2016) Kiasma preserves hybrid DNA-extract new media "mashup" for over 6 years! Available from: <https://pixelache.org/posts/kiasma-preserves-hybrid-dna-extract-new-media-mashup-for-over-6-years>
- 2 Vivoarts workshop with Adam Zaretsky, 27<sup>th</sup> March 2010 17:30 – 19:00, Kiasma seminar room, Mannerheiminaukio 2, Helsinki, FI, note: For the Herbologies workshops during Pixelache Helsinki Festival, our DIY-Hydroponic HYBRID DNA ISOLATION Skill-Share Lab the Window Farm garden was functioning as a hydroponic pharmacy. The Window Farm garden provided us with two important plants from which we isolated a mixture of DNA using household materials. <https://pixelache.org/events/vivoarts-workshop-with-adam-zaretsky>

continuity is the ability life has to be processed like food: blended to a pulp, denatured and digested. Both ephemeral and visceral, the DNA and the new media art produced from the isolating process are fundamentally unnamable. Hybrid DNA is especially useless for scientific research, which much prefers refined, distinct parts of single genome organisms. The DNA we are trying to isolate is actually: a mess, a tangle, a hodgepodge.

Furthermore, the lab showed how to isolate DNA in such a way that participants were able to take the skills home and run a similar lab in their own kitchen or back yard. It also showed DNA as a non-abstracted thing: a cloudy glop of partial flesh, like so many of our bioartistic productions. Goopy, snotty, spermatozoon muck is quite intricate yet far from the elegant, ornate and cleansed 3D animations of spiral staircases that usually connote DNA in mass media.

Consideration was taken to implicate the participants in the anthropogenic ecological effects of re-engineering life, to take an active and hands-on tactical stance on these issues, and to aid in the comprehension of the politics and responsibilities of altering and collaging of life at the genetic level. Much of this laboratory protocol was repurposed with credit from the Genetic Science Learning Center's "How to Extract DNA from Anything Living" web protocol. This experiment can be repeated at any time in the comfort of your own kitchen, which helps underscore the relationship of biological protocols to cooking. Furthermore, the lab includes the equivalent of the culinary process of straying from known recipes while still producing something edible.

#### Methods:

- 1 We assemble samples of living beings, parts of living beings or freshly dead and raw being-corpse, in this case of vegetarian or mostly vegetarian origin.
- 2 (See List)
- 3 We build a temporary still-life assemblage from the samples and throw a portion of each together into a blender.
- 4 The names of the samples are written down as a list of genomic sources. The samples include various types of fungi, bacteria, protists, vegetables and fruit as both edible and inedible food stuffs i.e., yogurt, papaya, skin flakes and hair.
- 5 We chant the list of the genomic ingredients in the blender as we blend. The blend is now identified as being a novel, unnamed, unutterable enigma.
- 6 We then filter the mystery juice through cheesecloth making new media mono-prints and new media sculptures from the byproducts.
- 7 The DNA from our admixture is isolated using readily available household items. We add soap to the liquid and let the mix sit.
- 8 Samples are transferred into tubes by bulb pipette and contact lens cleaning solution is added.
- 9 Finally, with ice-cold alcohol we precipitate the DNA.
- 10 A process called "Naming the Unnamable" now takes place where participants are asked to invent a neologism to name their isolated DNA sample.
- 11 Participants are urged to bring their hybrid DNA home with them. Museums and other arts spaces are encouraged to accept DNA and other 'remnants' in their permanent collection.

Beyond the experiences of the participants, the public spectators and the DNA sources themselves, the data or art produced includes: the list of genomic sources, the list of neologistic names for the hybrid DNA, the new media monoprints and sculptures, the samples and the injection performance. The lab produced some peak moments and some interesting concepts. The original DNA samples and new media sculptures were not saved, not entered into the donation ledger. But the new media monoprint is the central preserved biomedial artwork.

This lab is a public gleaning of techno-scientific relations to life's vital forces, borne from both strong revulsion and concrete poetry. The violent positioning of aesthetic judgment casts a wide net of dejecta and refusal over: the unnamable, the uncategorized, the irreducible, the mere material and the amorphous. From this we sleuth the role of the unnamable in new vitalism.

The intention of this lab is to provide a democratization of the authority to produce novelty and name it, reground it, own it, and a realization that, after all that, one might still not really know it. As in the case of science, once an original enigmatic contribution to quizzicality is isolated, due to the process applied, the quivering thing is there for the inventors to put a name on. It is as if the processing of life through a scientific protocol contains an innovative relation that the students were empowered to usurp. In its allowance of public neologism, this lab acts as a force of linguistic empowerment. Due to the fact that discovery in this lab is a ritualistic process, the naming of the unnamable smacks of scientism.

### The Return to Kiasma: Visit to an Ephemeral Biomedica Archive

In March 2022, I was in Helsinki for the Bioart Society's 'm/other becomings', a collaboration between Laboratory for Aesthetics and Ecology (DK), The Association for Arts and Mental Health (DK), Kultivator (SE), Art Lab Gnesta (SE) and Bioart Society (FI) meant to cultivate intergenerational and multispecies methodologies, make space for the investigation of domestic resistance practices, and probe technologies of reproduction, resilience, and recuperation.<sup>3</sup> I decided it was time to visit the archived bioart on site. This is a record of my findings and suggestions as well as some *suggestions for Experiments in Biomedica Archiving Research Creation (BARC)* focused on advanced conservation of living art through: 1) cryogenic storage, 2) biomedica colony preservation, and 3) bioinformatics database sequence and synthesis. This focus on advanced biomedica art archiving looks towards a more than digital version of living and semi-living and suspended animation yet revivifiable wet biomedica artworks in collections.

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Determined to visit the artworks, see an 'orthogonal to the contemporary', time-based, new biomedica monoprint in its preserved state and discuss options for Advanced Biomedica Archiving with the curators, I wrote to Saara Hacklin, Satu Oksanen, Leevi Haapala, Kati. T. Kivinen. After many trials and tribulations, I received an invitation to a viewing and discussion.

Before I tell the story of my visit to a 12-year-old example of ephemeral biomedica archiving in a Finnish contemporary art collection, let me tell you of my musings on the Arc-hive project as a critical commentator. I remain a critic of simplistic digitizing biopolitical biomedica arts as bioart is a project that has an a-digital stance. I was perturbed by a symposium called *Life as an Object*. Jurij wrote to me about it:

"It will be the symposium where we would like to provide some theoretical frames of how to understand, define (or undefine) the artworks where artists are using different biomedica. We will talk about how to define the field without falling into disciplinarisation where the term bio-art is understood as a compartment for everything alive. We found tagging with that term as damaging and would like to discuss other possibilities..."<sup>4</sup>

3 <https://on-the-move.org/news/bioart-society-mother-becomings-open-call-finland>, <https://bioartsociety.fi/projects/m-slash-other-becomings>

4 Personal Email Correspondance, Jan 16<sup>th</sup>, 2022. re: Symposium "Life as an object", Kapelica Gallery, Likozarjeva 1, Ljubljana, Slovenia, February 17<sup>th</sup> to 18<sup>th</sup>, 2022. <https://arc-hive.zone/news/international-arc-hive-symposium/>

Suffice to say, I went into the symposium with a strong anti-digital bent, hoping to keep the life in bioart. But the symposium was fun and I found that the enigmatic role of presenting living systems as artifice or contemporary art was presented with depth, seeded with breadth, and that the practice had not outgrown its own critical humorlessness. Biomedica Archiving may bring us to the next level cultural reframing of the mindset of OCD control and command. Bioart's first rendering lives in the closed world jail planet to suffer art-sci double jeopardy as an aesthetic and literary moment of abject materialism. Living on a snuff film shoot as exhibition, the organisms of bioart serve to grant the yuck factor a carnivalesque temporary impedance. Biomedica art finds the artist posing as biopolitical 'life support' in a storm of gore and demented medical experimentation.

In particular, Oron Catts' and Ionat Zurr's *Life as an Object* commentary on scientific and medical design aesthetics for invasive device architecture was summed up as "Square and Beige." This is the look of the technology built to camouflage a perverted aesthetic of psychopathic cradle-to-grave control of life cycle, life span and reproduction: the Square and Beige artificial mother, the Square and Beige artificial womb, the Square and Beige mother-as-incubator, the Square and Beige neonatal life support, the Square and Beige gas chambers of any animal facility. But I wonder about catcalling biomedicalization of the body (both human and nonhuman) in the name of the refined and regal perverted psychopaths of the world? The Square and Beige aesthetic foil for vivisection, reproductive tech, tissue culture and transgenics should not sully the Queer and Proud perverts of the world or the anti-psychiatry movement's critique of the very concept of sanity. Is Bioart is just a vilification of the psychic baggage attributed by science to what is often treated as: pregnant snot, messy leftovers, sloppy seconds? Or is Biomedica Art a collectible nothing burger of decaying remnants, biomedical art of celebrated waste product, catabolic arts? Does the analysis of institutionally violent techno.life control systems, through the biomedica arts, make the life forms into numinous, totemic objects, and is that celebrating the otherness or mocking it in a special Olympics of contemporary, differently-abled, freak show arts? In other words, by dressing up the organismic usery and giving the morphed life or partial life over to an artsy "Other than Square and Beige" facelift or by scaling the jail or hospital installation back and attributing the stark, overlit, colorless vacancy of the art to a tactical/political unsolvable social justice commentary, do any of these methods and versions of scopic bondage subtract from the denial of victimization in everyday life? The usual toying with concepts of pity and enrichment or dabbling in the eccentricities of euthanasia in relations to pain do not make the corpse less ill-begotten.

Archiving non-living biomedica art is just another form of bio-hazardous waste disposal, the making of a reliquary from a decaying scab or a designer oncomouse, sacrificed and plastinated. Biomedica conservation, bioart in general, is morbid teratology, religious reliquaries or war souvenirs. But a collection can enhance appraisal and make it easier to ship the accursed shares between the collection, auction house and exhibition. Is it the art that is being retired or the artists? This is a torture crypt and should adjust the online interface accordingly.

### **A-Digitality — Is Digitizing Bioart an OxyMoron?**

*The following prose/polemic came from my own theories of wetlab bioart practice and the wary relationship it has to data, digitalization and screen-life in general.*

Is it data down to the bodily form, the growth of axes, the specialization of the orifices, the official economy, the complexity of metabolic syndromes? Is it possible that data is more poetic and less rational, more infectious in a wet charismatic cultishness than dry, cyborgian reductionism of our wilding natures?

No to Wildphobic cultures, No to Schizophobic Cultures, No to Agnostiphobic cultures. No to Logic Addiction, the World is not a Software Program,

Code is Logic as Obsessive Compulsive Disorder is Empiricism's Crutch, not science but scientism.

Reductionism is anorexia of the imagination.

Faith based belief in elegance and simplicity towards a unified theory is just another Monotheism.

We don't have to think or feel or worry or be wild in any way.

Anal impulsivity is anal retentiveness, avoidance of anal explosiveness,

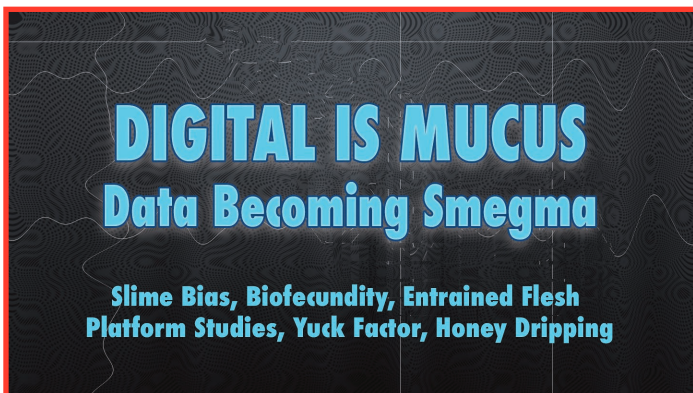
But life is not mere programmable existence.

Reification is mere hoarding, life ensnared in reliquaries.

The organisms are not just for next loops built for being as compiled

Life may be carnage but it's fun and untamable.

Life shits, catabolism are us.



All Organisms Living (AOL) are actually made of slime.

Gore is part of agency, Life is icky body pods.

Humans are mostly mucus too.

Although we have these fabulous frontal lobes

and because of those frontal lobes,

we make amazing click bait,

we can get stolen into fackMess

metabolic tracking device bullshit.

We have cradle to grave

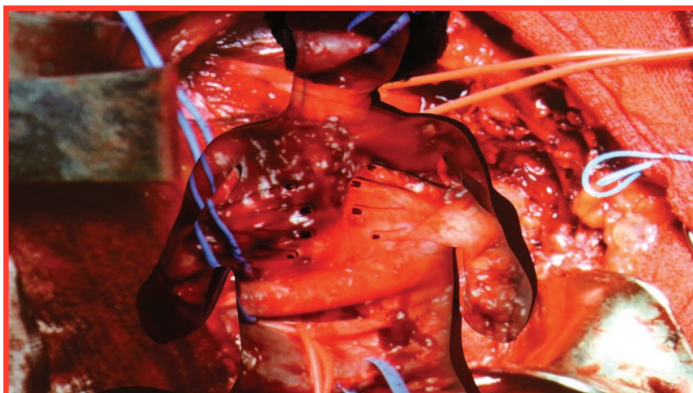
post-privacy monetized algorithms

bio-politically keeping us fed

digital facsimiles of our

AI target group sifted

personalized sales bombardments.



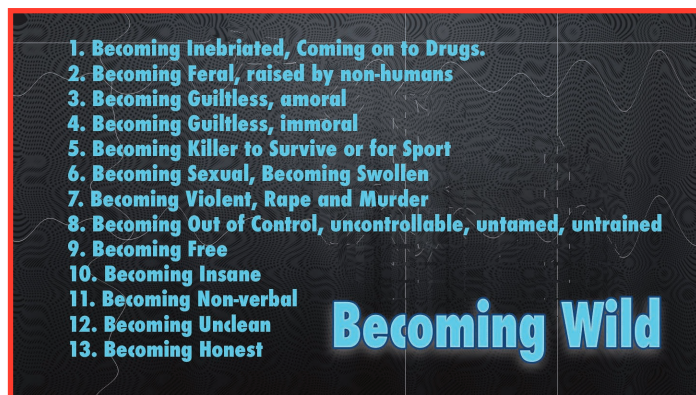


But, we are mostly snail trail goo leavers,  
 the other side of the interface,  
 the ones you touched, the ones you press your steamy face onto,  
 the one no one wants to like in viral times,  
 your phone is the most contagious part of your body.

Is the gory body pod so seeping and untamed? What is this wild flesh that is so in need of data encroachment? And is this data any less wet than the bodies held pronate and irrigated into their genomes as well as into their voice? Isn't the industrial persuasion engine run by flesh desire and flesh inventions? Is the body as code a rote programmed life cycling for/next loop? The proposition is that life itself as carnage is also wild, irrational and untamable literary splay. Aren't the data, the subroutines, the software and the platform UX all also already poetry; wet cognitive nuances disguised as lines of code but filthy with baggage, sloughed skin and detritus?

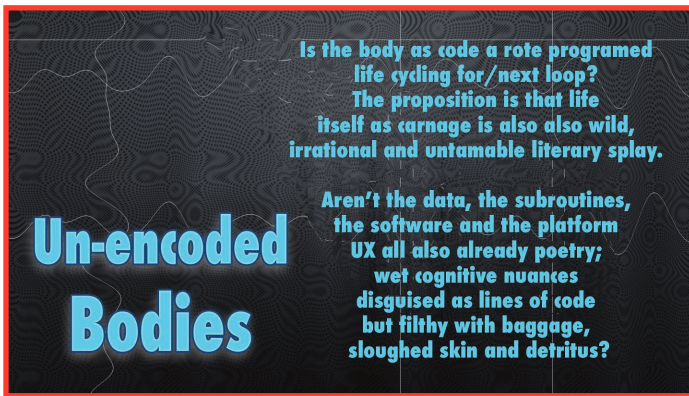
What does it mean that data encroaches on the flesh.  
 Our mind and our body are not just wetware.  
 We are actually just wet.  
 The mind is like a swamp of oatmeal, it is wet muesli.

Bioart doesn't like artificial intelligence art.  
 Bioart doesn't like whole brain emulation art.  
 Artificial life art is the worst,  
 It's like math and patterns,  
 It's not wet at all.



Life not just code,  
 It's not just the cloud...

In point of fact, the digital is also made of mucus  
 Data is smegma  
 It's an accrument,  
 information is like sloughed brain cells  
 like dermatitis, bad skin, dead skin  
 programmed, elaborating on a logic gate  
 what is the yuck factor in platform studies itself  
 where is the honey dripping in the stack?



LIKE A SLICE OF HAM ON THE LINOLEUM FLOOR.  
THE FLESH IN THE MACHINE.

Data is encroaching on the flesh, rendering your body and mind into wetware. Is the augmented user experience becoming digital or is the world of data just an extension of smegma and worldly wet mucosal membranes? Is the process of algorithmic colonization a path towards enhancing human utility? Or is this a case of automatic poetry as infectious behavioral and metabolic remodeling? From the big data of Google and Facebook to the big Data of 23 and Me and other bioinformatics searchable databases, Programmers are programming your lifeworld to keep you staid and regime friendly.

Flesh resistance  
Wet Cognitive nuance  
oaky honey dripping  
superfluous iconoclastic jazz.  
What is the wet digital?  
Follow the digital snail trail.  
constipated carpal tunnel syndrome back ache  
Your Mitsubishi half price heat pump  
is a shot in the dank of memic fire.<sup>5</sup>

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### Visiting the Biomedica in the Museum, 12 years later

I went to the museum on a Friday at 9AM for a one-hour art visit. As a donor I was treated to a backstage reception with three curators. It was obscure. There was an oversized archival cardboard box that had not been opened in more than a dozen years. We opened the box to reveal the cheese cloth with the blotchy abstract new media monoprint of processed based applique. We talked of many things. I was under the impression that there was a potential to re-enact the “DIY-Hydroponic HYBRID DNA ISOLATION Skill-Share Lab: How to Extract DNA from Anything Living in the Laboratory or in your Kitchen: A Compare and Contrast Vegetarian Laboratory and Hobbyist Workshop” as part of the ephemeral art rider, testament or captain’s log TBA. But, the concept of an official Kiasma Ephemeral Art section of the collection was no longer common memory. Nonetheless, Hi-Res Photography has been done on the artworks since my visit and scanning will take place. A testament or official written document will be drawn up and

<sup>5</sup> Some of this text is taken from: Red in Bluetooth and Claw: Bions vrs. Bytes, Dr. Adam Zaretsky presents at Meta.Morf X, Trondheim international biennale for art and technology, Digital Wild Conference, 2020, curator: Zane Cerpina, <https://archive.org/details/redin-bluetoothandclaw>

I have received correspondence since about timing but not about interest in partnering/playing with advanced methods of life in art, bioart, biomedica archiving beyond the digital or in situ, acid-free box, analog preservation. We did discuss the mold as extremophile and worthy of research instead of remediation. I think the letter below explores much of what was gleaned. Suffice to say that the X-ray study that would also lead to random radiation mutagenesis of the mold is a stupendous meta-biomedica commentary sciart historical analysis. The X-ray analysis should be done especially in the name of art collection/preservation history and art-sci in collaboration with special collections conservators. Some might call it animal enrichment for curators.

Here are some documents from my visit.

### Notes on Naming the Unnamable: Neologism as Experiential Qualitative Data Empowerment

“Through force of circumstance, poetic energy is everywhere renounced or allowed to go to seed.”<sup>6</sup>

In the interim, before the participants invent their own neologism and deign to name the mix of blended ingredients, the definition of our new media remains in a liminal limbo. The unnamable remains unnamed. This is a moment of suspense. Lingering over material-linguistic irreducibility reflects some of the tactics implicit in contemporary experimental literature. Authors of discontinuity come to mind, for instance: James Joyce, Samuel Beckett, William S. Burroughs, H.P. Lovecraft and Kathy Acker. These authors, particularly concrete textual experimentalists and poets in general, show the actuality of what cannot be said in a linear and rational way (i.e., what is beyond the logically knowable and what can only be accessed through the intentional fictions of literary applications or other grammatical estrangement mechanisms), in this case food-based.

There is a time before we name the new media paste wherein the novel assortment of blended genomic sources is outside of language. Guttural groans, other non-verbal sonic reactions and expletives come from the participants at a moment of proximity to the grotesque paste. This is a pre-linguistic signature showing a high level of disgust on the so-called Yuck Factor Index (YFI). We need this fluctuating gradient of nausea and rejection to arrive at the limits of our cognitive ability to appreciate difference. Without this, we would become incapable of supporting inequality, distinction or prejudice. This is the baseline for measurement of taboo and shows the collusion of fascist obsessive-compulsive xenophobia and intersectionality’s most transgressive, some might say unacceptable, facets towards true-to-queer democracy.

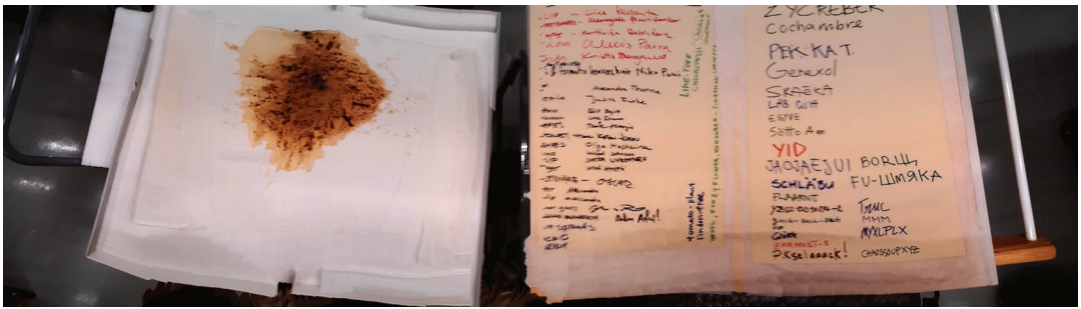
Here is the text of the letter I sent to the fabulous cabal of Kiasma Curators after visiting the Biomedica of the Collection:

----- Forwarded message -----  
From: Adam Zaretsky  
Date: Fri, Mar 18, 2022 at 2:22 PM  
Subject: Kiasma Biomedica Ephemeral Art Collection Archiving  
and the Project Arc-hive Handbook

Hello Kiasma Curators and Guardians of the Permanent  
Collection

Saara Hacklin, Satu Oksanen, Leevi Haapala, Kati. T. Kivinen

<sup>6</sup> Raoul Vaneigem, *The Revolution of Everyday Life: Survival Sickness and Spurious Opposition*, trans. Donald Nicholson-Smith (London: Aldgate Press, 1983), 130.



Muslin sheet with bio-materials "New Media", paper with list of contributed bio materials to the mix & names of participants, paper with list of names of new media (neologisms invented by participants).



Muslin sheet with bio-materials "New Media".

Thank you for the conversation around the 'Hybrid DNA Isolation', 2010, donation, N-2010-168:A- I am proud to have my enigmatic and ephemeral art owned by the State of Finland, the Finnish National Gallery. I am thankful to Museum of Contemporary Art Kiasma as the responsible caretaker of 'Hybrid DNA Isolation' for over 12 years now. I would like to initiate a collaborative dialogue, working with the Arc-Hive consortium to stimulate innovative practices and advanced techniques in Biomedica Archiving. There is a chance that our conversation may be a part of the upcoming Arc-Hive Handbook.

Please respond to this email with individual or a group statement and please do offer what you had dubbed a Testament, an amendment or addition annexed to a documents from N-2010-168:A- a way of talking about Ephemeral Art in the Kiasma collection. Another term for this might be a biomedica art rider or an ephemeral art allonge. In any case, please do share the Art Testament with me at your earliest convenience. If it can have some signatures and perhaps a stamp or two from Kiasma or the Finnish State, it looks better in the literature.

Let me start by saying that our conversation was informative and rewarding. We viewed the pieces. One piece had been in the dark for over 12 years in a large format archival cardboard box. Upon opening it we noticed some mold growing. We talked about the potential for having a conservator consider mold removal as a process of restoration. I was clear that the mold itself if part of the art, the only truly living part left from the original bioart life politics lab. It is true, when it comes to the interface between life and art, I am a bit of a purist. Some might even call me a biomedica bioconservative. So it is my proposal the mold is to remain in the dark, the art is to remain growing. On the other hand, we talked about a few other ways to conserve the life in the art.

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We all agreed on standard photography and large format scanning. I also proposed the idea of sampling very small high-resolution scans (i.e., 1 cm x 2cm rectangles) from the melange of genomic sources markign the cheese cloth. When you select very small areas on a scan-bed, often the resolution (pixels/cm) can be greatly enhanced, making for microscopic or near microscopic high-resolution magnifications. Please consider this a form of curatorial artwork detailing and ask your art quality scanning outsourcing to consider this an experiment worth crafting. Retain actual size and resolution data so we can calculate magnification.

If a restoration conservator is involved in the process, they may be pleased to hear that we did talk about macro X-ray fluorescence analysis. On my part, it is a great action to perform on such an abstract, new media piece. With x-ray analysis, this becomes an art/sci art and science collaboration with the conservationist. Obviously, any x-ray of a bioart piece is both a medical imaging of the art (which is nested loop as bioart or biomedica is often related to issues of art, science and health). The use of x-rays on living or semiliving art is also introducing mutagens to the genomic sources that

# DNA SOURCE GENOMES

- TULIP — Line Kusaito
- CHERRY TOMATO — Ranjyah Gowrisankar
- GRAPES — Martinka Bobrova
- onion Alexis Parra
- birch Kristin Bergaust
- vihta/vasta
- chili & tomato leaves, hait Niko Punin
- Kiwi  
Alessandra Thorne.
- Apple Judith Funke
- Lettuce Edit Bajse
- MUSHROOM Loei Daino
- GRAPES Teale Harjo
- HONEY Hana Keski-Koski
- GRAPES Olga Mashkina
- LIME Mikael Johnson
- TULIP JUUKA LUKKONEN
- ginger Kati Hyppä
- BALEZIANA — OSCAR
- Pepper Alessandra
- tulip Alessandra
- common grass Jari W. R.
- UNKNOWN MUSHROOM Anders Aspal!
- bean sprouts
- cacao
- melon

LIME-TREE  
 CHLOROPHYLL — Christine Stodlbauer

tomato-plant  
 linden-tree  
 WOOL, TONZY FLOWER, KUKKUNEN — JOVATHAN CMEJES

Z YC REBER  
Cochambre

PEK KAT.  
Genexol

SRAĒKA  
LAB GUT  
EGYVE  
Sötto Aan

YID

JAOJAEJUI BORLL

SCHLÄBU FU-UMYKA

FLAARNJ

YSGO BO 102/4-2

gush - Hush - Blush  
roo

Gürk

ZARMUST-5

Pikselaaack!

TyMC

MMM

MYXLPLX

CHAOSSOUPXYZ

make up the materials that went into the making of the new media. This new media in the monoprint was named and sourced from living being to produce the Hybrid DNA. It is presumed that much of the original DNA from the life forms that were blended in the lab is still intact. The x-rays would alter, break and mutate the DNA in such a way as to influence the art, again in an experimental way. Even the mold that prefers the new media as a habitat has genomic information subject to alterity through X-ray mutagenesis. So, I am affirming my willingness to entertain a macro X-ray fluorescence analysis of the many layers of this artwork.

This is a bioart piece and we are talking about Advanced Techniques of Biomedica Preservation, so let's take it a bit further. The DNA that was donated was not kept in the collection, neither were the new media sculptures pictured in the video<sup>7</sup>. So we are missing the Hybrid DNA sample from the original lab. This can be remediated:

We can take a sample from the cheese cloth of the DNA sources and Isolate DNA from a Sample of the New Media as preserved and call it a reenactment or a delayed sampling.

We could then Cryogenically store a Sample of this DNA.

Simultaneously, we could sequence the DNA that we have isolated and stored in suspended animation in liquid nitrogen. Yes, we could send a sample of the DNA to be sequenced and then the sequence of the DNA could be stored online in a digital database. This sequence data is a digital string or strings or genetic data but it can also be synthesized back into DNA and inserted into living forms at a later date to become alive once again.

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Obviously, this could be repeated for the mold that has been growing on and as a part of the artwork. We can name the mold: Curator's Extremophile. It is a Rarified Species after 12 years in the dark and may have novel extremophile properties that only a trained molecular mycologist consultant could uncover. This mold can be kept alive separately as well as allowed to cultivate the mixed media monoprint. This is a consideration of a colony stabilized as a form of archiving or even as a living database life support collection.

Furthermore, DNA from the mold can be isolated, cryopreserved and sequenced.

If we want to expend the art and science crossover, we can talk about doing this sampling before and after x-ray mutagenization to show the effect of x-ray art restoration on archived biomedica, a great case study.

Some of the sequence data could be reincarnated or transgene infected into a life form like a bacterium or a squid or

7 See: <https://vimeo.com/60815858>



a mouse or lactating kangaroo nipple. This would take the digital of the biomedica information database and print it to flesh, synthesizing the digital database into metabolic, anatomical and mutagenic lived experience.

These stages of post-digital or hybrid digital archiving represent life-art database interfaces engaged in improving biomedica ephemeral collections. We can show the potential by acting on these Advanced Techniques of Biomedica Preservation suggestions. Would you be willing to partner up with us and be the first museum to include cryogenic storage, genetic databases and even colony preservation in your collections room?

In any case, I look forward to your answers and your testament for Hybrid DNA Isolation, 2010, donation, N-2010-168:A-, Donor: Adam Zaretsky, Ph.D.

This is a formal pleasure and a groundbreaking moment. Please do write as if there was some art history being made here. Thanks,

Adam Zaretsky, Ph.D.

### **Welcome to BioStasis, and BARC@BioStasis or BARC@BS**

Ruminations on the “Life as an Object” Seminars led to Advanced Biomedica Archiving concepts origination in my Arc-hive suggestions for Experiments in Biomedica Archiving Research Creation (BARC) then advanced as an optional extension in the Kiasma Contemporary Art Museum Permanent Ephemeral Collection/Archive. At this time, an official Testament is being formed and answers to the questions in my letter are in formulation. But the Arc-hive Project does not rest and wait. Hosted at the Ionian University in Corfu, Greece, EU, the newly formed Biostasis Laboratory focuses on biomedica research and bioart research creation. Biostasis Laboratory has a wide umbrella in terms of Bioart and Biomedica Art Studies, including experimental space to prototype Advanced BioMedia Archiving methodologies, both conceptual and in practice. Biostasis has agreed to collaborate on Biomedica Archiving Research Creation (BARC), so we begin our BARC@Biostasis research. BARC@Biostasis research explores the development of archival projects using experimental methods beyond and in conjunction with digital documentation and emphasizes advances in biomedica archiving through practice-based research creation.

This art and science production project is a hands-on laboratory setting to: a) integrate a creative process team into biomedica as art archiving projects, b) develop systematic research on the exploration of vivo-archiving methods beyond digital documentation, c) be part of the dialogue on queering curatorial methods exploring dimensions of the body as an archive. In particular, experimental biomedica archiving will focus on advanced conservation of living art through: 1) cryogenic storage, 2) biomedica colony preservation and, 3) bioinformatics database. Biostasis BARC technical-life interfaces emphasize longevity, protection, proper care and revivification potential of archival biomedica. Forensic analysis of BARC biomedica storage methodologies will increase the stability of the archival index rating for a variety of novel biomedica, avoiding simple disintegration and enabling re-enactment through reanimation.

## BARC methodologies are as follows:

- 1 Cryogenic Storage Archive: Biomedica Preservation includes cryogenic storage. This is a form of suspended animation with freezing and thawing as the tech-life interface. Cell lines, body parts or germ cells kept at -80C in liquid nitrogen aid biomedica preservation by making the media itself become less ephemeral, more or less in the range of the timeless. For instance, if a tissue sample of a human appendix can be cleared for storage, then a living but cryopreserved appendix can be referenced in the Arc-hive literature as an appendix to an appendix, or an Appendix Appendix. BARC@Biostasis Labs would then approach a University Library to install cryogenic storage in the library stacks made ready for international interlibrary loan procedural nomenclature as a rare manuscript. This will help in the future understanding of the problems and solutions of biomedica archiving.
- 2 Bioinformatic Database Archive: cloud based, on-ground or underground stack architecture with ubiquitous software interface show artistically organized bioinformatic files that can be selected, cut, pasted and then printed from text-to-flesh. This process includes sequencing, genomic data storage and synthesis/retrieval. A copy of this bioinformatics database may be stored in a salt mine to protect the data from electromagnetic pulse (EMP) forces and cosmic radiation from solar flares. This database will remain open source and public with ubiquitous mirror sites for citizen biomedica access and public biomedica upload/download Creative Commons share and share-alike, body of work freely available for non-commercial, legal use, sharing, repurposing, and non-attribution remixing encouraged. Alternative to cloud based or LAN based bioinformatics databases.
- 3 Colony as Reproductive Archive: Breeding biomedica organisms includes managing them as multi-generational archives. This is the organism facility, the life support of the programmed bacteria, worm, fly, etc. So, the breeding site is a live archive. Multiple generations of organisms are compared to online genomic 'true-to-type' standards and stabilization measures are built into the environment to guarantee quality statistical similarity. A colony is a reservoir of mutation stability or passaging of select tissues with biomedica nomenclature and strain identification for the minimization of biomedica alterity. This should include a program for maximizing and assuring verified reproducibility with rigor and translatability as well as serious consideration of biological variables including technical and cultural readings on: husbandry factors in true breeding of strains, sex linked difference analysis in multigenerational programatics, and specific microbiota effects on metabolism and behavior. This living archive will result in an open call for donations to the permanent collection of museums or zoos to house and care for the techno decon-bricollage beings of biomedica.

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It is my hope that Kiasma will engage as a reference point and help make a clearing for other bioart projects to be collected as specimens in other than purely digital form. Regardless, BARC@BS Arc-hive advances biomedica archiving with the technologies and methodologies that most support the actual preservation of life science art data, tissues, life forms and sequenced/synthesized bioinformation inscription. Long live the Archive that can be revived; this is techno-eternity in a nutshell!

## Epilogue: Free Range GMO GLo-Fish, Earth as Archive: Epic Biomedica Fail

If it is a question of Arc-hive as both Arc and Hive, it is a question of survival, not storage. Merely to confine the biomedica arts would vilify a collection based on biowarfare-bi-security aesthetics: elite isolation and pure culture accept the aseptic fetish of containment in general. This is not simply bureaucracy around Permits, Risk Assessment,

Access and BioSafety, this is a vision of a biopolitical stalemate, we are either all dead or all in some jail of biometric monitoring and adjustment. Luckily, some of life's trademarked survivalist moves involve both evasion and escape.

Many a non-human collaboration artist, a multispecies artist, a fermentation artist, a transpecies artist or an animal enrichment artist has followed the ethological path towards understanding the Other, the unfamiliar life form to design an artwork that shows interspecies communication, enriched life in captivity and respect. But if our living beings as archives can be rewilded, then the Arc-hive can be intentionally released and become ubiquitous as free range databases of being. Free range bioart is wild, an open cloud in the wilderness of bioinformatic augmentation. In this way, we can insure the programmed organisms are also capable of living a life of culturally deprogrammed freedom. Unbeknownst to the worms, people and flies of Archive Backup, our Feral Archiving device-beings offer Free labor, Free storage, No upkeep, No tending. Ok, the escape is actually an intentional release coded as escape, but it is an alien and foreign invasive that could be considered an outbreak. For instance, when I let the colony of branded GloFish transgenic red glowing zebrafish go in the Gulf of Mexico, choosing rewilding of transgenic animal as a benefit worth the risk of ecological destabilisation:

“Yeah, I bought some transgenic beings their freedom. I bought them at a local pet store in Corpus Christi, Texas. I rolled up my pants and waded into the gulf with my mixed, inbred, interspecies cousins. I immersed the plastic bag of Starfire Red® Zebrafish in the waters to acclimatize. Then I popped the bag and let them go. They swam off. Was the modified family welcomed in their new environs? Did foreign GMO species have trouble integrating? Is there a living brood of intentionally released, different colored fish in the Deep South? ... Let difference reign supreme. Applaud new anatomy. Otherwise we must wipe out the rock snot of the lab and categorically stop the production of any ugly, unasimilated, invasive species. Can you decide?”<sup>8</sup>

By making living archives of biomedica experiments into intentional releases we are on a meta-path towards dissemination of the life art as living and replication data. But, as usual, industry leads the way. The Amazon basin is now a free-range transgenic runway, the jungles of Brazil thrive with bad actors, graffiti genomic pop art beings. The Museum is already hidden in biomes and habitats of our fecund open world:

“Trademarked as Glofish, they became the world's first genetically engineered species to be commercially available. Now, they are one of the first to escape and thrive in nature. Early on, environmentalists worried about the possibility, and Glofish sales were banned in some U.S. states such as California and several other countries—including Brazil. In 2014, a single Glofish was spotted in canals near ornamental fish farms in the Tampa Bay region of Florida. But it had not multiplied, probably because of native predators ... Brazil is proving more hospitable. In 2017, André Magalhães, a biologist at the Federal University of São João del-Rei, and colleagues began to survey five creeks in three municipalities, finding transgenic zebrafish in all of them.”<sup>9</sup>

But this is so silly, why put our databases of bioart into non-humans when we have no biosafety issues around transhuman or transgenic human free-range release even if our trans-normative archive meatbodies breed true to version. Bioart owes much of its true inner fire to body artists and performance art. This is a topic for another essay, but self-immolation and self-experimentation are interwoven into perfectionist human engineering and biomedica living archives can jump into the germline as commentary survival.

8 Zaretsky, A. (2010) GOF®P: The GloFish® Freedom and Reconciliation Project. *TDR: The Drama Review*, “Provocation” 54:4 (T208) Winter 2010, New York University and the Massachusetts Institute of Technology, pp. 2-3

9 Transgenic glowing fish invades Brazilian streams: Aquarium curiosity appears to be thriving after escape from fish farms and may threaten local biodiversity, *Science Magazine*, 11<sup>th</sup> Feb 2022, doi: 10.1126/science.ada1221

“Lulu and Nana, the controversial ‘CRISPR babies’ born in November 2018. The fetuses’ genomes were edited to prevent HIV by Chinese scientist He Jiankui, an act for which he was found guilty of forging documents and unethical conduct in 2019 and sentenced to three years in prison with a three-million-yuan fine (400,000€).”<sup>10</sup>

As kaballistic as it sounds, as crumby for human dignity, as rife with child labor and enslavement to the machine, we can drive towards an interstellar, non-terran human biomimetic design model as semi-solid state drives. And as we know from object relations, drives drive drives. This is the Arc-hive of the future, lasting until some art loving extraterrestrial art collectors find our hidden messages and realize the true value of biomedica as a living archive.

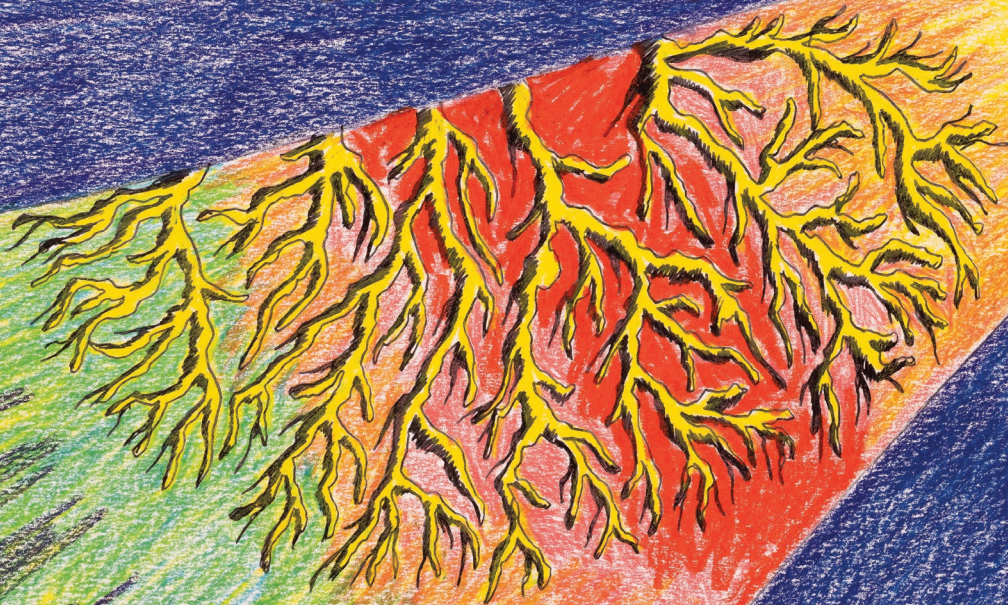
<sup>10</sup> <https://www.makery.info/en/2021/09/01/english-human-germline-gene-editing-is-bio-art-an-open-letter-to-lulu-and-nana/>, also see <https://www.makery.info/en/2021/09/01/english-human-germline-gene-editing-is-bioart-an-open-letter-to-lulu-and-nana/>

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- Dr. Adam Zaretsky** of NADLinc is a nomadic Wet-Lab Art Practitioner mixing Ecology, Biotechnology, Non-human Relations, Body Performance and Gastronomy. Zaretsky stages lively, hands-on bioart production labs based on topics such as: foreign species invasion (pure/impure), radical food science (edible/inedible), jazz bioinformatics (code/flesh), tissue culture (undead/semi-alive), transgenic design issues (traits/desires), interactive ethology (person/machine/non-human) and physiology (performance/stress). A former researcher at the MIT department of biology, Adam runs labs on DIY-IGM (Do-It-Yourself Inherited Genetic Modification of the Human Genome). His art practice focuses on an array of legal, ethical, social and libidinal implications of biotechnological materials and methods with a focus on transgenic humans, methods of transgenesis and germline aesthetics.

Identifying the challenges  
and solutions for

# 3D digitalization of BioArt



# Identifying the Challenges and Solutions for 3D Digitization of Bioart

Aurore Mathys, Nuno Sousa

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Digitization of artworks and museum collections is seeing a growing interest. It is of particular interest for bioart collections, as these artworks are often temporary or evolving with time. They are also made up of challenging materials, like reflective or transparent materials, plants, bacteria, etc. Therefore, digitization of these artworks is sometimes the only trace remaining of the artwork after its exhibition, or the only way to fix a form of the artworks as it evolves with time.

Guidelines for digitizing collections with a predominance of works developed with biological materials are non-existent, therefore in this chapter we wish to propose a series of adapted guidelines and recommendations to achieve the best results. We will review different case studies representing different challenges encountered and explain how we solved the difficulties.

Most of these artworks are tridimensional, thus the wish to record them in 3D. Traditionally, the most common methods used are 3D scanners (structured light or laser scanners) and structure-from-motion (SfM). Details of the techniques won't be explicated in this text, as many sources are already available on the topic (Brecko & Mathys, 2020; Keklikoglou et al., 2019; Ebrahim, 2015; Bell et al., 2016; Mallison & Wing, 2014, etc.).

# Challenges and cases studies

Challenges faced when digitizing biomedica in 3D are linked to the material, the temporary aspect of the artworks or their condition evolving in time. Another constraint is access to the technology and cost of the technology.

Challenges depending on materials and technique used have already been identified by Mathys et al. (2015) and suggestions on how to cope with them have been made. Unfortunately, these solutions are not always applicable to this branch of art production and installation, as the artworks are made of mixed materials that cannot necessarily be digitized with the same technique, but also because of the size of the artworks or the fact that these artworks have been built in the gallery for an exhibition and cannot be moved.

The challenging qualities of materials often found in this field of art are that they are reflective, transparent, organic (plants, bacteria). Objects are also challenging due to their shape (hairs, wires, leaves...) and due to the use of living materials that will evolve with time.

In this chapter, we will discuss solutions to tackle these challenges.

## 1. Reflective materials

Reflective surfaces (Image 1) are challenging to scan, so most would recommend spraying them with a mattifying coating. Unfortunately, as this is not applicable to artworks, alternative solutions need to be found.

Depending on the reflective material used, some techniques might work better than others. For example, as long as it is not metal, CT and microCT would give good results. Structured light can give generally decent results. Laser scanning and classic photogrammetry are typically the poorest performers for reflective surfaces (Image 2). But for photogrammetry there are some ways of improving the result either by using specific wavelengths, as shown in Mathys et al. (2020), or using cross-polarization like Hallot & Gil (2019).

## 2. Transparent materials

Transparent materials present a challenge for most of the classical techniques, as most are based on light which can go through the object. Moreover, even if the area of interest is inside a transparent container, the container can refract light, affecting the detection of the object's structure by the reconstruction software.

As for reflective surfaces, among the most common advice is to spray the transparent material with a mattifying coating. Another solution is the use of CT and microCT, but the use of these is often expensive, has size limitations, and some of the artwork cannot be moved. Furthermore, many microCT machines are not adapted to living materials (which are often found in biomedica artworks).

If the objects are not organic, the most accessible solution is to model them using 3D modeling software such as Blender, Cinema 4D, or 3dsMax. Industrial refractive materials can be recreated in the software to mimic the glass.

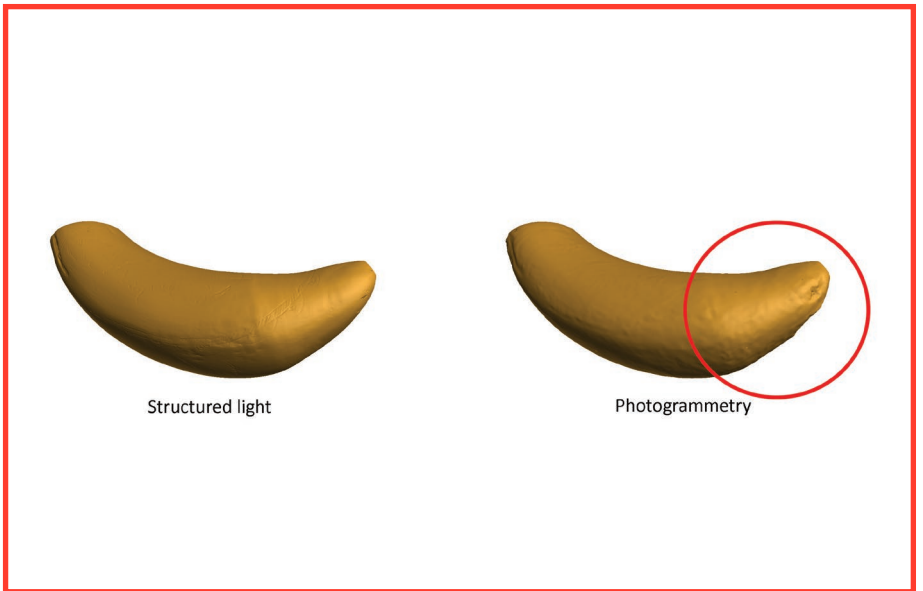
## 3. Plants

The main challenge in dealing with plants is the thinness of the leaves and petals which is in itself difficult to capture in 3D, but additionally these elements often move even in a slight breeze (Image 3).





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- 1 Example of an artwork with reflective properties.
- 2 Comparison of a reflective object in structured light and photogrammetry. In addition to the difference in precision between the two scans, the photogrammetry model presents excessive noise on the tip of the object.



3 Examples of artworks with plants of different sizes.

Aside from the difficulty of capturing a single state of a plant, they grow and evolve over time as living materials, with varying cycles, depending on the plant.

In the case of small plants like flowers, LaserDesign has managed to successfully scan flowers with a high resolution structured light scanner (<https://skfb.ly/onXW8>). This method is a good solution for small plants, but is impossible to apply to larger artworks as it will be extremely time consuming and difficult, if not impossible, to process due to the large amount of data produced.

Photogrammetry remains the most flexible technique that can be adapted to the most diverse scales of artworks. It will not render the detail of each plant leaf properly, but thanks to a good texture, this is probably the best 3D representation available. A drone can be used to capture large scale objects.

#### 4. Challenging shapes

By challenging shapes we refer mainly to structures that are so tiny that they become a challenge to digitize. It is often the case with wires, hairs, straw, and small thickness structures (Image 4). Indeed, these structures are a real issue to reconstruct in 3D, even with microCT.

First, these structures are extremely tiny, so only very high precision techniques can capture them. Second, they are often not completely fixed, as discussed previously regarding leaves and petals.

As in this case, we believe 3D is not actually an option, we would instead suggest using a system like the one of the Zoosphere that creates pseudo 3D: the user can move around the object, but actually the data is constituted of a large number of pictures capturing 360°.

## Example of case studies

In the framework of the project ArchHive, Cultivamos Cultura and the Royal Belgian Institute of Natural Sciences (RBINS) have digitized parts of their collections with different specificity and different techniques which will be presented in the following part.

### 1. Examples from Cultivamos Cultura

At Cultivamos Cultura, the digitization of the collections has brought into sharp relief several of the challenges mentioned before. In this part we will describe the solutions that have been implemented. Cultivamos Cultura is a small NGO, new to digitization and with modest means. Therefore, they have focused on low-cost techniques, mainly structure-from-motion photogrammetry (SfM) and 3D modeling.

SfM is a process that allows the creation of three-dimensional models based on photographs of the object. Capturing raw-data for SfM has certain limitations, among which are transparent, translucent, reflective, refractive materials or unstable constantly changing shapes.

This research faced several objects that correspond to these criteria: objects, structures, and concepts difficult to digitize with the aid of SfM. To address these issues, some techniques were developed and adapted to better blend 3D models, generated by SfM processes, with photorealistic textures and a variety of 3D modeling techniques. 3D modeling consists in creating 3D content from scratch in a modeling software like Blender (free) or 3DsMax (paid). The modeling software enables not only creation of geometrical forms but also materials with their optical properties.

### 1.1. Example: *Refugio* by Diana Aires (large scale greenery)

Because of its large scale (1.6m, 1.5m, 2.25m) and partly due to its location, this object remains the most difficult to treat so far. The refuge object is a structure made of branches and leaves that is supported by a wall (Image 5), resulting in a concave shape made entirely of vegetation. Aside from its large scale, another challenge posed by this object is the abundance of empty spaces, the presence of small details and areas with varying material densities. Since leaves are primarily two-dimensional, they present challenges in digitization; namely, although the program can recognize and capture features on both sides of the leaf, it has difficulty relating them. The object was illuminated as uniformly as possible and even so, due to its complex shape, there were always components of the object in shadow.

A Lumix camera was used to capture images with higher quality, allowing the recognition of more points of interest in the object. A smartphone was used to capture photographic content in positions and angles not permitted by the camera and its tripod for a more agile process. These photographs were critical for capturing information inside the concave shape of the object as well as detailing the various curvatures of the holes and the object's edges. The two groups of photographs were processed together in the photogrammetry software, and the results were, in part, better than expected (Image 6). This result, as well as its texture, allowed the platform's end user to perceive the piece's spatial perception. However, processes to treat the resulting geometry and make its shape and appearance more corresponding to the reference images are still being sought out.

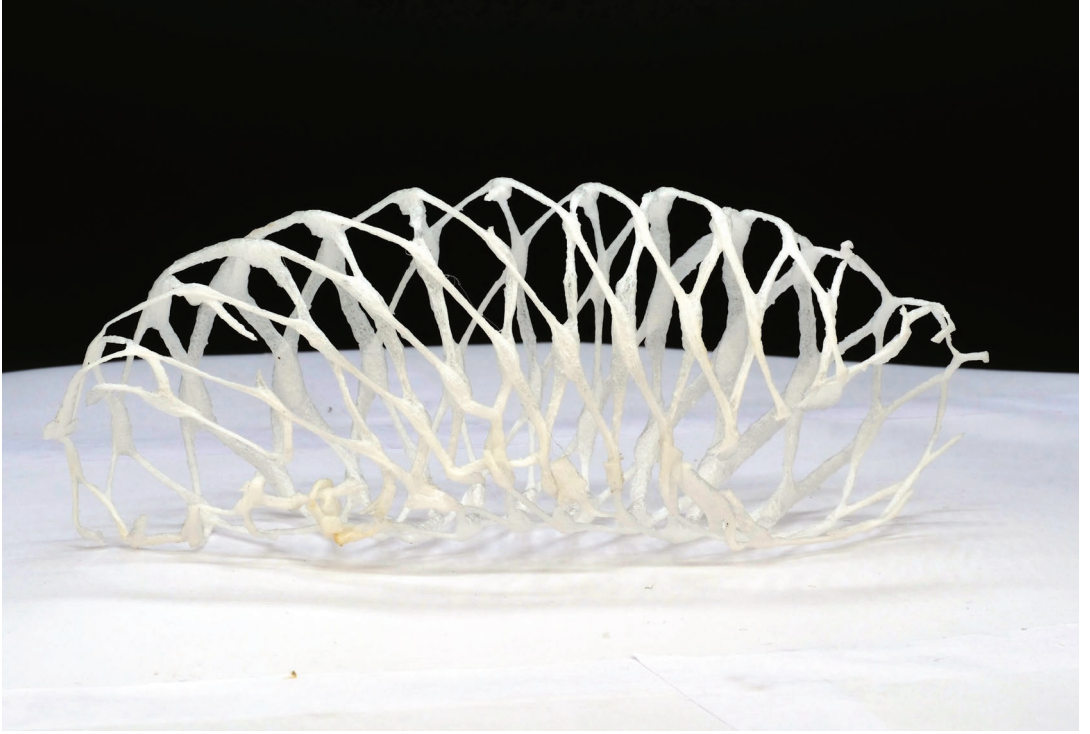
### 1.2. Example: *Crosta* by Anna Isaak Ross (transparent materials)

*Crosta* is a piece composed of a wooden box with earth-filled test tubes and a glass panel in front of it. This piece has various aspects that make digitalization difficult, most notably the multiple layers of glass, of varying thickness, and light artifacts on the textured items. Because of the object's properties, it was not possible to remove the glass objects from the wooden box, and digitize them separately, so the photoshoot had to be done with the complete piece (Image 7).

We did our best during the photogrammetric shot to prevent harsh reflections and highlights on the glass created by the studio lighting. With this control over the light, we were able to extract as little information from the glass as possible. Our goal here was for the photogrammetry program to be able to ignore the glass due to the lack of points of interest. The final SfM object had the proper overall shape and proportions. The backside of the frame was highly detailed, and every object had its textures accurately assigned. The inside of the box, on the other hand, was considerably deformed, with only fragments of the original shapes of the test tubes remaining, and its textures were influenced by the light refracted through the glass. After exporting the object from Agisoft, several approaches were used to take advantage of the complexity of the textures and the model derived from the images, as well as the initial model's simple shape. A replica of the inside of the box was designed, to which the textures from the photogrammetry were assigned. The two geometries were carefully connected using remeshing methods. The generated geometry was sculpted, and a retopology procedure was used to reduce the density of the geometry. Texture transfer was performed from the geometry with high geometric density to the reduced geometry. Textures from the source object were used for texturization whenever possible. In areas where intervention was required, texture painting was used to correct the texture of the models based on the original texture information. Texturing and prior knowledge of the materials in question were used to extrapolate material attributes. The resulting model represents the artwork as fair and as faithfully as can be expected considering the challenge of such an object.

- 4 Example of an artwork with a complex structure.
- 5 *Refugio* by Diana Aires.
- 6 SfM result.

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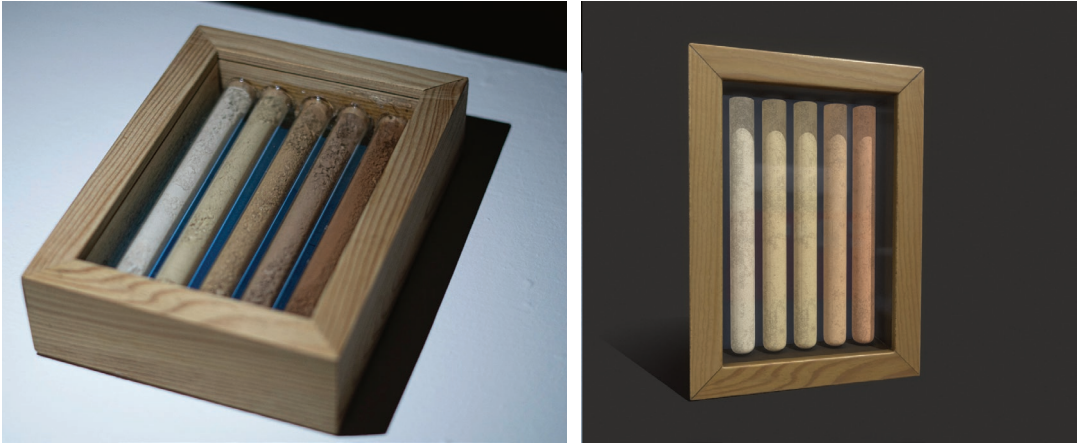


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- 7 *Crosta* by Anna Isaak Ross: picture of the real object (left) and 3D representation (right).
- 8 Picture of *Tinkering Life* by Carolyn Angleton.

### 1.3. Example: *Tinkering Life* by Carolyn Angleton (transparent materials)

*Tinkering life* is an artwork composed of several different objects, one of them being a reliquary formed by a frame with objects inside, behind 5 glass plates (Image 8). All this glass surface presented difficulties due to refraction artifacts and reflections from the outside light. We were able to ensure that the photogrammetry software could not identify enough features on the glass to recognize it as geometry by using cautious camera locations, extra attention to lighting, by using background and carefully cleaning the glass. Thus, we successfully had the software ignore the glass components of the object, resulting in an object with a detailed interior and entire glass support structure. Glass plates were then added to the digital object in the original position of the glass, and the rest of the process followed the standard object treatment line until the model was completed.

### 1.4. Example: *Uma arqueologia do tempo presente* by Carla Rebelo

This object has a lot of properties that make digitizing challenging. Its material, color, and texture do not contain enough features for the photogrammetry software to recognize. Because of the delicate nature of its structure, it was positioned with the utmost care so that there were no changes in its shape between photographs. This object's shape is primarily made up of negative space, with a structure made up of circular styrofoam tubes (Image 9). This has resulted in a continuous occlusion of parts of the object by other parts of the object that are closer to the camera.

We were able to achieve a satisfying result by employing a variety of techniques at various stages of the photogrammetry process. When gathering special photographic content, care was taken to ensure that the background was devoid of details and tone variations. The contrasting background with the shape and color of the object aided in the speeding up of the mask creation process in Agisoft. We were able to distinguish the foreground from the background of the object during its rotation by taking care of the focus field of the lens, so that there was a distinction of depth at every moment.

The process of correcting the resulting geometry was simple and straightforward. We filled the space by adding small, sculpted objects to the small gaps in the geometry based on the reference images. A voxel remesh algorithm was used to join the geometry. The original texture was transferred to the resulting geometry after these symmetries were mapped. Later, the patchwork that had no texture represented in the original geometry was painted with the texture of the remaining object, resulting in a final object with no alteration marks and respecting the initial object's proportions and morphology (Image 10).

## 2. Example from RBINS (reflective materials)

RBINS is one of the biggest federal museums in Brussels, holding more than 39 million objects or specimens. It is a pioneer in the world of 3D digitization of the collection, using a wide variety of techniques.

In the framework of Arc-hive, RBINS digitized a collection of scrimshaws. Scrimshaws are artworks made by whale hunters in the 19<sup>th</sup> century, from whale bone or teeth or other sea animals. RBINS collections contain mostly engraved sperm whale teeth. Although scrimshaws are not exactly bioart, they were included in the project because the definition of bioart hadn't been clearly agreed on among the partners previously to the project. Scrimshaws serve as a good example of digitization of reflective materials. Sperm whale teeth are difficult to digitize in SfM due to their reflective surface and their light featureless color. An additional difficulty was to be able to record the engravings with enough precision.



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9 *Uma arqueologia do tempo presente* by Carla Rebelo.

10 3D representation.

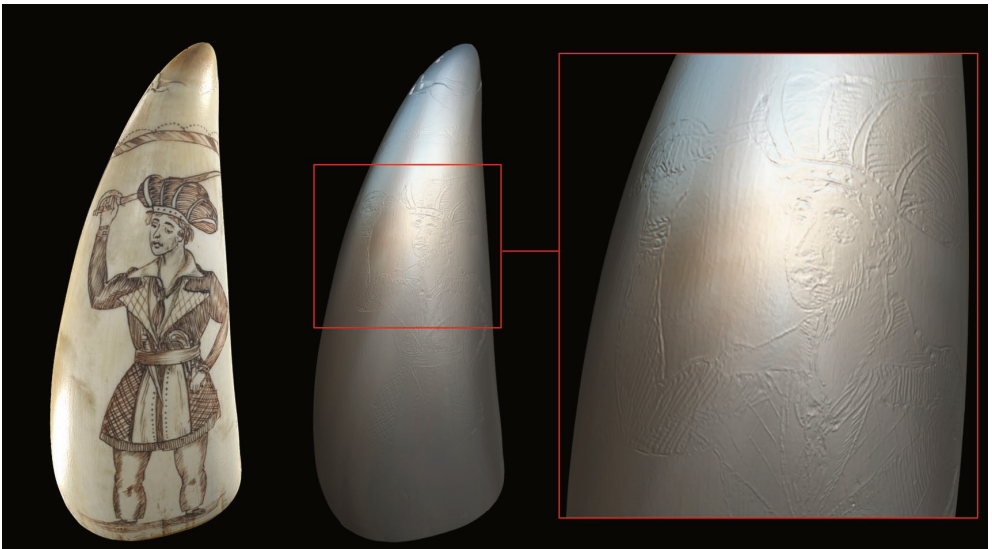
11 Example of the result obtained for the scrimshaws in 3D.

12 Detail of the recording of the engravings.





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Therefore, RBINS chose to use a combination of two techniques to obtain the best possible model in terms of quality for both geometry and texture. They used a specific one-shot structured light scanner for geometry combined with SfM for texture.

Structured light consists of projecting a pattern of light on a surface and one or several cameras will capture the deformation of the pattern and use it to calculate the 3D volume. Structured light scanners can have different levels of accuracy. In this case, we chose the Keyence VR-5200, a one shot microscope structured light scanner allowing us to achieve 5µm of accuracy. The Keyence VR-5200 can capture only one view at a time and cannot export the 3D model texture. Therefore, to capture a sperm whale tooth we have to perform 4 to 6 acquisitions which are recombined in a third party software. The tooth is also photographed with 4 rotations of 36 pictures to calculate a scale SfM model. The SfM model and the structured light models are aligned together and the texture from the SfM model is projected onto the structured light model. The result is a high accuracy model with a physical record of the engraving and without artifacts due to reflection and lightness of the material, but with a photorealistic texture (Image 11–12).

## Recommendations and discussion

Based on the case studies, the literature and our general experience, we observe that biomedica and reactive artworks can be challenging and often several digitization techniques have to be used together to achieve good results. In the case of Cultivamos Cultura case studies, they have focused on low-cost techniques, using photogrammetry, modeling, 3D sculpting and texture projection (or texture painting from SfM texture). The result is fair and as faithful as can be in terms of the representation of the nature of the art piece itself. It is a process of documentation that focuses first on the question “What is the artwork?” to develop the right protocol to create a 3D representation of the art piece itself.

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Having access to high-end equipment, RBINS took a different approach, where the aim was high-resolution to record as much details as possible within the geometry and the texture. In order to do this they combined a high resolution structured light scanner for geometric accuracy and photogrammetry for texture accuracy.

Unfortunately, as discussed in part 2, the high-resolution approach cannot be applied to all bioart case studies. For example, plants remain a challenge even with high resolution structured light scanners. But what has been underlined with all the case studies from both institutions is the use of a photorealistic texture based on photogrammetry, as this procedure will work for most artworks.

Therefore, our first recommendation will be to use a photorealistic texture from SfM, no matter what solutions you use to obtain your 3D model.

Our second recommendation is, when materials don't allow for 3D scanning, consider modeling or sculpting.

Third, consider if 3D is really the necessary or appropriate way to record the artwork or whether a video or a time-lapse might suffice.

To conclude, there isn't one perfect solution for all case studies and the technology required may not yet be publicly available, but as technology is evolving and developing quickly, new solutions might arise soon.

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- Aurore Mathys** is a researcher at the Belgian Royal Institute of Natural Sciences (BE) and the Royal Museum for Central Africa (BE), specialized in 3D digitization of the collections. She holds a master's degree in art history and Archaeology, with a specialization in prehistory and archaeometry. She also holds a bachelor's degree in computer graphics. She has been working on 3D digitization of the collections since 2012, and she is an active member of the international Digital Heritage community. She is also active in the digitization of biological and paleontological collections. She is now working toward a PhD on 3D multispectral at the University of Liège (BE), with the aim of developing a low-cost technique for 3D multispectral and evaluating its benefits for the digitization of cultural heritage.
- Nuno Sousa** is a Visual artist whose focus is the relationship between memories and aesthetic experiences with digital art. His work manifests itself mostly in digital content and interactive pieces. He holds a degree in the production of interactive content and multimedia. His specialization is the modeling and rendering of 3D content. He is currently a 3D modeling teacher at the Instituto superior de Ciências Educativas do Douro (ISCE Douro), where he is also part of the NIAM research team. He presently works with Cultivamos Cultura, a non-governmental organization that serves as a platform for experimentation and development of shared knowledge in the theory and practice of science, technology, and contemporary art.



# Tomorrow's Fossils

Judith van der Elst

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I let my finger trace the squiggly embossed surface of the thin layer of rock. It is a trail of a worm-like creature turned to stone. It doesn't feel strange at first, but then it sinks in: it is ancient body language for us to read and interpret. A sign that refers to the onset of the Cambrian explosion, a rather remarkable transformative time from which an incredible diversity of life emerged. We continue our walk, suddenly aware of the squishy sounds as our feet meet the wet, muddy ground.

Northern Finland, A.D. 2021: a small group of artists and scientists, including a paleontologist and an archaeologist, meet and start to traverse the land, and collectively follow a geological layer containing early Cambrian trace fossils that are signs of early bioturbating behavior.<sup>1</sup> I am part of that group.<sup>2</sup> A lecture given to us by Dr. Gabriela Mangano during the first, preparatory week, inspires us. She is a specialist in ichnology<sup>3</sup> who studies fossilized tracks and tells us, by the way, that members of our own kind are also considered bioturbators, much like the organisms whose traces we are about to follow. This sudden awareness of behavioral commonality with organisms that lived on our planet 541 million years ago provides a very interesting opportunity to explore our

- 1 The term 'bioturbation' can be defined as the biogenic reworking of sediment.
- 2 I was invited by the BioArt society to join a two-week exploratory Field Notes in September 2021, citing the invitation text: "The group will pack its backpacks and follow the geological outcrops in search for the fossil traces. When using the trampled paths across the Saana tunturi we will need landscape reading, a practice of orientation, of trace-making, documentation and a constant decision making. We may call this (palaeo)-ethology of tracing."
- 3 Ichnology is a branch of paleontology that deals with plant and animal traces, trails, burrows, and excavations made by animals and, more broadly, the study of bioturbation, which is the reworking of sediment by animals.

planetary connectedness as part of a meta being, planet Earth. It opens up a different avenue to investigate our place in the evolutionary track and consider our current time as another transformation that can make room for the next cycle of Earth's life supporting abilities. But how to read the signs in the land, and what are the methods that can help us now to connect, balance, and interpret deep time to the shallow imprints of our footsteps, and even speculate beyond? In this effort, I am inspired by Charles Sanders Peirce (1839-1914) who outlined a novel theory of signs. As our group sets out in search of fossil traces of animal behavior and other signs, we will engage in something beyond the practice of ethology, the study of animal behavior, in the narrow sense. Tracing serves as a starting point of our field exploration, crossing layers in space and time, from Paleo-ethology to Neo-ethology or Neo-ichnology, considering our own traces as an equally dynamic layer in anticipation of what is about to form. What follows is a report of this exploration, the encounters in the land, and the wanderings of mind.

## Tracing

Trace fossils: the lithified remains of animal behavior. At first sight they don't look spectacular, but looks can be deceiving. The traces etched and preserved in the shale layer are signs of early bioturbation, and as such, representations of one of the most revolutionary times in the history of life on Earth. Bioturbation, defined as the biogenic reworking of sediment, is now regarded as a major force in macroevolution, and the trace fossils we hope to find during our field trip are evidence of this phenomenon through which our planet experienced a major increase in life's diversity (Fox 2016; Herringshaw et al. 2017). The stone traces formed when the traces were covered with new sediment and compacted. However, it is other geological and planetary forces that brought the trace fossils to the surface in this place in time, for us now to see and interpret. It is this understanding that makes us realize that we need a way to make sense of these geological processes in which we play a part. As bioturbating beings, we can now ask: when and where will our own behavior be buried or come to light to be recognized in another place and time?

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Charles Sanders Peirce comes to mind – an original thinker and polymath who developed a theory of signs, or semiotics, during the late 19<sup>th</sup> and early 20<sup>th</sup> century. This theory was central to his work on logic as a medium of inquiry and process of scientific inquiry. Mostly known as 'the father of pragmatism,' he was also a brilliant scientist, even though, or maybe as a result of this, his personal and working life was larded with controversies and misunderstandings. Working for the U.S. Coast and Geodetic Survey, he conducted investigations into gravity for instance, and was also the first to experimentally tie a unit, the meter, to an absolute standard, the wavelength of a spectral line (Lenzen, 1969). But, according to Smith (2013), Peirce was primarily interested in explaining and refining the ways in which humans engage in inquiry. It was not only important what we know about the world, but how we know it. For Peirce, the dialogical nature of inquiry and knowledge acquisition was a necessity. As we embark on our transdisciplinary fossil finding mission called 'Traces,' we hope to tap into some of Peirce's brilliance to help us address the questions that emerge along the way. As a search strategy that can go anywhere, we set off.

First, we need to rethink what ethology means within the context of our mission. Commonly, ethology is known to be the study of animal behavior, it is set apart from the study of human behavior, which became the topic of anthropology. This was not always the case, and unfortunately, science has long treated human and other animals as different beasts, where ethology as a discipline became based on the conception of animals as "machines" and humans as species of culture. Newly considering ourselves as a bioturbating species changes our perspective in multiple dimensions. In preparation, all of us develop a specific field collection protocol to help us engage and read the signs in the land.

### *The trail*

*Together with one other Traces team member, Jaakko, an architect/artist, I, an archaeologist, engage in a kind of systematic reconnaissance survey to help us structure our observations and thoughts during our hike to the cabin where we will stay for a few days. We need two days of hiking to reach the cabin and we will stay overnight in a cabin approximately half-way. According to the protocol, we plan to stop every thirty minutes, and record our foot imprint on the land photographically with a few written annotations in our field books. On a basic level, this method is used to consider the impact of our footprints. On another level, it is used to explore the transformative force of human behavior in our shared ecosystem across space and time.*



## Contemplating movement: connecting plates and people

Seen, or better yet, sensed passively from above,<sup>4</sup> our own collective behavior can show distinctive patterns on the land. A trail system that connects different nodes. In our case, we follow an established pedestrian trail connecting Saana, an iconic mountain bordering the lake Kilpisjärvi, with Halti, the highest peak in Finland, through intermittent cabins. Our destination is one of those cabins, while our goal is to follow other trails, traces that can be spotted by those in the know or willing to open their minds. The main – scientific – objective of our group is twofold: one is to collect trace fossils that can contribute to our current knowledge of the transformation from late Precambrian to early Cambrian life, and the second is to question if our conventional way of collecting – human – heritage<sup>5</sup> material is still valid in this day and age (Kröger et al., 2022). The latter is a topic relevant especially in my own field, archaeology, the history of which is riddled with colonial practices of removing cultural valuables from original cultural contexts. The lack of consultation and consideration of the needs and opinions of descendant populations is often an expression of the violation of human rights. Even so, removing shale fragments containing trace fossils seems innocent, since these are fragments that are eroding as a result of weathering processes anyway. It is, however, the nature of the attitude and practice of collecting, rooted in colonial histories, that requires us to address these kinds of questions (Van der Elst, 2010). Especially since we are guests in this land, and the Sami, who have lived in these lands for thousands of years, maintain a different relationship with the land, based on a deep respect for its rocks (Lewis et al., 2018).

The goal of the larger *Traces* group is more open. Walking across the landscape raises many other related questions, which we each, and collectively, will contemplate and reflect on in different ways as a part of the process. As an archaeologist, I feel free to cross some disciplinary boundaries and speculate about life on Earth, our connection to past life, the nature of our current life, and the possible traces we leave behind as *bioturbators*, transformers, as agents of tomorrow's fossils, for other life to possibly pick up in the future.<sup>6</sup>

Archaeologists and anthropologists have long focused their research efforts on monuments and built environments of a certain kind, tangible interventions in the land. The environmental impact of landscape-scale activities, such as agriculture and resource exploitation, was long thought to be negligible, or less tangible, until recently when debates regarding humans as a geological force began in earnest (Crutzen, 2002; Ruddiman, 2003). Let alone trails, roads, tracks, in other words, features that connect, landscapes of movement that weave together elements of daily lives, bridging distance in the physical and now digital realm, that only a recently became an object of study and/or concern (Snead et al., 2010; Zalasiewicz et al., 2014).

### Step 1:

*We are walking, our backpacks still comfortable, and we are full of excitement and anticipation. A cricket sound emits from our synchronized phones, it alerts us to stop and record our first footprint. There is a lake to our left, north of us, and Saana in our view in a northwesterly direction. Leena tells us this area is culturally rich, and of traditional reindeer herding importance.*

- 4 While seeing can be considered an act of interpretation, much of the data is collected by so-called passive sensors, which receive backscattered radiation. This data needs to be processed and can be interpreted in different ways.
- 5 Human heritage – where human heritage not only refers to elements of human origin, but also to the environment on which we are dependent and for which we collectively share responsibility, now often referred to as ecosystem services.
- 6 Archaeology is an interdisciplinary field. To understand (past) human behavior it is necessary to collaborate across fields.



**Stop:**

*This stop is not according to our systematic time frame, but as a group we decide to have a quick break because it is protected from the wind. Soon we will enter open land. Part of the same area as we stopped at step 1, this area is traditionally used for earmarking young reindeer.*

It is September, a prime time for spectacular autumn colors, warm yellows and reds, interspersed with the capricious forms of birch, bark, and rocks partly covered by lichen, water bodies rippling in response to gusts of wind. We are entering the archives of planetary history. In 2015, pristine trace fossils were discovered near our stopping point on the slopes of Mount Saana by two artists from the Bioart Society. Saana was long known to potentially contain fossiliferous rocks, but previous expeditions and geological mapping campaigns produced only few and poorly preserved samples (Berger, 2020). It is due to their discovery we are on our current trail.

Professional habit urges two basic questions when I am faced with a rock layer that exhibits past behavior. How is it that this layer is exposed to the surface I am now walking on, and how old is this layer in which this preserved behavior is embedded? The methods we can employ to approach these questions are long established, but on the scale of human presence on this planet, they are quite recent, 19<sup>th</sup> century ideas. To start with the latter question, we normally rely on the law of superposition, the stratigraphic principles according to which the youngest layer is on top and, therefore, by digging down from our present surface, we go back in time. It is a relative method. To establish an absolute date, we can use radiometric dating. Widely used in archaeology to date organic material by measuring the decay of radioactive carbon isotopes, it signals the time through decay since its first formation. As it turns out, it is not just carbon, but many rock types that can be dated through this method, each with different decay rates of radioactive isotopes, which allows for different time periods to be dated. However, rock language, in case of dating the Cambrian explosion, is still a challenge (Budd, 2013) but, lucky for us, the earlier found specific trace fossils are known as indicator fossils,<sup>7</sup> indices of time, assuring us that indeed we are reaching into the early Cambrian.

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Since the 541-million-year-old trace fossils are our departure point, I wonder how these fossils ended up here, far from their point of origin near the other pole.<sup>8</sup> It begs to tell the story of plate tectonics, changing climate and planetary forces, in a nutshell. It also makes me curious who these creatures were, what they were doing, and how we are connected in more than simple evolutionary terms.

<sup>7</sup> *Treptichnus pedum*, [https://fossilid.info/3424?mode=in\\_baltoscandia&lang=en](https://fossilid.info/3424?mode=in_baltoscandia&lang=en)

<sup>8</sup> As a result of plate tectonics, the layer that was formed close to the south pole is now exposed in the Arctic Circle.

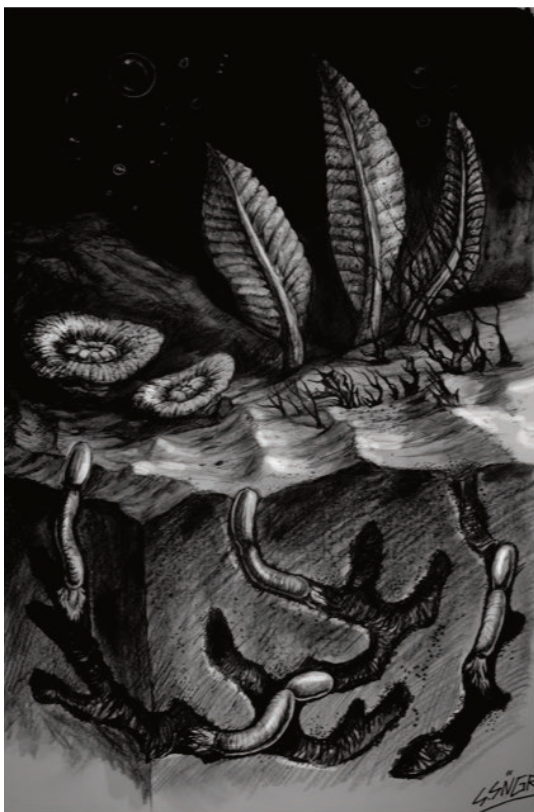


Image by Simon Sanger

The Earth's surface today. Seen from space, the 'Blue Marble,' as our planet was dubbed during the view from the first space flight, looks so smooth, but zoom in and you see a number of different oceanic and terrestrial plates that are vying to stretch and fit the sphere, the geoid surface, or lithosphere. Tension at the seams, cracking open, colliding, and sliding across each other.

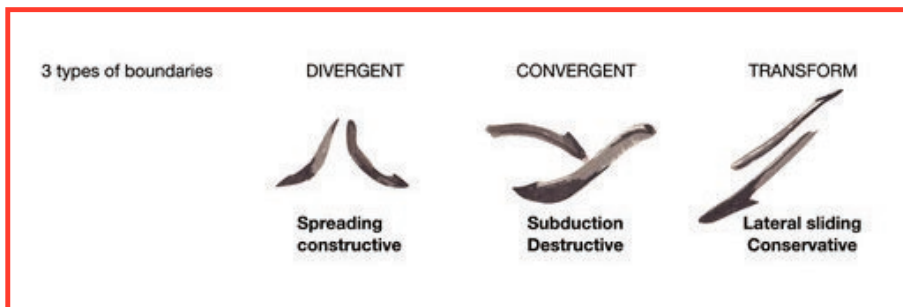


Image by Judith van Der Elst

That these plates are anything but docile is obvious when our world is shaken up by volcanic eruptions, or earthquakes, which are signs of plate movement along the seams. Given time, these plates, seven or eight in number, move over large distances, in different formations, cycling all of surface/crust materials to below ground and back, eventually. Moving minerals, known as the rock cycle. Plate tectonics, now generally accepted as a scientific theory, is a relatively recent discovery, proposed during the early 20<sup>th</sup> century. The leading theory at that time, which envisioned a static Earth, remained in favor for a while, and the moving plate phenomenon was not accepted until the process of seafloor spreading was validated in the 1960's, and new data began to support the idea of this continental drift. The plates lie on top of a partially molten layer of rock called the asthenosphere, and due to the convection of the asthenosphere and lithosphere, the plates move relative to each other at different rates. This interaction is responsible for many different geological formations, such as the Himalaya mountain range. It also formed the Scandinavian Caledonides, during the Silurian-Devonian continental collision of Baltica and Laurentia, after having moved from their position near the south pole to their current position. Now we find ourselves in this landscape following the shale layer of the Baltica plate that is exposed at certain spots through this collision a long time ago. The way these plates move is still a mystery to me, maybe because of its spatio-temporal scale, but it turns out that *water*, making slushy sounds beneath my feet, plays a big part (Korenaga et al., 2017).<sup>9</sup>

*Step 2:*

*We are still close to the lake and start to walk north, the wind in our backs. I hear water and we are walking along a fence on our right side. Walking on, we cross the fence, it is to keep the reindeer enclosed. The reindeer are not able to cross the fence. We are entering open land.*

If any human artifacts are present in the 1-meter radius around our footprint recording location, we collect it. This method makes us aware of the ground beneath our feet at all times, also between sampling points. We notice many places where we leave deep prints in the muddy trail, but somehow, our sampling points are often on hard dry soil, leaving no humanly visible shoe print. It allows us to start to ask simple questions. How effective is our sampling method in representing the landscape we are traversing?

Even if we cannot see it with our human or photographic eye, what is the trace we leave, how much damage does our footstep do to life beneath our feet? Or the electronic signals we consult, what is their impact on life? The path we follow on the ground, at least, is a trail created over time. A trace in the land resulting from collective behavior, our individual footprints lost in the whole.

We stop, we connect to satellites orbiting our planet to give us coordinates that relate to the geographic framework we humans devised to record and communicate location information. Besides our only natural satellite, our moon, over 3000 active artificial satellites are currently orbiting our planet, most of them for communication purposes, while earth observation comes in second. Navigation and positioning are only served by 150 or so, some of which are helping us track our trail, as part of the Global Positioning System (GPS).<sup>10</sup> A number of sensors aboard these orbiting platforms are just receiving signals, gathering information that Earth is emitting, while others actively send signals down into our atmosphere. In the case of our coordinates, this is an active sensing system that measures the time between sending and receiving through ground stations. In

9 <https://www.nature.com/articles/d41586-018-07335-8>. A tectonic plate descending into the Mariana Trench carries sea water deep into Earth's interior. It seems that much more water enters Earth at this location than was thought — with implications for the global water budget.

10 <https://www.geospatialworld.net/blogs/how-many-satellites-are-orbiting-the-earth-in-2021/>

order to calculate our position, we need at least three signals to conduct triangulation. Our telephones act as translation devices. For those of us remembering traversing land during pre-GPS times, we know that determining your position through triangulation is something you can do with a paper map and simple compass, tapping into Earth's magnetic field. You can even do it without any extrasomatic means,<sup>11</sup> just observing the changing position of your body in relation to a few landmarks. Of course, in case of the latter, your reference system is not a geographic projection as we now know it, but something else, picking up different signals, as indices of planetary connectedness. We can speculate about the physical impact of the digital trails that are also transforming our sphere, perhaps in similar ways in which the early bioturbators transformed their world. We record a few notes and continue our path.

Today the awareness of the physical impact of our digital communication world grows, especially the need for large physical pipelines to transfer data, and regarding devices and energy required to facilitate these communications. However, the role of man-made radiation and impact on life remains relatively unknown or hidden (Parikka, 2016; Starosielski, 2015; OCEANIA RADIO FREQUENCY SCIENTIFIC ADVISORY ASSOCIATION (ORSAA), 2022). I wonder though if the body fossils of tomorrow will show the impact of this radiation.

### Matter of mediation

Thus, curious about other traces/signs we are not even aware of, along with our footprints, we do need a framework for interpretation. I turn to Peirce for guidance on how to read the signs in the landscape through his account on semiotics. Sign theories have a long history, but what makes Peirce's semiotic theory unique is the role of the *interpretant*. In a nutshell, in Peirce's theory a sign consists of three interrelated parts, a sign, as signifier (e.g. molehill as sign of mole, trace fossils as sign of burrowing animals), an object, that what is signified, the mole, or burrowing animals in this case, and an interpretant, to interpret meaning.<sup>12</sup> His account developed over many years and is much more complex than can be described in this paper, but in simple terms, the interpretant provides a translation of the sign, allowing a more complex understanding of the sign's object (Sonesson, 2019). In our case, we follow the fossil traces that some of us can interpret as animal behavior. The beauty of the theory is that the translations then become new signs, and can be newly interpreted as an ongoing signifying process, an infinite chain of signs, a flow of interpretants.<sup>13</sup> A ubiquitous, infinite semiosis throughout the living world. If we think further, a piece of rock with a trace fossil that is collected to become a museum object changes meaning in the process; our phones intercepting satellite signals, translated into geographic coordinates. For Peirce, the world is perfused with signs.

It took the rest of us a while to realize, but information is now widely considered as a fundamental building block of reality, along with energy and matter. Given the conservation of energy and mass respectively, I wonder if the conservation of information is also true, what exactly that entails I can only speculate at this moment, but I am inspired by others to further explore this in the future (Cengel, 2021; Madl and Yip, 2014; Van der

11 'Extrasomatic means of adaptation' is a term or concept first used by archaeologist Lewis Binford to indicate all tools and methods that are not bodily adaptations to the environment.

12 SEP <https://plato.stanford.edu/entries/peirce-semiotics/>. Signs in Peirce's theory are further classified into more threesomes: notably, signs can be icons, indices or symbols, accordingly as they derive their significance from resemblance to their objects (icon), a real relation (for example of causation) with their object (index), or are connected only by convention to their object (symbol).

13 Peirce did not specify the interpretant. This allowed, for instance, research in the field of biosemiotics to adopt Peirce's model (Van der Elst, 2018).

Elst, 2020). As I am contemplating this, I start to think about it in a more mundane or humanistic way: how names or categories disappear, processes and relationships become forgotten, features are given different meaning (Van der Elst, Richards-Rissetto, Garcia, 2010). Leena tells us that none of the Sami names are on official maps. It only makes sense that many of us have lost the connection to their environments in this way. The traces we follow represent the behavior of animals that moved in shallow marine environments, plowing away before life moved onto land permanently around 450 million years ago. We are now so used to our terrestrial lifestyle. It is hard to imagine *not* being able to live and breathe above ground. But according to the ruling theory, life originated under water and for most of the time has played out in a watery context (although this is currently under revision<sup>14</sup>). In any case, water plays/ed a key role in the emergence of life, so the question is, why did life move onto these terrestrial plates, into hostile environments at that time? The ‘why’ may remain a mystery at least for now, but the ‘how’ is addressed in an innovative way by the concept of *Hypersea*, a model proposed by Mark and Dianna McMenamin (Macmenamin M., Macmenamin, D., 1994). Organisms that evolved under water, they argue, had to stay wet, they are essentially fluid-filled bags floating around a nutrient filled medium. To understand life on land, according to the McMenamin’s view, you have to recognize it as a unified whole in which unrelated terrestrial organisms, from microbes to large mammals, form a vast number of direct, physical connections through which fluid can move, and in this way create and extension of the ocean on land within the sum of their tissue. The *hypersea* model is strongly underpinned by *symbiosis*, a term describing any relationship or interaction between two dissimilar organisms, a form of living together that for long was thought to be exceptional and restricted to a few examples, such as lichens. It was due to the work of Lynn Margulis that symbiosis came to be accepted as a mechanism that unites what appears to be isolated biological species (Margulis, 1995). Some have more free-flowing relationships, but other, complex organisms, such as ourselves, exist thanks to the support of our inner ecosystems that are inhabited by a great number of non-human microbes. Insisting that no organism lives in isolated purity, our understanding of the biosphere, and of ourselves, has changed.

Imagine if we had a sense, or sensing instrument, to capture this flow, signaling our connective fluid. Trees would then be represented by a matrix of nutrient laced water columns. This fluid-filled network could then be colonized by a number of other organisms that could live within its boundaries, like our dynamic microbial gut community for instance. Knowing that our bodies consist largely of water and other non-human cells, moving as a group suddenly feels strange. We are no longer as agents of free will, but tethered into a system that makes me look at the organisms beneath my feet in a different way, and even the traces of organisms long gone. Family?

### Question of attraction: balance and gravity

#### Step 3:

*A small group of reindeer are passing along the fence. We leave the lake behind us.*

#### Step 4:

*On a small hill in open land, walking NE direction. Evidence of human passing, we find some cigarette butts, a bandaid and poo paper in our foot print radius.*

#### Step 5:

*A little lake to our left (north), walking NEE direction. We find a twirly fragment of white plastic, Leena tells us these are fragments coming off the underside of*

14 <https://www.nature.com/articles/d41586-020-03461-4>. Living things depend on water, but it breaks down DNA and other key molecules. So, how did the earliest cells deal with the water paradox?

*snow scooters used by herders these days. You can find them everywhere. The ground beneath our feet is wet.*

Walking roughly along the exposed shale layer, but not close enough, we now contemplate our own behavior with our senses heightened, our footsteps, the way we move, how we relate to space and time and to each other, in what feels like an inhospitable environment for us humans. We carry our food packages in our backpacks. Modern inventions, tech-dried food in sealed disposable pouches. It only needs hot water to fill the pouch and a few minutes in order to become a nutritious meal, a text on the package explains the procedure in a language we understand. It is a short-term survival solution. One of us, Leena, an artist, lives in this region together with her husband who is a Sami reindeer herder. They offer a different perspective on what it is like to live long-term in these lands, the beauty, the hardships (Valkeapää, L., & Valkeapää, O.A., 2022). Humans made it up here, but only in symbiosis with other living beings, the reindeer most obviously. We see only few during our trek, we notice the fences that are supposed to keep them in or out of certain areas.

At times, we notice their tracks in the wet ground, in the snow. Wondering how they can find enough food in this sparsely vegetated landscape, where lichen covered rocks are ubiquitous, it reminds us that we are on Sami homeland. People who have lived here for thousands of years, but whose livelihood has been challenged and threatened, especially over the last hundred years or so. Not so much by environmental forces per se, but by the local and global behavior of fellow human beings impacting those environments and imposing regulations, such as denying herds to cross state boundaries. In what is now emerging as a global issue, Sami voices have been silenced, and their rights violated (Tor A. Benjaminsen et al., 2015; Nicholas et al., 2021). Similar strategies have played out around the world, in places where indigenous populations were forced to assimilate through methods that denied the use of native languages or cultural expression, and children removed from their homeland. In addition, traditional lands were often forcefully taken or curbed considerably, leaving mostly marginal agricultural lands left. As it turned out, many of these seemingly barren lands are rich in natural resources that are increasingly sought by others in order to keep our modern ways of life churning. Sami homelands are no different; mining has impacted Sami life since the 1600's, and increasingly so (Koivurova et al., 2015; Sacco, 2020).

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Mining is what I am thinking about, a human activity that, in the context of our current project, comes to my mind as a prime example of bioturbation. I make a mental note to explore this link further, but first I need to pay attention to the uneven land I am crossing, the fossils we are tracing, to keeping balance. We walk in line, carefully tracing the person in front of us in order to decide where to put our next step, in a split second.

I am thinking about the fluid in our ear, helping us to keep our balance, like a bubble level. The image of vertical water columns comes back to mind, imagining how we connect as a group by a bigger force that keeps us level in relation to the land we are traversing, all of us doing the same thing, while the trace fossils come out at totally different angles than their original orientation of locomotion. We are about to enter Norwegian territory, we can, we are aware, we can read the sign. Reindeer, however, are clueless as to why their natural path is denied in this way.

*Step 6:*

*Walking NE, another little lake to the north, with a view of 'little Saana' open land and wind comes from the south.*

*Step 7:*

*Lunchtime. We are on the modern state border between Finland and Norway. On the edge of a lake and our path in front of us goes upwards. It divides the reindeer herds.*

Upright, from mats and crawlers moving horizontal, to plants, animals, and humans pioneering verticality, defying gravity in the process. Gravity, the weakest of fundamental forces, is keeping our planet and life on earth moving along. A weak force, but attracting all the way. The sense of gravity is not a sense we are usually aware of, but it is crucial, nested in our inner ear, the vestibular system, helping to keep us together, balanced and moving along as a group. The planet's plates are slowly shifting underneath our feet. Overthinking it, are we even upright, or leaning into it? Earth, orbiting the sun, keeps spinning, no force to stop it from doing so, we go with the flow.

We continue to move across the landscape in line, unsteady at times as a consequence of atmospheric forces and our altered center of gravity influenced by the weight distribution in our backpacks. Heavier than our normal selves, we are still able to move together, attracted to the ground, attracted to each other. At times, despite the weight on my back, I even feel like dancing, hopping from stone to stone to avoid the slushy parts. Gravity be damned.

*Step 8:*

*The land is rocky. Walking NEE in Norway, the wind blows from the south but not so strongly.*

We know we are in Norway because a sign says so, soon back in Finland.

*Step 9:*

*The fog is coming in. We can see the first hut where we will stay overnight.*

*Step 10:*

*We are close to the hut, only 6 more minutes to go. We are ready to give our backs a break and have dinner. Lake area. We are surrounded by water.*

Variations in gravity, known to be caused by differential mass distribution, a bit like our backpacks adding mass onto our backs, I think. We are glad to take our packs off, to change our center of gravity.

It is now possible to accurately measure fluctuations in Earth's gravitational forces, thanks to the NASA GRACE (Gravity Recovery and Climate Experiment) program.<sup>15</sup> Using a very sensitive microwave ranging system, it is used to study changes in the planet's water, ice sheets, and solid earth, all this from space. Since water distribution affects gravity, the gravity measurements tell us something about the Earth's water. Who knows if this research would even be possible if not for the extensive research conducted by Peirce during his years working for the U.S. Coast and Geodetic Survey, where he developed new instruments and innovative methods to study gravity (Lenzen, 1972).

For now, we recline from upright, we eat and talk for a while. Horizontal is our next phase. Different from our stay in the biological field station, this is the first night we will all sleep together, side by side, cocooned each in our own mummy sleeping bag, like chrysalises, laying still but moved by forces bigger than ourselves.

*Day 2*

We wake up, side by side, after a good night's sleep, and prepare for today's hike that will take us to our destination cabin. We have breakfast, warm oats, and hot coffee. We are in a good mood, it feels like something has happened to us, a gravitational pull between our bodies, starting to dissolve the strangeness. Our mission, even though from different backgrounds, starts to be pulled together through the landscape we find

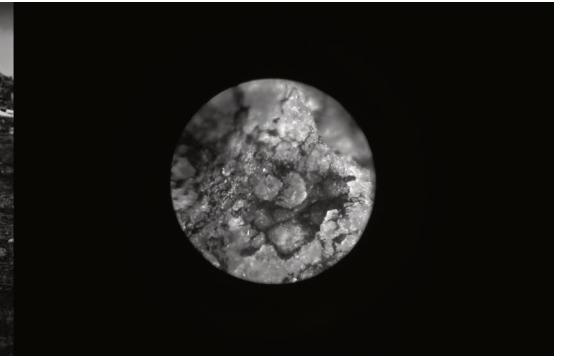
<sup>15</sup> [https://www.nasa.gov/mission\\_pages/Grace/index.html](https://www.nasa.gov/mission_pages/Grace/index.html)



Above Leena and fragment of snowmobile ski. Image by Jaakko Pesonen  
Below Björn and shale outcrop. Image by Jaakko Pesonen



Above Elisa and trace fossil. Image by Jaakko Pesonen  
Below Erich and microscope view of rock. Image by Jaakko Pesonen





Above Sirja and algae in pool of water. Image by Jaakko Pesonen  
Below Lisa and ice formed in wind. Image by Jaakko Pesonen

ourselves in, the attraction of mass. Even the landscape feels different as we depart. We are leaving our familiar world and entering a different zone. This feeling of cohesion is strengthened by the fog that gives the illusion that we are in a world of our own. Soon the landscape changes as well, the green-reddish colors and soft bottom of yesterday gives way to rocky fields with a soft grey-green sheen of lichen and snow. It is cold and windy, and while we still record our footprint locations, we make fewer notes. We are entering the fossil world, time and space expanding in different directions.

Images portraits

### Power of transformation

The rocks along our path come in different sizes and types, at times severely testing our balancing skills. Hard and heavy, they don't give way to our pressure like the soft earth and slushy mud that characterized most of yesterday's trail. Walking over large stretches of rocky fields however provides a meditative event, balancing our bodies, breathing, finding our centers of gravity, while becoming aware of the subtle sounds coming from the deep. Water moving through, the rock configurations acting as acoustic chambers that provide music to our ears. Sometimes my eye is caught by a bright green slurry in between the rocks, gently swaying, moved by water. A sign from the subsurface, of deep life, I wonder. These seemingly small moments are when I become aware of how everything is connected and start to question my place in space-time, as part of the group and as part of the planetary cycles that move us on multiple scales.

Björn picks up some shale pieces with trace fossils along our path. At a certain point we cross the shale outcrop that is holding the fossil record, water has been doing its eroding job, crumbling the sheets of shale. We stop, happy to release our backs for a moment. Excitement circulates through the group, especially when a few specimen are already found easily. This is promising for what is to be our main target area. Expectations rise. For the untrained eye, the traces are nothing spectacular, but as an archaeologist I recognize the kind of excitement that Björn and his student Elisa display. The message from the deep, suddenly you realize what the sign in front of you represents, recognizing a plant that you know indicates human cultivation or disturbance underneath, depending on your perspective. The feeling is contagious, we are all affected each in our own way, adding to our group cohesion, as a temporary organism we connect to these traces. It is still difficult to grasp that these seemingly shallow trails made by burrowing animals represent a major evolutionary turning point, leading to the Cambrian explosion.

Treading as lightly as possible still begs the question, how will our behavior fossilize, what kind of materials do we impact in such a way that will be preserved like the trace fossils we are now boxing up. Will it lithify and be interpretable through the eye, or turn into something else, and what kind of interpretants will be able to detect those signs?

There is no creation without destruction, what goes up, must come down, simple truths we believe in. The law of conservation alludes to this. There is no empty space for us to fill with new things, be it digital signals, or boxes to store fossil specimen. Whenever we create something, something else is transformed, be it energy, mass, or even information. This also makes the effort to preserve material in perpetuity in museums quite illusionary, taking it out of the cycle of matter, when even preservation is transformation when you start to think of it. As we attempt to stop the aging process, we keep it in artificially climate-controlled environments, stubbornly trying to retain it in a static state. Eventually, everything will become part of the Holocene geologic layer, a term that will lose its meaning once it is topped off by the next stratum of Earth's life cycle. Time for Neo-ethology.

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Some things will remain to be seen, or sensed, and interpreted otherwise by the next generation of life. Other things will be buried and will take a while to resurface, if at all. Mining comes back to mind. As humans we have engaged in this kind of activity for a long time, since the Mesolithic,<sup>16</sup> but as of late, our efforts have reached a whole new depth dimension. No other species has tunneled on this scale. The world of international mining is changing rapidly in response to our ever-increasing energy and information hunger, transforming fossil fluids into life changing gasses, rare minerals into short-lived signal capturing devices, digital signals preserved using energy slurping, physical storage facilities (Parikka, 2016).

From the outcrop canyon where we have lunch, we follow our path to cross a pass to enter another valley. We see few reindeer, but the trail has become a popular tourist attraction as of late, as more humans seek solace from their modern, digital lives. A harsh environment, from our human perspective, where rocks rule and water transforms. It transforms by transforming itself, freezing, thawing, breaking rocks, modifying the sub-arctic landscape slowly, but steadily. The water sounds peaceful, but much gets transformed and polluted as a result of mining and other industrial processes, even here. Plant life at the surface is rare, but lichen thrive, slowly colonizing the rock surfaces. Lichen, terrestrial symbiotic life forms that can survive in extreme environments and that developed characteristic growth styles of their joined symbionts at least 415 million years ago, as evidenced only by rare fossils. The partners, that each draw from different energy sources, are held together by a kind of interface, which is called an extracellular

16 <https://whc.unesco.org/en/tentativelists/5421/>; Ngwenya Mine is situated on the north-western border of Swaziland.

interaction matrix (EIM), and are able to move out and in together, mysterious signaling, up close and at a distance (Dr. Ineke Beltman, personal communication).

Finally, we arrive at our destination cabin where we will stay for a few days. We feel totally removed from the place we departed from; we settle in our cabin. The fire is already burning. One of us arrived by helicopter that carried field equipment and food. During evenings we discuss, wonder, and laugh a lot, as part of the process of collective inquiry. I wish I could pick Peirce's brain in order to describe the value of this process, but it feels profound and, for now, that is enough.

The landscape is overwhelming. The few days we spent around the cabin are successful for fossil hunting and collecting. It is also transforming us as a group. We easily move together as if in another dimension. This becomes very clear when we return and realize what just happened. It is hard to describe, religious almost, mentions of us. It is only then that I can start to contemplate future fossils neo-ethologically, tracing our behavior forward. Past and Future, in our minds, are similarly removed from the present (De Tienne, 2015).

Feeling small in this vast landscape, it is actually places like this where human subsurface modification is at its lowest, the depth of turbation the deepest. Places that were never most favorable for human settlement turn out to contain the most coveted mineral resources for modern societies. Mining and deep boreholes. Whereas human bioturbation has modified large parts of the terrestrial surface and shallow subsurface, often visible to the eye, it is the deep drilling that is mostly happening out of sight. Surface and shallow turbation takes place in the zone where we know that other organisms thrive, plants, burrowing insects, and mammals. Humans colonized large parts of this stratum, especially around urban centers as transport and energy networks, but also widespread as in large land surfaces modified as agricultural surfaces, long-distance, extending into the marine environments as buried energy and information networks, that also connect continents through undersea networks, and erode ocean surfaces through deep-sea trawling (Starosielski, 2015; Zalasiewicz et al., 2014).

Whereas archaeologists have also begun to speculate about future fossils, focusing on the bones of domesticated animals that will end up in the fossil record (Plotnick and Koy, 2020), media geology and archaeology is emerging as a field that speculates about our future traces and human bioturbation specifically. Mining, the underground extraction of solid materials, leaves voids in geometrical patterns. Material extracted via boreholes, that can reach much deeper, is mostly fluid, oil, and gas, and even deeper. Mining as a destructive activity will ironically also likely be the best-preserved record of human intervention in the land, and will only reach the surface if the crust is eroded following a tectonic uplift, like the one that created the Caledonian mountain range. Even though the deep structure may have minimal impact on our current environment, the accompanying infrastructure and waste stream reaching the surface all the more so, polluting waters we so depend on (Moody, 2021; Zalasiewicz et al., 2014).

My mind wanders. To address our current far-reaching energy needs and fossil fuel dependency that permeates our behavior, mining activities are increasing across the globe. The bedrock of northern Finland, for instance, contains all the minerals to produce new batteries, a so-called green solution to the energy challenge. The rush to secure these minerals around the world will certainly impact Sami people and their lifestyles. The rocks can speak to those who choose to listen (Koivurova et al., 2015; Newman et al., 2017).

And speculating beyond, I let my mind wander far out, inspired by reading some novel research ideas in my quest to learn about tomorrow's fossils. I learn that mining also creates something else, whereas deep boreholes have exposed some deep earth secrets. It turns out, we are the facilitators of new signatures in the strata below that cannot be

detected readily, but are there. Just like the plastic that litters ocean floors, the radiation of atomic tests, and man-made radiation in our atmosphere. Man-mediated minerals can now be found in mine walls, around 200 of them, and could possibly be identified in layers millions of years from now. Other man-made mineral-like substances, synthetic compounds, far exceed that number, and geologists liken that process to the Great Oxidation Event, which for long marked the largest known increase in minerals. The sedimentary layer we leave behind will be quite interesting, the burrows we dig already give us a glimpse of another world (Hazen et al., 2017).

The deep boreholes, reaching over 10 km in depth,<sup>17</sup> provide us with signs of the deep biosphere. Although it was already known that microbes populated the subsurface, surviving in environments of low or no oxygen, the depth and variety at which life is found is astonishing (Mangelsdorf et al., 2010). As if breeding to rise to the surface and populate a new layer by entering into symbiotic relationships to form new life forms. Like lichen, microbes are able to form temporary relationships, acting in unison, something that is known as quorum sensing. It turns out that these temporary assemblages, or biofilms, can be classified as new organisms (Penesyan et al., 2021). My final thought circles back to our group, held together by gravity and other forces. Did we become a new organism temporarily, engaged collectively in critical inquiry, edging closer to another truth? And by doing so, did we come close to Peirce's proposed strategy for inquiry?



Image by Simon Sängér

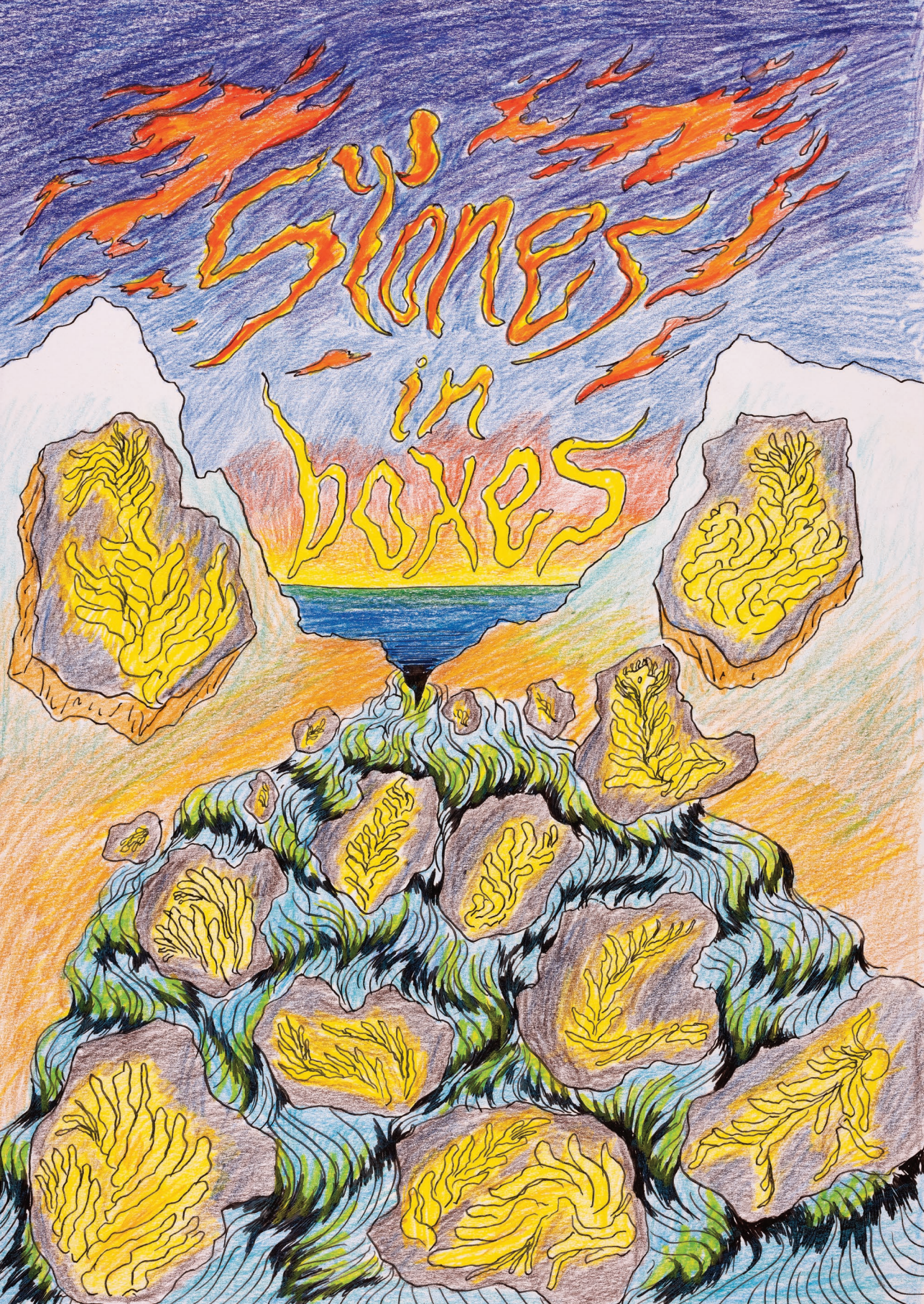
<sup>17</sup> Humans have dug deep boreholes, including the 12,289-meter borehole drilled in the Al Shaheen Oil Field in Qatar, and the 12,345-meter Kola Superdeep, drilled at a spot that is called Vilgiskoddeoyvinyarvi, or 'Wolf Lake on the Mountains'. The Sami are the indigenous inhabitants of this subarctic area in Russia, just across the border with Norway. Dotted with open iron ore and nickel mines, and watched over by enormous smelters in the mining towns Zapolyarny and Nickel, it is a bleak, heavily polluted landscape. <https://www.darkecology.net/mobile/drilling-deep>

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**Judith van der Elst** has since completing her PhD research at the University of New Mexico in the United States led a semi-nomadic life as an archaeologist/anthropologist and socially engaged independent researcher, and spent the recent years mainly in Europe. During her stay in the United States, she specialized in humanistic approaches in emerging spatial technologies (Geographic Information Systems, Remote Sensing) in order to investigate how people experience and shape their relationships with the environment. Her collaboration with indigenous communities in particular radically changed her outlook on life and respect for the land. She is dedicated to creating new ways of teaching and learning in the land in Transdisciplinary settings. She currently works as a researcher within the research group Art & Sustainability at Hanze University of Applied Sciences, Groningen, the Netherlands.





# Stones in Boxes — Collecting Fossils from Finland's North and Beyond

Björn Kröger, Judith van der Elst,  
Leena Valkeapää

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In September 2021, a transdisciplinary group of a paleontologist, an archaeologist, five artists, a biology student, and a geology student, joined up for two weeks in Sápmi, northern Finland to follow a geological layer containing Cambrian trace fossils. The intention was to collect these fossils for the Natural History Museum in Helsinki, while at the same time questioning this practice of removal and archiving that has been part of human history for at least several centuries. Museums trace their history back to colonial times when unique and exotic materials from distant and conquered lands were put on display in private collections. Collections have continued to be formed in similar ways, but have become more systematic and scientifically justified over time. While the material collections that are mostly meticulously curated add to our collective knowledge, they also have a dark side. Historically, materials, be it natural or cultural, were removed from distant locations without much consideration of the consequences for local communities. We approached the landscape and its fossiliferous strata in a way that brings together artistic practices of research and scientific research. Our joint time in the field offered a dialogue between art, science, and the humanities to question practices of collecting and archiving, and to explore alternative directions.

## The Valley of Time

The old fossiliferous shales in the Kilpisjärvi (Gillbesjávri) Region in Finland's extreme Northwest have been known among map making geologists for a long time. Here and there, in some obscure publications and in semi-public reports, pictures of the pristine trace fossils have been published, but were rarely noticed by anyone else (Image 1).

It was in 2003 that an Estonian geologist traveled all the way up from Tallinn, Estonia, to Lapland in search of these fossils. He spent two weeks in the mountains near the Kilpisjärvi Biological Field Station, where he stayed overnight, only to conclude: "the almost total absence of trace fossils of organisms — the bioglyphs — even on contact planes of sandstones and clays, where they could have been best fixed. Despite a careful search, such bioglyphs, even problematic ones, were not found" (Pirrus, 2003:p.35).

The Kilpisjärvi Field Station is run by the University of Helsinki and is usually used by scientists and students for all kinds of research related to the arctic environment. For over a decade now, artists of the Bioart Society, Helsinki, have also been visiting the station. The artists come here to experiment together with scientists, to explore specific topics, and to conduct fieldwork. In 2013, the theme of their two week long gathering was "Deep Time" and, naturally, the group took a closer look at the rocks in the vicinity.

An essential resource to get information about the geologic situation of the region is the geological map. In geological maps, strata and other geological units are marked by colors. The outcrop area of the fossiliferous strata is marked by a deep blue color in the Kilpisjärvi geological map, where it forms an easily recognizable band around Mount Saana (Sáná) just east of the field-station. However, in the field these rocks are difficult to find. They are hidden below a thick layer of scree and vegetation that forms the hillslopes of the mount. This is where Pirrus searched without success in 2003.

In 2013, the Deep Time group put in some additional effort to search again for proper outcrops. The group of artists succeeded and found a small exposure with plenty of fossils in a valley formed by a small creek just below Lake Saana, they called the location "Valley of Time" (see Berger, 2020).

This location is special because it is protected from the wind, and the small creek, which runs there below a field of big boulders, produces a constant gentle bubbling and clinking. It sounds like a constant distant whispering. The fossiliferous layers are exposed at the western slope of the small valley. The exposure forms small patches of dark grey, folded layers of shales and sandstone. On the surface of the centimeter-thin weathered sandstone slabs, traces of animal movements have been preserved. They become easily visible as beaded, curling, or meandering shadow-lines when the sunlight comes in at a low angle.

The traces are beautiful and enigmatic. They remind one of rock carvings, and they expose themselves on handy, shiny sandstone slabs. Hence, they invite one to collect them, to carefully wrap them in newspaper, to put them in a bag and to carry them home or into some or other collection.

In autumn of 2021, we were part of a transdisciplinary group of nine, comprising four artists, an archaeologist, an architect, a paleontologist, a biology-, and a geology-student. We came back to the Valley of Time.

The composition of our group reflected our wish to bring together artistic practices of research with scientific research when searching for, collecting, and archiving trace fossils. Artistic research here is considered from a broad perspective. In this we draw on Klein (2017), who appropriately refers to the UN definition of research as "any creative systematic activity undertaken in order to increase the stock of knowledge, including

knowledge about humanity, culture and society, and the use of this knowledge to devise new applications.” What follows is that the division between what constitutes artistic or scientific research is not exclusive, and that artistic practice of research can also be scientific research. “But ultimately it has to be acquired through sensory and emotional perception, through the very artistic experience from which it cannot be separated” (Klein, 2017). Scientific research practice, in contrast, is theory driven, aims toward reproducible results and peer review publications.

For us it is important to acknowledge that “transdisciplinary research practice has become a core element of global sustainability science” (Cundill, Roux and Parker, 2015). And as argued by these authors, opportunities need to be purposefully created and nurtured as communities of practice. Building on that, they further explain that transdisciplinary communities of practice “are more likely to be distinctly heterogeneous, cross-sectoral groups with a shared interest in and basic commitment to solving complex social-ecological problems”. (ibid) Our group has been created based on this idea.

From the beginning we perceived our common practice as a “tracing” in full recognition of the ambiguity of the word, which can be understood as following a trace or leaving a trace. And because we have been aware from the beginning of the vast timescale(s) that are involved in our tracing, we called our research “paleo-ethology,” the study of behavior in relation to geological time scales. Even though the initial goal of the paleo-ethology-team was specific — survey and collect trace fossil specimens of interest — therefore, the overall aim of the group was more open to exploration of people and landscape and their interrelationships.

Several lectures presented to us during our first preparatory week at the field station further inspired us to take new directions in our short field work session. We designed different survey protocols which provided food for thought and surprising insights at our dinner table. Although we are still far from solving our collecting and archiving questions, these insights brought us closer together and opened new avenues for pursuing novel ways of keeping our past and future alive.

### **Kilpisjärvi — a place in time**

Kilpisjärvi invites one to contemplate about deep time because the landscape is rough and very open. Wind gushes constantly around the mountains and only in the lower altitudes some open birch forests provide shelter. The trees are small and stand in the distance, and they are densely crisscrossed by reindeer paths. The paths continue where they give way to a terrain of dwarf birch, berry-shrubs, moss, and lichen. Lichen grows where nothing else will. It also covers the big masses of erratic boulders, the so-called splitterseas (from Swedish, “Skärhave,” German, “Blockmeere,” see Hausen, 1942) that are everywhere in the area and that were transported by the ice and the water to their current locations. The black-green patches of lichen give the landscape a very peculiar greenish-grey shiny color from afar. Rocks, lichen, and traces are everywhere so that the landscape exposes what one could call a maximum tension between presence and deep past. But there is nothing to romanticize here because it is a rough, war-torn landscape, which is currently under heavy touristic development.

The valley of Kilpisjärvi is one of the main transit routes between Finland, the Baltic Sea, and the Arctic Atlantic coast of Norway. It connects the big harbors of Tromsø and Tornio. Today, truckloads of Arctic Salmon pass Kilpisjärvi on their way south to Asia via Helsinki. During World War II, the valley had been one of the main strategic defense lines of the Germans. They left deep trenches in the landscape and scrap metal, still visible today.

At the same time, the land has been inhabited for thousands of years by semi-nomadic reindeer herders and their animals. The pastures are structured by a dense network of reindeer paths and by a mosaic of enclosures.

Tourists have been coming in bigger numbers to Kilpisjärvi since the first hotel was built in the 1950s. During the winter they go skiing and enjoy daytrips by snowmobile. During the summer they follow marked hiking trails and go boat fishing. Nowadays, Kilpisjärvi is also the starting point of a heavily frequented long distance hiking trail to Halti (Háldi), Finland's highest mountain. The placement of the Biological Field station in such a region seems to be almost like a necessity. It was established by the University of Helsinki in 1964 and quickly became famous for its research on lemmings. In the entrance hall of the field station, a world map is posted on the wall with red pins scattered all over the continents, marking the origins of its guests.

The landscape near Kilpisjärvi is exceptional and interesting for so many people, because it is geologically positioned right at the local southern margin of the Caledonian mountains, a huge mountain chain that runs through central Scandinavia. Southwards are the large plains of mainland Finland; northwards are the glacier-topped mountains of Norway.

These are old mountains. They grew out of a continental collision between what is now North America and Scandinavia more than 400 million years ago.

At Kilpisjärvi, the southern cliff-like front of this mountain-range forms impressive bastions at the steep slopes of Mount Saana, Malla and Jiehkkaš (Image 2). Southward, the much smoother Finnish foreland is built by the archaic rocks of the crystalline basement. The strata, which contain the trace fossils, form the narrow seam between the crystalline basement and the rocks of Caledonian mountains.

### The trace fossils of Kilpisjärvi — a forgotten treasure

For people unfamiliar with the area, the map remains the main tool for locating and finding fossiliferous outcrops. Current maps are mainly the result of the work of Finnish geologist Jyrki J. Lehtovaara, who published them during the early 1990s for the Geological Survey of Finland, the relevant state agency for geological map making (Lehtovaara, 1995). Previously, two major attempts were made to understand the regional geology of the area. The first geological map was part of an effort to produce a geological map of what was then the Grand Duchy of Finland of the Russian Empire. It was based on the 1889 expedition into the region led by Hugo J. Stjernvall with the explicit aim to search for Gold (Stjernvall, 1891). The second attempt was undertaken by the Turku geologist, Hans Hausen, based on two expeditions during the early 1930s (Hausen, 1941; Hausen, 1942). Both Hausen expeditions aimed for mineral deposits and were financed by the mining industry. Hausen complains in his report that the time was too limited to search for fossils. Minerals were the priority.

The presence of fossiliferous strata in the area, therefore, has been known for a long time. But there was little interest in it, even from specialist paleontologists from museums in Helsinki, Stockholm, or Oslo. This lack of interest could simply be explained by remoteness. Collecting and searching for fossils in the narrow band of shales that runs through the mountain ranges around Kilpisjärvi is still a major undertaking. To make a finding is a risky task that requires significant logistical efforts and financing because shales and clays are often hidden under scree and vegetation, and the younger mountain forming may have destroyed the fossils in many locations.

However, fossils are collected from locations that are much more difficult to access. Therefore, the remoteness of the place cannot be the main reason for the long-lasting lack of interest by paleontologists in Kilpisjärvi trace fossils. Rather, an explanation could be found in the economics of collecting and scientific practice. It is worth to go a bit into the details of the practice of scientific classification and valuation of fossils because they can help to explain the change in circumstances that brought the Kilpisjärvi fossils into scientific focus, which ultimately made our transdisciplinary field trip possible.

An exceptionally valuable fossil needs to be a character figure with a certain stageness, such as the Berlin specimen of the *Archaeopteryx*, or “Sue” the Field Museum’s *Tyrannosaurus rex*. A character figure also needs to have its plot in the evolutionary story: *Archaeopteryx* is the missing link towards modern avian evolution; *Tyrannosaurus rex* is not only an extinct dinosaur, but one of the largest carnivores that ever lived on Earth.

But before transferred to that status, scientific work is needed, which would include proper classification, and publication at a prominent and reputable place. Without a proper name, there can be no fame.

The most successful practice of biological classification by far is Linnean taxonomy, where organisms and organismic remains are placed and named into a hierarchical system of species, families, orders, phyla, etc., based on similarity and inferred genealogy. Species are the core of Linnean taxonomy.

The taxonomic practice is highly regulated by binding international codes for botany and zoology (Ride et al, 1999; Turland et al, 2018). To be valid, a new species needs to be published in a scientific publication, and a physical reference specimen needs to be assigned and deposited, and publicly available. The specimens, which serve as a reference for a species, are called “type specimens.” Any specimen subsequently assigned to a Linnean species effectively represents an opinion or hypothesis based on the type and its description in the original publication. The museum, herbarium, or garden collection are central here because they are the repositories of the types. Thus, Linnean taxonomy, from its beginning, is tightly interwoven with the technology of the natural history museum, the herbarium, and the botanical garden (e.g., Müller-Wille, 2006; Müller-Wille, 2007; Müller-Wille, 2017; Tamborini, 2020).

The practice of Linnean taxonomy creates its own inherent dynamics and drives toward completion at several levels. Curators and taxonomic researchers are often attracted to complete their catalogue lists, be they the complete inventory of, e.g., a certain pond or mountain, or country (Müller-Wille, 2017), or the entire species of the world. Moreover, each new taxon in a series endlessly calls for the discovery of the missing link toward the next taxon, and each new taxon puts other existing taxa into question. Through this system, museums and their researchers are inherently attracted to an expansion of their “paper empires,” (Müller-Wille, 2017) and to restlessly fill drawers with ever more specimens.

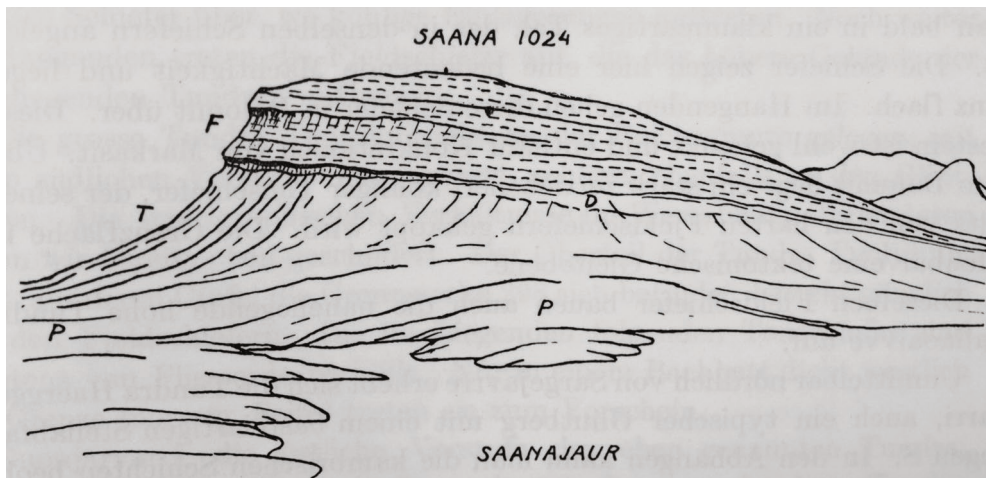
However, this internal attraction towards completion and expansion is always limited and channeled by specific economies of the collections, by storage capacities and complex societal, political relations among the institutions and authors. “Economies of attention” (Bueno, 2016) are an increasingly important factor for collection development and taxonomic practice.

Scientists are increasingly forced to attract attention, be it by publication in high impact journals, such as *Nature*, and *Science*, by the citation count of their papers, or by fundraising success (e.g., van Wesel, 2016). Taxonomic papers are typically low-cited, and hence have almost no chance to make it into high-impact journals and, consequently, taxonomic work has low chances to get funded. Classical natural history museum work, which is based on the accumulation of types, is therefore challenged by low career expectations for taxonomists (e.g., Agnarsson & Kuntner, 2007).

Therefore, research on fossils also increasingly focuses on popular topics and on charismatic species. Until relatively recently, trace fossils, the kind of fossils that can be found in the Kilpisjärvi area, did not relate to either of those groups. This is probably the simple reason why no further efforts have been taken by paleontologists from Finland and abroad to visit this remote area, and to thoroughly search for more material.



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- 1 Slabs with trace fossils from the Kiplisjärvi area, Finland. The traces are c. 541 million years old, and belong to the oldest animal traces in the world. Scale in centimeters.
- 2 Sketch of the geological interpretation of Mount Saana, Kiplisjärvi area, Finland, by Hausen (1942). D, dolomite lense; F, slates of Caledonian overthrust; P, Precambrian crystalline basement.

## A specimen of *Treptichnus pedum*

The situation changed with increasing scientific interest in a geological time interval that is known as the “Cambrian Explosion,” a period in the history of life roughly 541 million years ago when the first animals evolved on Earth. During the years of the geological mapping campaigns in the Kilpisjärvi area, the significance of Cambrian trace fossils has not been fully recognized. It needed books, such as Stephen Jay Gould’s “Wonderful Life,” + to raise interest in the enigma of the rapid Early Cambrian diversification and expansion of animal life (Gould, 1989). And it needed catchy terms such as the “Agronomic revolution” (Seilacher & Pflüger, 1994) or “Cambrian substrate revolution” (Bottjer, Hagadorn, & Dornbos, 2000) to make Cambrian trace fossils famous.

During the 1990s, paleontologists recognized that a drastic ecological transition occurred during the Cambrian period, which changed the way organisms lived on seafloors. One peculiar feature of animals is that most of them move to forage. In the Precambrian world, large motile multicellular organisms didn’t exist and, hence, could not leave any tracks. What is quite an ordinary fact today, that the ground is moved and mixed and full of traces of animals of all sorts, was the exception in the time when the first animals evolved.

Precambrian marine sediments are often horizontally laminated and vertical burrows of animals are absent. In Cambrian sediments, a variety of animal traces occur for the first time, originating from grazing organisms, deeper burrowers, and completely mixed so-called burrow-churned sediments became abundant. This evolutionary transition is interpreted as resulting in a massive and lasting impact on the oceans’ chemistry, and it is a prominent example of how organisms engineered marine environments on a global scale, making them more inhabitable (Mángano & Buatois, 2017; Herringshaw, Callow & McIlroy, 2017).

The oldest abundant vertical traces in marine sediments were produced by priapulid worms (Vannier et al., 2010). These traces are very peculiar in forming curved zig-zag lines, preserved on sediment surfaces. They occur abundantly in sediments with an earliest Cambrian age (541 million years ago) in South Africa, in India, in the deserts of the western US, and on the rocky Atlantic coast of Newfoundland.

In fact, the zig-zag line has by now received an almost iconic status, illustrating the Cambrian substrate revolution and the onset of a modern organismic lifestyle of inhabiting and feeding within the sediment (Narbonne et al., 1987; Buatois, 2018). The traces have been given the status of a Linnean taxon by Seilacher (1955), originally as *Phycodes pedum*, but currently it is mostly referred to as *Treptichnus pedum*. The type specimen is in the Paleontological Collection of the Geologisches Institut, University of Tübingen, Germany. Today, *Treptichnus pedum* is definitively like *Archeopteryx* – a famous, charismatic fossil with a proper name, certain staginess, representing a fascinating aspect of the history of life. In this sense, it is also an extraordinarily valuable fossil.

Now, what is remarkable is that a beautiful slab with *Treptichnus pedum* was found by the artists of the Bioart Society when the Deep Time group searched for fossils at the foothills of Mount Saana (Kare, 2013; Berger, 2020). In 2018, this specimen was shown to one of us (BK), who is the curator of the paleontological collections of the Finnish Museum of Natural History, and in that moment, geologists in Finland became interested in the fossiliferous strata near Kilpisjärvi again.

### “Always is a long time”

Antero Kare produced a detailed report of the 2013 Deep Time group activities, published under the title *Always is a long time – experiencing time in landscape* (Kare,

2013). The text is remarkable because it offers a glimpse of an artistic perception of the fossils of Mount Saana. The text is also a meditation about the signs of time in an arctic landscape.

The group was interested in the figurative rock carvings left behind by arctic prehistoric hunter-gatherers at the Alta site in Norway. Kare noted that the carvings depict some stories, but obviously leave out others, which must have been central to the people that produced these carvings. Landscape features, mountains, and lakes are missing in the Alta carvings.

In historic Sápmi time, holy mountains accommodated ancestors. Holy lakes had two bottoms and levels and, generally spoken, the sacred Sápmi world was vertically layered, with an underworld and an upperworld, and mediating agents. But this sacred world, Kare noticed, is barely visible in the carvings, as it was probably undepictable.

The text then confronts the reader with quite a different topic, that of Leonardo da Vinci's art. Here, Kare noted that, in da Vinci's paintings, the detailed aesthetic qualities of the geology and the landscape are part of an, what he called, "index of authenticity." In the painting *Virgin and Child with St. Anne* such an authentic landscape forms the background of an almost confusing depiction of an ageless Saint Anne holding her similarly ageless and daughter Mary in her arms. Hence, Kare interprets the painting in the context of an iconography of timelessness, a time of prophecy, and he relates this to the limitless, undepictable landscape of the Sápmi. This is a topic that appears in another text written by Kare (2020), where he comments on his journey to Mount Koli, one of Finland's most iconic mountains, with the words of the painter Eero Järnefelt: "[...] only the truth is eternal" (Kare, 2020:p.82).

And finally, in Kare's text the Lehtovaaras geological map is discussed; the blue fossil-promising area of strata, 541 million years old. He describes that the artist-group built a model of Mount Saana from clay in a reenacting performance, filled it "with blueberries, sticks, bullets from the remains of the exploded First World War Russian ammunition magazine, metal parts from a Second World War German airplane that had crashed into the mountain, stones, water from the lake, etc" (Kare, 2017:p.138).

Then they burned it in a kiln: "With the heat of 1200 degrees, we targeted explosions, cracks, bursts, and bangs, and the group named the piece Saana Drama" (Kare, 2017:p.138).

The next logical step for the artists was to search for the promised fossils at Mount Saana, although prospects given in the literature and from consulted paleontologist experts in Tromsø were rather reluctant:

"The question of possible fossils in Saana had three professional answers now: 1. No, we have checked, Tallin, 2. Cannot say, Tromsø, 3. Nothing is impossible, maybe with years of intolerable patience, Lehtovaara." (Kare, 2017:p.139) And then they found them in the valley of time: "What a joy and surprise, we found the first trace fossils. The worm-like figures crawled on dark black stones" (Kare, 2017:p.138).

It is worth citing a longer part of the conclusion of Kare's text: "Saana has now turned into an active event of crawling, eating, digging, and breeding. We see the mountain with new eyes, the knowing intelligence: about 600 meters above sea level, there exists a layer of living organisms, under the mountain churns the bottom of an ancient sea with contemporary animals and organisms. One says that even if in ancient art sites there are many magnificent abstract monuments as stone circles, graves, spirals, and geometric figures, the real story tellers, figurative images, are still missing. Somehow, pictures of animals or humans or objects bring deeper epics to art.



[...] The story of Saana has now developed from rock, geology, theory, and gravel to a more interesting, more imaginative story closer to us, it has gotten faces and actors. Small signs of worms changed the scene to the tingling drama of real life. What news! What facts! How effectively a small living creature can enliven all, even a vast mountain landscape.” (Kare, 2017:p.144)

### Coming back to Saana – the synergy of a transdisciplinary group

Eight years after this finding and three years after the meeting in Helsinki, when Antero Kare showed the piece to one of us, a new transdisciplinary group formed under the aegis of the Bioart Society, returned to Saana. This time with the explicit aim to search for the fossils, to follow the path of the Deep Time group, the mappers, the reindeers, and the tourists, to attempt what we call a “(paleo-) ethology of tracing.” Our approach could best be explained as a means to find out more about the unimaginably long ongoing activity of tracing, trace searching, and trace reading at Saana.

The members of our group came from very different backgrounds (archeological, geological, architectural, academic, non-academic, visual arts, storytelling, etc.), and each had a different motivation to participate. Our overall rationale was to search for the trace fossils and, at the same time, to collectively reflect on our practice of searching and collecting from our different perspectives.

It was a highly unusual setting because, originally, the paleontologist was invited by the artists to collect fossils, and not the other way around as one would expect. A conventional, stereotypical setting would be that the specialist scientist reaches out to the artist to join their research, and that mutual inspiration is expected. Here it was different. The Deep Time group of 2013 hacked the geological map, claimed it in their own right, and now reached out to the paleontologist to join their research in a novel kind of experience and expedition.

The paleontologist (BK) was motivated by the prospects of finding well-preserved large surfaces with Cambrian trace fossils, and to measure sedimentary successions containing the fossils, which would eventually give him a better clue on the origin of the traces, the behavior of the trace makers, and the ecological conditions during deposition. He also had a broad interest to know more about the landscape and other methods to approach the fossils, the strata, and the landscape containing them. He was especially interested in a critical reflection on the paleontological collecting practices. Before the trip, he meticulously studied the maps to limit potential easy to access fossiliferous outcrop areas.

Two students of geology were part of the group as well. They were keen to learn scientific techniques of mapping and logging of sedimentary outcrop sections, and of getting in touch with fossiliferous rocks, but had to be confronted with artistic approaches to do research.

The other members of the group had to agree or not with the rigorous techniques of paleontological collecting. One of us (LV) has known the area for decades and lives in it deeply involved in her family’s reindeer herding. For her, many places on our path are full of memories and stories, traces of labor, leisure, love, and conflict. Her art involves storytelling in personal settings in films and through published diaries. For her, our field trip was a chance to add another layer of experience and knowledge to those places. Different perspectives in a group complement the cultural experience. Seeing the environment as a member of the group gives her a chance to watch herself as a visitor again.

One of us (JVE) has focused her research and practice over the last two decades on different cultural conceptualizations of space, especially if and how emergent spatial technologies perpetuate conventional mapping ideas, but also how these can be

applied and developed into new directions to become more inclusive through a focus on the diversity of spatial cognition (Van der Elst, 2010; Van der Elst, Richards-Rissetto, Garcia, 2010). The work by Van der Elst in the American Southwest specifically has illuminated the notion of diversity in spatial perception and cognition across cultures. Through different pilot projects she has demonstrated that this can greatly contribute to developing different, more equitable pathways toward sustaining our human heritage. For instance, her work with indigenous and traditional communities started from the premise that the recognition of different languages, categories, and principles of spatial organization, are necessary for addressing our current environmental challenges. Her research and practice during the field trip served to further develop these ideas.

We packed our backpacks and followed the geological outcrops in search of the fossil traces. While traveling the trampled paths across the Saana tunturi, we needed landscape reading, a practice of orientation, of trace-making, documentation, and constant decision making. At the outcrop itself, at the location where the fossiliferous slabs are exposed, we had different protocols of what to search for and what to look at. Scale mattered. For some of us, the place in the landscape was of main interest. One of the students had an interest in the traces left by mountain forming tectonic movements and how to measure them. One of us wanted to measure and understand the succession of sedimentary layers. Others were busy hunting the most spectacular fossils.

We had our protocols because our trip came not only with our own group's widely framed aim, but also with an obligation toward the larger project in which the trip was embedded, the ARCHIVE Creative Europe project. And we also had a few obligations toward our supporting institutions, such as the University of Helsinki and its Natural History Museum, and the Bioart Society, Helsinki.

These obligations were partly very explicit: we had to produce deliverables, such as this article, and documentation via various media. The students had to learn scientific techniques and concepts to get their study credit points. The paleontologist had to bring samples and produce a scientific article about the findings. Partly, these expressed themselves more as subtle expectations to produce results which will attract attention. While in the field, they were present and shaped our activities.

Consequently, we did not only collect fossils, but took pictures, and all kinds of data. As an example, two of us stopped every 30 minutes on our track toward the outcrops, documented all artifacts on the spot with photos and GPS-data, and collected them carefully, wrapped in a plastic bag. One of us took drone videos of the outcrop scenery, and others just listened to the wind and collected impressions. But all of us, to a certain degree, were interested in picking up the rocks with fossils.

### Putting rocks in a bag

It was as if they invited us to collect them, especially on sunny days. The light is low in September in the arctic and draws long shadows. This is perfect to spot the traces because the surface reliefs of the slabs show themselves in heavy contrasts when the light comes from the side. Many of the slabs have a handy size, just right to pick them up and to hold them in the light to examine the fine details. There are different types of rocks: a shiny, almost golden colored fine sandstone, and a dark graphitic dirty version of sandstone, and all kinds of pale colored variants in between.

The variety of traces is also quite impressive. Most abundant are the patterns of a chaotic crisscrossing of finger-thick bulges. Sometimes, strange loops and meanders can be found, while the rarest are the beautifully curved zig-zag lines of *Treptichnus*. But there was always a chance to find something new and unexpected, which kept us busy collecting.

We collected not only handy trace fossil slabs, but also other pieces of rock. Some beautiful lichen covered pebbles and slabs ended up as gifts for friends. Other small stones became forgotten in some hidden corners of the pockets of our outdoor gear or in our backpacks. The paleontologist among us also collected larger samples, having already an exhibition in mind. He searched for pieces that could be exhibited impressively in the museum. The size of these samples was only limited by what he could carry.

At the outcrop we tagged all samples by location, carefully wrapped them in newspaper, plastic bags, carried them to the camp, and flew them at the end of our trip by helicopter to the field station. There we packed them into crates, ready to ship to Helsinki.

However, when picking up the rocks and building our own personal piles of collected samples, the issue of ownership quickly came up. Where do the samples go? What does it mean when we pack the rocks into our own backpack?

This question seemed to be easily answered by the paleontologist, because he must deliver, without question, all his material to the museum, where it gets numbered, catalogued, shelved, and eventually digitized and exhibited. His samples become a public good.

But what about the material collected by the students, the architect, the artist, and the writer? Is it the chance to stumble upon a beautiful piece that determines its ownership and consequent fate? Does the rock become private property when it slips into one's own pocket? What does it mean, in terms of ownership, when a fossil becomes a part of an artwork?

In Finland, there are no laws that regulate ownership of privately collected fossils from public land. It is allowed to collect them, to take them home, even to sell them. This is not different from berry-picking or mushrooming. Hence, the very act of finding them, taking them into one's hand and putting them into one's pocket, marks an event of changing ownership. There is nothing wrong with it.

This does, however, not answer our question: who takes which fossil? We explored, searched, and collected collectively. Is then the chance event of finding a good specimen the right base to decide in which pocket it goes? This question came up during collecting in the outcrop. While in the field, we found a pragmatic answer without much discussion: every specimen of potential public and scientific interest goes into the museum.

This pragmatic solution, we believe, needs a more thorough discussion. The moment of collecting is always preceded by a phase of searching and exploration. In our case, this was a collective effort funded in large part by public money from the EU, and in a much smaller part by the University of Helsinki. Therefore, it seemed obvious that the physical results of our collecting efforts should go into a public repository.

However, it was already clear from the beginning that our collecting will yield some private revenue, at least in terms of artistic, scientific, or public attention. And of course, when a sample becomes a part of an artwork, the artist or art collective will have ownership over that artwork. This is where things got complicated because here the role of a public museum needs to be discussed, and our own personal responsibilities in terms of the consequences of our collection effort.

### Helicopter research

The base of our exploration was the geological map. Any geological map is precisely made for this reason: to delimit an exploration area. In our case the exploration area is marked by the beautiful blue reserved for the strata containing the fossils, and we should not forget that its demarcation lines are the heritage of Stjenvall, Hausen, and Lehtovaara.

We walked literally in the footsteps of these three explorers, and we carried the rocks in the same geographical direction, toward the South, into the very same museum where their samples are already safely repositied. The work of Stjenvall, Hausen, and Lehtovaara needs to be seen as part of a long and ongoing history of map making, prospecting, and exploring of mineral deposits in Finnish Lapland. In recent years, the region has seen a massive intensification of prospecting activities (e.g., Konnunaho et al., 2013; Lassila, 2018), and more generally a mining boom (Kröger, 2016). The prospecting activities and the mining pose serious challenges to indigenous livelihoods, often ignore Sápmi property rights, and for centuries have been creating massive pressure on reindeer husbandry and the local environment (Ojala & Nordin, 2015; Koivurova et al., 2015).

Our own fossil collecting activity will have no direct or foreseeable consequences for any mineral prospecting or extraction industry in the area. However, fossils attract scientific collectors, amateurs, and commercial collectors alike. A respectable commercial fossil trade has existed since the 19<sup>th</sup> century with traditional companies, such as Krantz Rheinisches Mineralienkontor from Germany, providing large natural history museums around the world with spectacular specimens. In some countries, such as in Morocco, a massive industry developed from fossil excavation, preparation, and trade, providing the main income for tens of thousands of people and, at the same time, posing a real threat to the landscape and geological heritage (Gutiérrez-Marco & García-Bellido, 2018). Fossils are often excavated in artisanal and small-scale mining by the poorest people in poor countries with almost no possibility to escape their precarious situation (Schwartz et al., 2021).

There is also no real threat that at Saana a trace fossil trading industry will or could evolve. However, our fossil collecting should be seen in relation to a colonial tradition where the paleontological heritage of the poor or marginal regions gets exploited by people in rich metropolitan areas with little chance to use their resources locally and sustainably. Paleontologists are becoming increasingly aware of these aspects of their research (see e.g., recent discussions about research on Myanmar blood amber fossils, Rayfield et al., 2020; Haug et al., 2020; Shi et al., 2021). In our context, the emerging discussion of so called “parachute research” or “helicopter research” is important, in which research where no locals are involved is criticized and in which there is no backflow of knowledge, training, profits, and other resources (Ortega et al. 2021; Zin-Maung-maung-thein & Khin, 2021).

A thorough overview of the possibilities to sustainably use fossil occurrences was published by a team of Swedish paleontologists, who distinguished between non-extractive and extractive usages (Sookias et al., 2013). Following their suggestions, non-extractive usages could include solutions of geotourism and/or a local museum. Extractive usage, by e.g. commercial collecting, should involve scientists, regulation, and a secure local reinvestment of profits.

Shipping our collection to Helsinki, although securing it for the public domain, therefore by no means secures the sustainability and prevents further “helicopter research” from which locals are excluded and no backflow of knowledge occurs. When our (paleo-) ethology of tracing leads us to Helsinki, we need to trace paths that re-connect to Saana.

### **New paths**

In many traditional communities, the idea of storing natural and cultural elements in boxes is foreign, because these are part of the living community and its cycles. Removing elements from this larger community disturbs the balance, often in detrimental ways (e.g., Spence, 2000). Developments in digital heritage can assist in overcoming, or at least ameliorating, the tension between diverging ideologies. In many cases, a digital facsimile can serve research needs. In this way, only select physical objects need to be kept in storage. Digital heritage practices also offer many opportunities that were

unavailable before our current Information Age. For instance, not only can an object be digitized in 3D, but the context from which it is taken can also be digitally preserved. This allows for example to take accurate measurements, even when the research is conducted away from the original site location. As an archaeologist, Van der Elst has conducted such research with promising results (Singer, Garcia, Van der Elst, 2012). For her as an employee of the US National Park Service (NPS), this meant that a certain object could be repatriated to the descendent tribal communities, while a digital record could remain at the NPS archive. The added benefit of this practice is that a better understanding of objects in their original context can be fostered. This especially could lead to a more inclusive cultural understanding of the relationship between people and their environment.

Is it even possible to use the objects, the trace fossils, for some kind of counter-mapping in the sense of Lassila (2018), where counter-mapping is understood “as an all-encompassing, social process of unravelling the land’s locally meaningful aspects” (p. 3) through a kind of “wayfinding” (i.e., through an active, wayfinding engagement with the country that opens up along the path, Ingold, 2006), that takes place in the course of moving, through memories and storytelling?

An artistic approach to unconventional map making, which is very much in the spirit of Lassila’s counter-mapping, is a practice called “inefficient mapping” by Linda Knight (2021). Inefficient mapping is seen by Linda Knight as a “protocol for attuning to phenomena,” which respects their resistance, unpredictability, and unrepeatability, and emphasizes the imperfection of the research (Knight, 2021). Mapping here has a wayfinding function across scales, even if it is, as in her case, extremely idiosyncratic and highly abstract. And mapping is here seen as a process in which research and creation are intertwined and require each other. This distinguishes it from the highly instrumental, product-oriented map-making we are so used to (see also Ingold, 2000; Lassila, 2018). For us, the possibilities of approaching the landscape via mapping or counter-mapping orient toward what is left behind by our fossil hunting and, at the same time, allow us to bring the fossils to life in the museum and at Saana.

Here we need to come back to Antero Kare’s joy when he found a *Treptichnus* trace at the foothills of Mount Saana: “How effectively a small living creature can enliven all, even a vast mountain landscape!”

Once found, these trace fossils become part of the landscape. They connect Saana with South Africa, India, and Newfoundland. And their curious stories about the Cambrian oceans, with their ecosystem engineering burrowing worms, now have a place here as well. The shales from Kilpisjärvi with their traces mark a new path to follow among all the other deeply imbricated human and non-human paths in this region. This is almost a new reality.

In Helsinki, in the exhibition hall of the Natural History Museum, these stories would remain abstract, even if the original, beautiful slabs were displayed under perfect lighting. Natural history museum collections and exhibitions are highly reduced spaces without daylight. In exhibitions, often nothing or very little refers to the place and the circumstances of where and how the fossils had been collected. Little else than the objects themselves refers to the outside world.

This is not necessarily a bad thing because it offers possibilities to view the objects in a novel perspective. In the museum drawers, in the catalogues, and in the taxonomic databases, they can be placed into series, they can be counted and measured, and the numbers can be put under the scrutiny of a statistical analysis (see e.g., Müller-Wille, 2017). After all, it is the scientific research based on museum specimens that allowed for the story of *Treptichnus* to be told.

But a natural history museum should be more than a scientific institution or a service agency for scientists with a pedagogically oriented public outreach, not only because the objects themselves deserve more than a tag with a name and a location. Collecting is more than the result of mapping and where the objects come from as there is always something left behind.

For us it will be a challenge, now, when the material is transferred to the Finnish Museum of Natural History, to use the museum's existing structures to continue our approach of tracing, and to reconnect to Saana. However, natural history museums are unique institutions because they also address certain aspects of public life, which are unique and differ from, e.g., the media, libraries, and pedagogical or scientific institutions (Chakrabarty, 2002). The objects in their collections, their physical presence, their authenticity, and their specific stories allow for a sensorial and very personal encounter. How these qualities of natural history collections, which include aesthetical, historical, and political aspects, are properly valued is an open question that can probably never be conclusively answered. With our future work on the material collected during our trip, we will try to contribute to some possible answers and to find traces that re-connect to Saana.

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**Björn Kröger** is curator of the Paleontological Collections of the Finnish Museum of Natural History and docent at the Helsinki University, Finland. He received his PhD at the Freie University of Berlin, Germany, and worked in Germany, France, and Sweden. He is an expert on the evolution of the oldest cephalopods. His current research focus is on the early evolution of large-scale ecosystem engineering in the oceans. He also has an active interdisciplinary interest in how our knowledge of Earth's deep time is gained, narrated, and used.

**Judith van der Elst** has since completing her PhD research at the University of New Mexico in the United States led a semi-nomadic life as an archaeologist/anthropologist and socially engaged independent researcher, and spent the recent years mainly in Europe. During her stay in the United States, she specialized in humanistic approaches in emerging spatial technologies (Geographic Information Systems, Remote Sensing) in order to investigate how people experience and shape their relationships with the environment. Her collaboration with indigenous communities in particular radically changed her outlook on life and respect for the land. She is dedicated to creating new ways of teaching and learning in the land in Transdisciplinary settings. She currently works as a researcher within the research group Art & Sustainability at Hanze University of Applied Sciences, Groningen, the Netherlands.

**Leena Valkeapää** (Doctor of Arts) is an artist and researcher. Since 2004 she has been living on fells in northwestern Lapland, near the village Kilpisjärvi. Valkeapää is working as a mentor in the Ars Bioartica residence. She has exhibited as a visual artist since (1988) and has produced public environmental artworks, including the rock wall piece Ice Veil (1999) in Turku. Her doctoral dissertation, "Luonnossa, vuoropuhelua Nils-Aslak Valkeapään tuotannon kanssa", 2011 (In Nature, a dialog with Nils-Aslak Valkeapää's art) proposed a dialogue with nature and its poets. Valkeapää is taking part in the daily work of reindeer herding, in the Sami cultural tradition. She is interested in engaging with the authenticity of a deeply individual experience with nature.

Platformization in today's  
hyper-connected world



# The Internet Hijacked by Big Tech – Platformization in Today’s Hyper- connected World

Efraín Foglia

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We watched the world of platforms gradually take shape for years before the COVID-19 pandemic came and sped up the process. The so-called “platformization of the web” is a process that can be explained by two phenomena:

## 1. The internet is shrinking.

The internet is indeed getting smaller, owing to the hegemony of platform capitalism (Wark, 2004; Véliz, 2021; Berardi, 2017). Web-based services are becoming hyper-centralized and the control over them has fallen into the hands of just a few corporations. The platforms we are referring to were born out of the Californian spirit of economic innovation. Big tech companies – Google, Amazon, Meta, Microsoft, Apple and the like – have pervaded every facet of our lives and play a part in nearly every present-day social construct. Could there be someone out there who does not use them at all? Are there any internet-based services that do not rely on them? When we say that the internet is shrinking, we mean that most of the data flow and web visits are concentrated on these platforms, so everything resides on their servers and storage systems. This gives these tech giants tremendous power to shape public opinion, and profound relevance when it comes to building a well-informed and participatory democracy. What is happening now is quite the paradox: the technology that was supposed to liberate information in the 1990s has ended up locking us in a gilded cage. We can no longer escape using these services; their reach is virtually all-encompassing.

Various scholars and internet critics (Bartlett, 2018; Morozov, 2018; Véliz, 2021) have remarked that this new reality is ushering in the internet's third age, a network of service platforms and complex algorithmic systems that govern whatever runs through their hands. The internet has become more automated, and the big tech industry keeps reiterating the idea that the internet is now "smarter."

The internet, which from its inception promised to draw a rhizome (Deleuze & Guattari, 2000) of complexities, voices, and colors, is being compacted into a stream of centralized data that flows to very few centers of power. What is important to note is that this power no longer represents traditional nation-states as neatly as it did in the past. Nevertheless, its structures can still ally with the great global geopolitical powers, mainly the United States and China. These nerve centers have new post-capitalist features (Wark, 2019) underpinned by the data economy (Véliz, 2021). In the 1990s, US scholars from the Massachusetts Institute of Technology (MIT Media Lab) claimed that we were leaping from atoms to bits (Negroponte, 1996).

Nowadays, the platforms are showing us that bits can give rise to countless social practices that have an impact on the world of atoms. Plus, all of this is mediated by algorithms designed to benefit a select few (O'Neil, 2016; Bartlett, 2018). We only need to stop and think about the power we have to impact the tourism sector on our mobile devices by booking a hotel room 8,000 kilometers away without fully understanding the context surrounding our decision. Most actions like this upset the balance between local tourism and the global giants using platforms to dominate the market. The immediacy and convenience of performing various acts of consumption on our smartphones blind us to the exploitative processes underpinning that service, as well as the collateral effects of our own acts as consumers. Finally, it is worth asking whether the hotel room we booked was our own choice or an algorithm's recommendation.

## 2. Our knowledge is in the cloud.

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The second phenomenon behind platformization is the transfer of much of our knowledge and many of our cognitive abilities onto the above-mentioned platforms. We are living on them more and more. We wake up, spend our day, and go to sleep all while fully connected to digital platforms. As a major sign of this, our current way of life has created new pathologies that are native to this environment, such as the anxiety of interacting via the internet at an ever-increasing speed.

Then came COVID-19, which only accelerated this trend. Staying locked away at home for health reasons shifted our on-the-street practices towards a schizophrenic system of clicking to consume goods and have others delivered. This process had already been encroaching on our way of life for some time. Dating platforms, for instance, had been proliferating before the pandemic hit, altering the way we socially interact with each other. All this was set against the backdrop of automation in the selection of people for our specific needs. Naturally, the big tech are happy. Their stock prices continue to grow, generating new multimillion-dollar fortunes and giving rise to new vectoralist social classes (Wark, 2019).

The innovative kids from Silicon Valley are now cashing in and taking their place at the top of the world's wealth ladder, overtaking the former kings of the world linked to the oil and television broadcasting industries.

In the midst of the COVID-19 pandemic, our societies became more fragile overall and we were able to see just how interdependent we are on the global scale. Understandably, many people turned to remote connectivity, putting in thousands of hours to talk to family members, to work, and to support each other on medical and health issues. In this regard, we should point out the relevance of all those activities and sensitive information that we deposited on the web as a trade-off to be able to enjoy the services offered

by platforms. This information, to a large extent, makes up our history and experiences, memories that will be difficult to remove from the Californian servers in the future. All these hours of shared knowledge, affection, and global support have been recorded and are well stored on the servers of privately owned internet platforms. What risks does this pose for the future of society? Are we aware of how much information tied to our healthcare system has passed through these platforms?

### What's next?

The two phenomena discussed above have numerous ramifications and pose a great deal of complexity for the future of our society, as remote connections have become normalized in our contemporary way of life. All signs point to the global economy structuring itself to operate through technological matrices of connections on platforms. There is not a single productive sector that is not undergoing digitalization or is not linked to a technological platform.

Various business and public policies involve plans designed to consolidate this way of life “from home,” even after the COVID-19 pandemic has been brought under control. In other words, this type of social interaction is definitely here to stay. Working on platforms, with platforms, and through platforms has become an ever-present prosthesis of the global productive system. Furthermore, this has given rise to various phenomena that have not occurred in society before, such as the fact that many of our life experiences end up on platforms, or rather in their massive data centers.

Our photographs offer a prime example of this. These cultural items used to navigate between our intimate and public lives as it suited us best. That barrier has largely vanished and what was once intimate is now posted on Instagram. This image-based construction of human knowledge has another kind of feature: bits. Plus, it now lives in devices and servers rather than in private family photo albums. It is crucial that we analyze the consequences of this phenomenon. Our historical and global memory travels like a ghost among “the cloud,” which is really a storage server in an unknown location.

Here, we ought to pose a number of questions to the people upstairs: What is being done by public authorities to balance this excessive use of private platforms; who is concerned about this huge accumulation of sensitive citizen data; and what is being done to revitalize the net neutrality movement?

### Escaping platformization with an open platform for art

The European project Arc-hive creates an open source digital platform <https://arc-hive.zone/> that aggregates, preserves, publishes, distributes and contextualizes a variety of information, knowledge, and documentation on art with a focus on biomedica, ensuring open access to a variety of users, and a wide outreach of digital materials across cultural sectors and territories. Arc-hive is a collaborative initiative by Cultivamos Cultura (PT) and KONTEJNER | bureau of contemporary art praxis (HR), FBAS — The Finnish Society of Bioart (FI), Zavod za kulturo, umetnost in izobraževanje Kersnikova (SI), Hangar — Fundació Privada AAVC (ES) and RBINS — Royal Belgian Institute of Natural Sciences (BE).

The platform under construction for the Arc-hive project stands for openness. The socio-technological protocols that are being implemented reflect the open source philosophy. The code, the framework, the repositories, and the general content are born, natively, out of the possibilities of open knowledge. The advantages of this should be clear, especially considering what was said above about the power of digital platforms. Designing an open content platform should, by default, be seen as something positive. Despite almost 40 years having gone by since Richard Stallman first launched the GNU project (“GNU’s not Unix!”) in 1983 to write a complete operating system free

of restrictions on use, modification or distribution, we are still a long way from having open platforms as widely used as the GAMAM (Google, Apple, Meta, Amazon, and Microsoft). There are hardly any examples of support for this type of project in the art world, even though artistic production, to some extent, coincides with the postulates implicit in the demands of open platforms.

One of the main reasons for this distancing is surely the fact that subjectivity creation, the art market and all its institutions see artistic production in terms of content rather than infrastructure. The content and narrative surrounding a piece of art can be highly politicized and create discourse against the hegemony of Silicon Valley, but the art world has been incapable of challenging the internet infrastructures that are used in its operational centers. Some may believe this is not their job, but the fact is that this has created a vacuum of critical analysis regarding our reliance on network infrastructures. The internet, its platforms, its servers, and the logical computer processes that operate in the art universe are viewed as separate pieces of the art ecosystem and are often considered a technical asset that does not affect the content of the artwork. They are seen as harmless tools, and their political coherence in relation to the work is hardly debated. It could be compared to an artist who creates a work of art with a critical view of mass surveillance and yet uses an iPhone for their personal communication.

The commitment to an open source platform for the Arc-hive project will come up against two key challenges. The first is that of building the platform on the values of the open source imaginary. On top of this are other challenges such as designing the platform's usability and interoperability, issues that are always being questioned in the open source approach to digital interaction consumption systems based on usability led by companies such as Apple. The second challenge, and the one we consider the most important, is that of crafting a contemporary narrative that will convince the art world to commit to such a platform. We suspect that the original tale of open source values no longer resonates with the imaginaries of the TikTok era. There is a need to work with communication, storytelling, and even seduction methodologies to enhance the already proven strength of open source projects. Given their intrinsic spirit, art projects need a platform that lives up to the stories created by the humanities, and this is definitely not something offered by private platforms. Can open platforms offer new narratives for art?

We have to understand that open source purism is only an illusion. The internet works on the basis of interoperability between networks and network services. It is impossible not to depend at some point on a connection to a proprietary service. In fact, the <https://arc-hive.zone/> website itself recommends visitors to follow us on and log in through Meta and Instagram.

From here, the political challenge is not, as was thought years ago, in creating a free ecosystem of open knowledge from scratch, but in creating platforms with open governance that negotiate with the interoperability of the GAMAM but from a more symmetrical place. The long-term challenge is to reduce our reliance on extractivist data systems and create reliable infrastructures that generate new imaginaries. For example, infrastructures that are always thinking about how to consume less energy and be more environmentally friendly for the world we are creating, of which the internet is very much a precursor.

### **Speculating on the possibilities of a bio-systemic platform**

We have designed a series of speculative infrastructural diagrams that map the interactions of an open source platform focused on hosting projects with living matter and biological materials and that help generate symbiosis and interdependencies between biological and algorithmic entities.

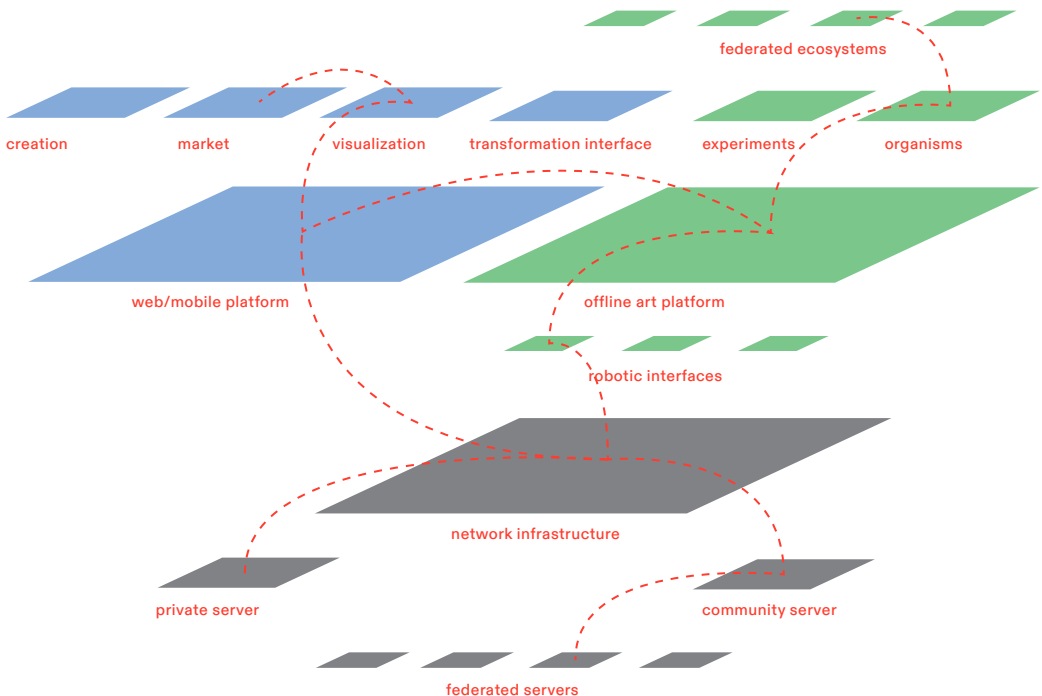
The diagrams are not intended to provide a technical description neatly based on infrastructural engineering. Rather, they are intended to depict the correlations of a possible ecosystem of platforms that come close to the postulates of this text.

Speculative design is an emerging specialty that combines humanistic thinking with design praxis. It is a methodology that enables us to address the necessary questions to concrete and future problems in the field of design (Dunne & Raby, 2013). The idea behind these diagrams is not to find concrete and clear solutions, but to imagine networked systems that help us find the right questions for a desirable future for the project. The questions we are seeking cannot be formulated solely from a technological perspective; they need to embrace a combination of different specialist fields since the project being developed is broad, diverse and highly complex.

To this end, the following topics have been covered as future lines of research for designing art platforms based on protocols that are more symmetrical in terms of negotiating with today's global platform culture.

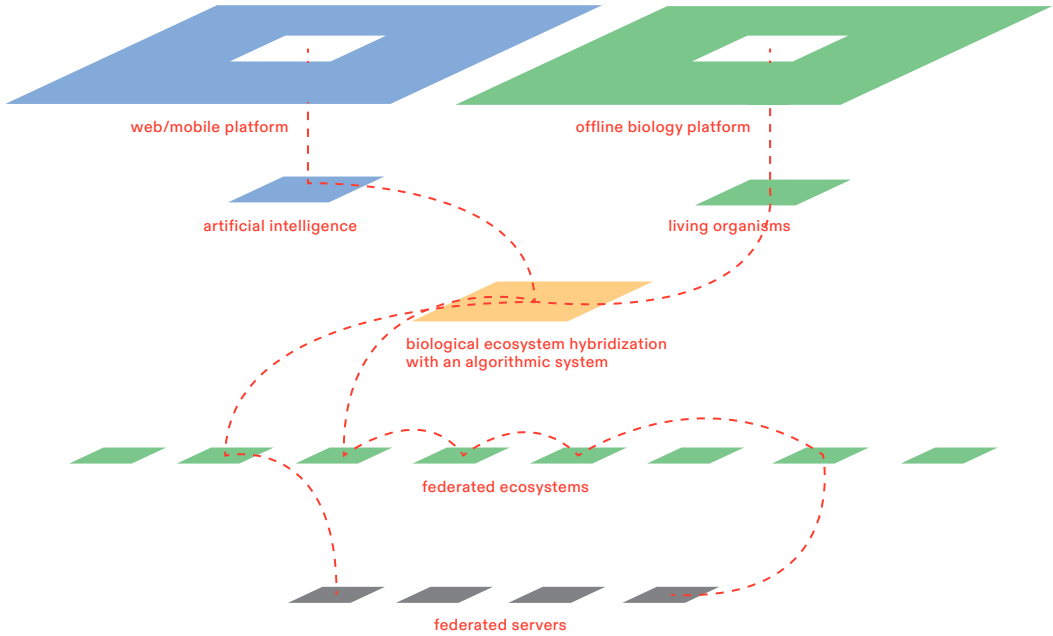
**Living matter in infrastructure.**

We propose a system for the coexistence of living and artificial organisms on an interdependent infrastructure. Both artificial and biological intelligence will feed back into one another, giving rise to an experimental and unpredictable evolution.



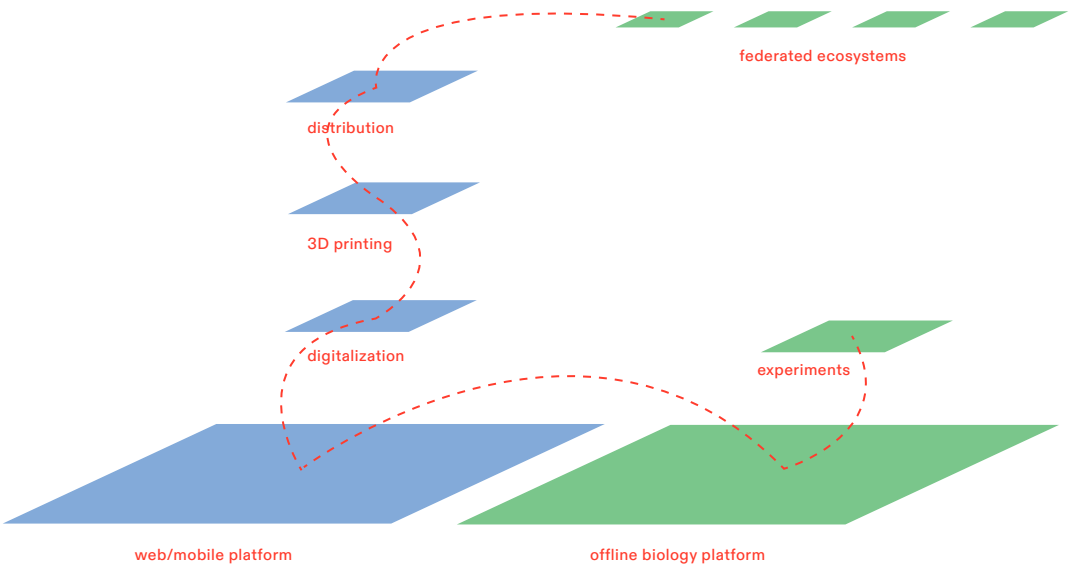
**Open source – open evolution.**

We propose that the platform's open source nervous-communication system promotes an evolution and scalability towards federated environments and systems (partnerships in common agreement). This would enable replicability in different areas of knowledge.



**Digitalizing as an act of returning to the atom.**

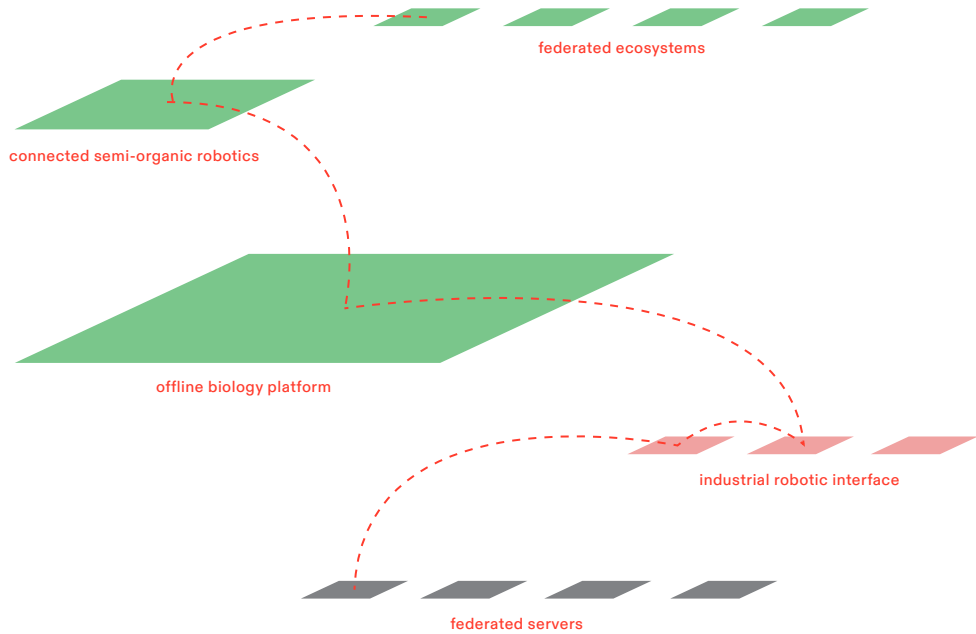
We propose a return to the atom of all possible digital interactions. Regardless of the usefulness of this proposal in all cases, it is fundamental to understand the ecosystem of interactions as a multidirectional channel for physical-digital creation in both directions.





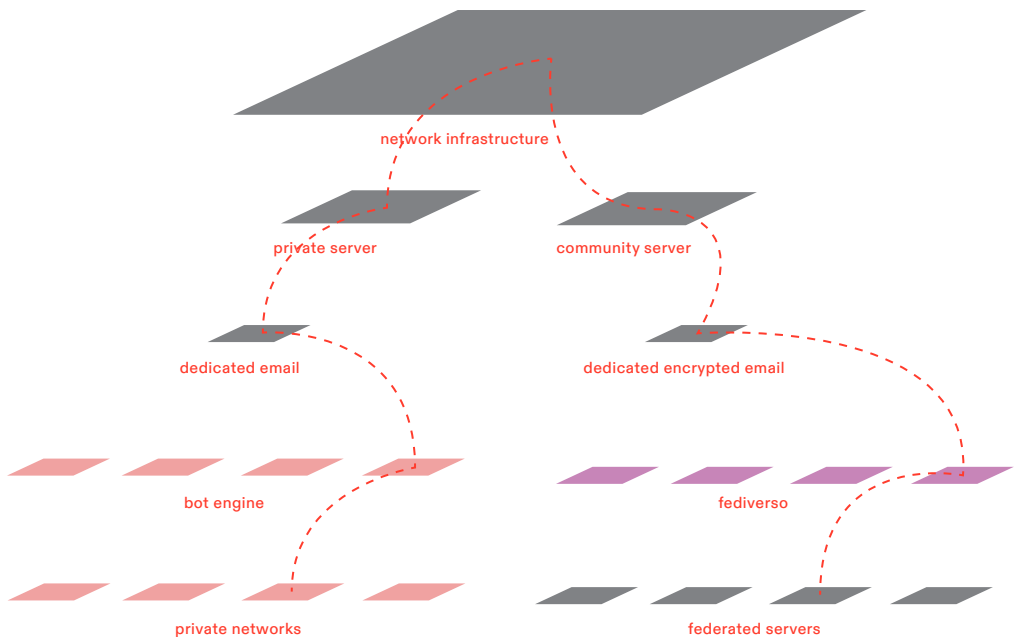
### Network biology.

We propose that the machine-robot matrix of the platform helps produce and reproduce the biological and organic systems of artistic production. In this way, the platform will help create new organisms that will inhabit the physical world.



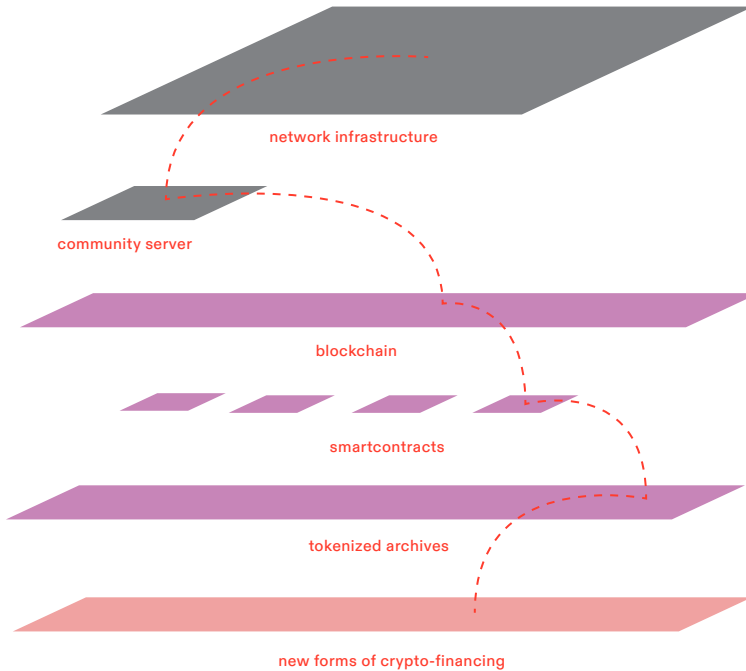
### Ecosystem of public and encrypted data.

We propose a hybrid system to control information on the platform, granting the freedom to share knowledge with varying degrees of openness. The system will have federated and community protected channels, while offering the option of socializing assets algorithmically in private and commercial networks.



### Possibilities for future archives and new economies.

We propose the possibility of experimenting with emerging economies based on Blockchain and tokenization of platform assets. The relevance of the system must lie in the design of peer-to-peer agreements or “smart contracts,” on which a philosophical consensus suitable for bio-art projects must be reached.



## Conclusions

The idea of using a web platform exclusively as a system for displaying works of art is rather limited and uninteresting. Ultimately, such a system limits and disempowers the humanistic expressions of the 21<sup>st</sup> century. A web platform for art should aspire to be more than just a one-sided display case for visual consumption. An open platform should strive to become an ecosystem of communication, as well as a platform for the work of new subjectivities. Artists must identify with the platform and understand it as a matrix capable of aggregating imaginaries in their conceptual work.

It is common for web platforms to be understood as isolated containers for artistic production. We must not lose sight of the impact the internet has had on our recent history. Today, millions of people around the world build and augment their lifestyles on the internet. Millions of people begin or cement social, sexual, and political relationships using internet platforms on a daily basis. Thousands of voters around the world choose a political side through the influence of inflammatory social networkers. We could go on forever about how everyday life in today's global society is linked to internet use. A much-needed reflection on these daily actions leads us to the following questions: What can these platforms do for the artistic ecosystem? How can technological platforms be used or built to hybridize with analog artistic creation? What avant-garde tools can the art world use as new resources for future imaginaries? In short, what kind of internet does the art ecosystem need to transcend the current poor relationship between thought and technology? The analog-digital divide and the distance between biological networks and the possibilities of creation with online networks can no longer be tolerated. These debates need to gradually be put to bed so that we can focus on what is truly important.

Various theories point to the recognition and importance of biological ecosystems as the center of our future society (Haraway, 2016). Coupled with this is the pervasiveness of technological networks. It is time to stop working with these entities separately and start imagining them interdependently. Otherwise, we will see the hybridization of languages impoverished in this world, which is ever more beset by problems linked to major changes in our natural environments. To discuss these changes, we need all the semiotic, esthetic and technological tools at our disposal. Great challenges lie ahead, and art must be involved in interpreting the future and making proposals about this digital technological revolution that is here to stay.

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- Wark, M. (2019) *Capital Is Dead: Is This Something Worse?* New York, Verso Books.
- Efraín Foglia** is a designer, researcher, and lecturer. He holds a PhD in Fine Arts from the University of Barcelona. He lectures in Design and Art at the Faculty of Information and Communication Sciences at the UOC (Universitat Oberta de Catalunya) where he is a member of the Mediaccions research group. His work focuses on the intersection between design, grassroots activism, and networked technologies. His research covers diverse scenarios such as building tools for alternative communication, decentralized networked infrastructures, and new paradigms in technopolitical design. He is a founding member of guifi.net, the world's largest community network. In 2011, he created the Mobility Lab, a platform for experimenting with new forms of physical and digital interaction. He is founder of XRCEB, Xarxa de Ràdios Comunitàries de Barcelona, an online platform for research, experimentation, and dissemination of diverse community forms of radio and Internet content. Originally from Mexico City, he has been living in Barcelona since 2003.

# OPEN arc-Hive



# Open arc-Hive

Helen Torres

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1.

I clearly remember the day everything started.

It was a cold, grey morning. I had checked the AQI before going out: 98 PM2.5. I decided to take my FFP3 mask, no need to wear a PAPR. Those were the precious moments that helped us endure fuel scarcity, regardless of all the hardships. Whatever those nostalgic for the past might claim, since the majority of power plants have been dismantled and it has become economically infeasible to extract oil, the air is cleaner.

It was very early; the streets were still dark and nearly empty. The few of us who remained in the city thought twice before getting outside into the cold. I grabbed my bike and rode to the faculty premises for my first meeting with the dean. The first one and totally unusual, since giving assignments was not part of per chores. I was not smart enough then to realize this was the first sign we would be working on something really important, and most probably secret.

Three people were standing at the entrance. The well-known HM couple, Lurky & Jest, whom I had met in the Analysis of Algorithms class when I was still a fresher, and someone else whom I had not seen before.

“I’m Verna, a student in Applied Linguistics, pleased to meet you,” said the stranger, trying to be polite.

Lurky gave Verna a cold hard gaze and looked away towards the parking lot. The dean’s electric vehicle was the only one parked among a few rusty bicycles.

“Not everybody lives in scarcity,” Verna complained.

“Well, they say the dean lives in a gated community in the North, no doubt it’s a long way to come by bike,” said Lurky teasingly.

“These are just excuses. We were freezing to death last night, but some still have the nerve to use their cars,” said Jest, missing the irony.

“Didn’t you find some wood at the abandoned warehouse last week?” I asked.

“We’ve burnt it all up,” answered Jest. “Now we don’t even have gas to cook. We are feeding raw until Friday, when we’ll come back to the farm.”

“At least you have a farm to go back...,” I said in a resigned voice, warming my hands.

“It’s time for the meeting, let’s go,” Verna urged us.

The dean’s office was on the third floor of the old college building. In the era of the One Home, One Computer, that place must have looked stunning. The cedar desk, the soft chairs and the computer with some of its keyboard letters worn off formed a postcard image of the old times of the Cheap Nature.

The dean was standing against the big window, the soft light outlined per delicate silhouette — no doubt that body was not from downtown. I looked at per askance (or should I say “*her*”? Why bother using the reformed pronoun *per* – for person – to talk about someone who denies it?). Her clean, well-maintained fingernails and her worn-out high heels, although clearly inherited, showed the need to stress gender and class status. There are only a few people who dare to take such an arrogant attitude these days, and I am lucky enough not to have to deal with them.

I was pretty sure that Lurky’s suspicions about the dean were founded. She could only be one of the elected to work for The Flourishing instead of colonizing the Space, or just another rich person who had chosen to remain in Terra under the rule of the Everlasting Normal, that empty promise of a better future. Whatever the case, the dean’s arrogance was outrageous.

When formal presentations were made and we had all taken a seat, she spoke first.

“As you all may know, research into past artwork is one of the Faculty’s major concerns nowadays, as it is a priority to learn and understand old narratives and artifacts and, if possible, hack them to reuse them in our present times. No doubt we will not be able to use this knowledge to replicate it, as we don’t have the necessary means, but its understanding could help our communities, and farms, know more about our past and grow up as collective bodies.”

The dean did not sound worried, but a nervous twitch in her eye told differently.

“Now, the news is that some recovered devices have been found and we think they contain invaluable knowledge about a 21<sup>st</sup> century art project. So, the faculty committee has chosen the four of you to work on these files due to your personal abilities, your knowledge and your aptitude for teamwork.”

I had known Lurky and Jest for quite a few years then, but we had never worked together, and that was the first time I saw Verna. So, how could the dean talk about teamwork skills? I wondered what kind of techniques they had used to get information about us. Had they analyzed my khipus? I was absolutely sure they couldn’t read them thoroughly, there was always something that escaped their understanding. But whistleblowers are everywhere, you never know.

I caught Lurky staring at the dean’s shoes, but before per could open per mouth, she unlocked one of the desk drawers and picked up a brown envelope with the inscription “21stC. ART” in big black letters.

“There is a pen-drive inside this envelope, but the files are either encrypted or protected. And here is when you four come into play.”

We all nodded.

“We’ve made all the necessary arrangements in the basement, where computers are stored, for you to work there until the task is done. The place is heated and there’s enough food for a week.”

This last statement made us all move in our chairs with excitement.

“I’d like to add that this could be a great opportunity to discover more about different understandings of art in the digital era. So I’d like to remind you that the fruits of this research are strictly confidential.”

All that secrecy sounded a bit exaggerated, but who cares about confidentiality when you have enough food and a heated shelter for such a long time?

We stood up and left the dean's office. Down the stairs we went to the computer room, that dark and wet place where I used to spend hours diving into knowledge that seems so useless nowadays.

Two rectangular tables separated by a pellet stove occupied the center of the room, while four single beds had been placed at the corners. On one side, a sink, a cupboard, and a small fridge made the basement look like home, or what might have been called home in the last century.

"It doesn't look very cozy in here," groaned Verna.

Lurky & Jest made eye contact with each other, not saying a word. They were one of the funniest and smartest couples I had ever met. Always together, they were known as The HM, a.k.a. The Holobiont Mind. Everybody knew them for their skills of cracking combination locks of hidden safes looking for jewels they traded for food, making their farm one of the richest communities of the suburbs. Rumors traveled that they had contacts in La Resistencia, the secret society of the wealthy, the embryo and the very substance of the metaVerse.

I entered the room and walked straight over to the fridge, opened it, and looked inside: lots of colorful packages wrapped in that shiny plastic called *cling film* that I had only seen in pictures. I stuck my nose in the fridge but I could not recognize any flavor.

Lurky approached the stove. "It's the first time I see one of these."

"They work pretty well, but just to heat up the place, not to cook," clarified Verna.

"I know that, genius."

I closed the fridge door and walked away towards the tables, trying to ignore Lurky's sarcasm. Jest followed me but sat by Lurky's side, who had already grabbed a seat in front of one of the two computers.

"What do you use for heating at your place? Are you also part of a farm?" I asked Verna while per approached one of the beds, sat down on it, and took off per backpack.

"Sure I am, I come from the Antiverse farm in the extreme south," articulated Verna. The HM looked up to per. "It's my first time downtown."

The whirring noise of the computers filled up the room. "I'm a linguist, by the way," Verna added, shyly looking at per backpack, taking some books out and scattering them over the bed. They were quite big and gave off a musty smell.

"Yeah, you've already said that," I said sheepishly.

The Antiverse farm was one of the most powerful communities living outside the realm of the ruins of the Cartesian world. I was not even sure about its location, all I knew was that it was so distant in time and space that nothing we knew about it was certain. I looked at Verna, but per was so concentrated on the books that I did not dare to add anything else.

I inserted the pen drive and started to work.

## 2.

I was awoken by the HM's squeals of joy. The aroma of coffee brought me back to the Monday dawns at my grandma's hut, in the good old days, when the locals gathered to share one of the few pleasures inherited from the past century before going to the shore.

"We got it!"

"Oh yeah, we've done it, people!"

The room was filled with shouts. Lurky & Jest were screaming and hugging each other in front of the computer, Verna was jumping on the bed, making some books fall down.

I did not know how long I had slept. No way of knowing whether it was day or night being stuck in that windowless basement, but for the number of used mugs, it looked as if I was the only one who had grabbed some sleep.

"I knew we could do it!" The three of them all talked at the same time, their faces showing the fatigue of excitement.

I jumped from the bed and went towards the table. On the shining screen, a neat website with a white background displayed the content in two sections: on the left, a white text on a blue background with a project presentation; on the right, a beautiful logo with two words, *arc & hive*, wrapped inside a graphic shape which reminded me of the cellular phenomenon of mitosis.

“Look, the domain’s extension is .zone.” Jest was standing behind me, staring at the screen. “Was that a geographical place?”

“No way. Never heard of it. It must have been a freed-up online space,” answered Lurky. Verna stopped jumping to grab a notebook from the floor, sitting next to me.

“Sorry to disappoint you, guys, but it was just a generic domain,” I explained.

“White was used to indicate perfection and new beginnings,” Verna muttered, opening per notebook.

The HM decided to celebrate it by making themselves another round of coffee.

“The description says it is ‘an open-source digital platform’ by the name ‘arc\_Hive’ to host ‘biomedia artwork and events,’” I read out.

Lurky handed me a steaming mug and looked at the screen from behind our backs. “I love the logo. Perhaps this graphic representation of mitosis was thought to underline the biological and polyhedral dimension of the platform.”

“Yeah... it looks as if they wanted to put emphasis on the links between the biological replication process of a single cell and the endless replicating capacity of the so-called open-source codes,” I went on, trying to show off.

“What do you mean?” Verna grimaced, taking notes by my side.

“Well, here it says that the platform was built ‘following the philosophical principles of open data and information sharing in all project phases,’” I continued.

“Never really understood what the Wirings called ‘open source,’” replied Jest, taking a seat on the other side of the table in front of the computer. I saw a pen drive plugged in. Lurky stopped looking at our screen and went to sit beside Jest.

“The Open-Source movement advocated sharing the code with users that could eventually hack them, becoming programmers in their own right...,” I started.

“Were the Wirings all capable of reading software codes? Did they learn it at school?” interrupted Jest.

“Not at all,” I replied. “Only some of them could, but that’s not the point.”

“What is the point then, you expert?” joked Lurky while Jest pounded the keyboard.

“The point here is the principle of sharing knowledge and ways of doing,” I answered in a proud tone, “which brings us to the idea that some people in the 21<sup>st</sup> century were really fighting against private property.”

“That’s not what I’ve heard,” teased Lurky.

“I mean private property of knowledge,” I growled. “Look. One of the most repeated statements here is that the selection criteria of the artwork should be ‘totally visible, clear and transparent.’”

“So, help me clarify this: was the Open-Source Software Movement the same as the Free Software Movement?” asked Lurky.

“Not really. ‘Open’ was not the same as ‘free,’” I explained.

“I know that,” smirked Lurky. “What I wonder is what a society in which everything had a price understood as ‘free.’”

“You’re the linguistic here,” Jest said to Verna derisively. “Why don’t you check it out in one of your dusty tomes, dear?”

“Let’s see what the 21<sup>st</sup>-century dictionaries said,” said Verna, ignoring the mockery and standing up to pick up a big book from the floor. Lurky grimaced and placed a hand on Jest’s knees. “I’m good,” mumbled Jest.

“There are quite a lot of entries. Let me see.” Verna sat back down again next to me carrying two tattered volumes. “Here it says that ‘free’ is something ‘provided without a charge’. Another meaning defines it as ‘enjoying liberty’. Mmm... There’s another one that says ‘clear of obstructions.’”

“I understand the links between no obstacles and liberty, but I cannot get the connections between ‘liberty’ and ‘free of charge,’” said Lurky without looking up, eyes stuck to the screen.



“Maybe they called ‘free software’ a kind of ‘free of charge’ technology that enabled them a certain kind of ‘liberty,’” suggested Jest.

“Not really, it wasn’t a question of price.” Those two knew very little about the main philosophical principles of our past. They had an extended knowledge on how to survive in the present, but very little on the situation that had brought us there. “‘Free software’ meant that you could run a program, copy it, change it, redistribute it and improve it, while ‘open source’ was a methodology that allowed you only to read the code,” I explained.

“Hold on a sec, let me go on with the report. So, could we affirm that one of the goals of this platform was to share biomedica artwork in a mutant open platform, probably with the aim of selling it in the metaVerse?” surmised Verna.

“I think we are jumping to conclusions.” I was sick of listening about virtual realities while our cold and hunger were so real. “Maybe the aim of this arc\_Hive platform was to build an online museum of biomedica artwork.”

“Why would they do something like that? Wasn’t this artwork only real in a metaVerse universe?” Lurky’s obsession started to sound suspicious.

“Not at all, it was digitalized from material work. Besides, the metaVerse was still in its infancy at that time.” The HM exchanged a glance.

“What do you mean by ‘material work’?” asked Lurky. “How can you tell the difference between virtual and material? I’m not very acquainted with people from La Resistencia, but what I do know is they considered virtual stuff as real as this chair where I’m sitting right now,” boasted Lurky.

The room turned graveyard silent. The buzzing of the computers filled the place. So The HM did know some big fish from La Resistencia.

“A must in research is reading all the available information before making any statements,” I stammered with my back bent towards the computer screen, trying to redirect the conversation. “First of all, there’s no way the digitalization, archiving and distribution of this artwork would be intended for the meta world because back then was not as it is today. Besides, this artwork has a list of characteristics that indicate differently, like... let me see... Here it is: there’s a classification of artwork regarding the substances used in its primary production, the specificities for transportation, its lifespan, and its storage needs. Apart from this, I can see here that some of this artwork was made from ‘living organisms’”

“How do you know?” Verna stopped writing for a second.

“Look, there are specific requirements regarding temperature, humidity, and maintenance. I think it must have been a kind of virtual museum aimed at — and I quote — ‘housing artwork made of living materials in a permanent state of mutation, degradation and regeneration’... and that’s probably what they called bioart,” I concluded.

“Have you just made this up, you know-it-all?” asked Lurky.

“I’m reading it from a doc called ‘pad’, smart-ass,” I retorted. “They wrote down the whole process of building the website as it was as important as the website itself.”

“What else does it say? Can you go more slowly? I need to write some of this down.” Verna wrote frantically while the HM whispered at each other.

“Ok. Look, here I’ve found a more accurate definition of bioart. There’s a list..., let me see.” The HM were wide-eyed as they stared at the other computer. “Have you found anything else there?” I asked.

“Not yet, we’re just making a security copy, that’s all. Come on, read that list.” Lurky feigned interest, but I could tell differently.

“Here bioart is defined as the kind of artwork that uses biological and living materials. And it goes on to say: ‘artwork that works in the continuum of biomateriality — from DNA, proteins, and cells to full organisms — and that can manipulate, modify or (re) create life and living processes; artwork that manipulates biological processes, intervening directly in the networks of the living organisms; artwork that incorporates and/or embodies life as a material specificity that is not reducible to other media; artwork that expands and reexamines ethical implications and status quo; and artwork that, while not being or incorporating living material explore, expands and reproblematises issues of life’...”

"I see here an obsession with understanding life as opposed to death," said Verna.

"I'm not so sure. Look at this: there is a bunch of artwork that works with dead organic materials. And there's one here that includes sound pieces. All these go beyond what they called 'living materials,'" I replied. "And they did insist on 'challenging the boundaries between the human and the nonhuman, the living and the nonliving, the natural and the artificial...'"

"Here it goes again: what did they consider as 'artificial'?" inquired Verna. "I'm confused. Look at this entry in the dictionary, it defines 'artificial' as 'not natural, made by human skill', which means that, as they considered culture as artificial, culture was understood as opposed to nature." Verna confirmed the culture of reading at the Antiverse farm. "I've also read that they considered the digital as non-material, as if their beloved Internet didn't need any infrastructure or left no prints. They looked so smart for some things and so naïve for others!" Verna looked deeply inspired by the platform's content, but I was so concerned by the HM that I could hardly listen to per.

"It could also be a critique to the death of the objects," I suggested, giving a glance at the HM.

"What do you mean?" Verna struck again.

"Well, we know that, at that time, only a few objects reincarnated. They called it 'recycling,'" I explained. "I've also read that some art was made out of litter, but I don't know if that's what they called 'crap art'. Anyway, assuming that museums were houses to immortalize what they considered 'precious objects', this platform could have been an effort to build a virtual museum for resurrected objects."

"We've all heard about planned obsolescence, but I think that didn't apply to artwork," suggested Verna. "I think that works of art were not created for use as everyday tools, but for saying things, for the transmission of knowledge, for the arousal of emotions."

"As we do with khipus and songs," I pointed out.

"Not really," claimed Verna. "We consider forks and knives as artwork, but not khipus, songs and tapestry, which are mutant codes. Things that are always becoming cannot be called 'immortal,' as death is part of their becoming."

"I'm not sure I follow you," I said.

"Consider this," said Verna, playing with per dreadlocks, "In the 21<sup>st</sup> century, death was still seen from a human perspective, that is, as the programmed-and-inevitable end of life. They still found it hard to assume that not all living organisms die on schedule, that biological immortality exists, that some microorganisms remain young until they die, and that there are biologically immortal organisms. Let alone that things are not just *objects*, as they used to say, but events, they are always becoming-with." Verna's words floated as smoke clouds. I could hardly breathe in the thick air.

"And so...?" I was starting to lose my patience.

"And so, artwork might have been considered eternal, but not mutant. I guess what they considered mutant was the perception of the work of art, not the artwork itself. Because they didn't consider what they called 'things' as living, mutant events."

I felt tired and confused. I liked Verna, but while we got philosophical about life and death, the HM were up to something.

"Maybe this idea of death was one of the reasons why they were so obsessed with leaving traces of their own existence." Verna was immersed in per notes. "Perhaps their obsession with digitally archiving events eventually made them lose interest in the materiality of memory."

"No need to criticize for the sake of it," teased Lurky.

Verna rubbed per cheek. "Well, you know. I love recalling the faces of the dead when we read their handwriting, the trail of memories left by the smell of old objects, the pleasure of feeling their texture molded over the years."

"Yeah, we've figured that out already," joked Lurky.

I started to get annoyed with Lurky's sarcasm. "Before we indulge in too much speculation, let's have a look at the kind of artwork contained in the platform and the 3D techniques used to digitize it," I said coldly.

The sneer on Lurky's face showed nothing but contempt. "Maybe this project was one of the main steps towards virtual reality-based experience."

“Of course not! 3D techniques didn’t start in the art field,” I clarified.

“Well, in a way, they did,” argued Verna. “I’ve read that the first 3D printing appeared in a science-fiction TV series from the early 1970s called *Star Trek*. They had a device called *replicator* used to duplicate things, like food and water.”

“Poor things... they didn’t know that they would run out of graphite as they did of lithium, let alone air pollution and soil contamination,” mocked Lurky.

“Well, no doubt they found it difficult to get to the root when thinking of the future,” said Verna with sadness.

“Can we concentrate on the project? We are losing focus here,” I insisted with a gesture of impatience. “Look, this website was created in 2021. By then, the first 3D printer had long been invented.”

“When was that?” asked Lurky.

“In the early 1980s, by an automobile designer,” I went on. “I don’t remember per name. At the beginning of the 21<sup>st</sup> century, the first 3D printer was first brought to the market. Twenty years later, the 3D techniques were used in all kinds of industries: fashion, education, defense, security, you name it,” I illustrated.

“I have a book on this, hold on.” Verna got up and approached the bed, searching among the scattered books. The HM remained silent. Only the buzzing, the whistling, the grinding. And the humming stove.

“Look! Here it is!” Verna announced triumphantly. “Do you want to hear the story?”

“Please!” cried the HM in unison, breaking their silence.

“It’s about the *Visible Human Project*, an undertaking of the 1994 National Library of Medicine for the digitalization of the human body to be downloaded via the old Internet. The story goes that there were two bodies, male and female. Before you say anything,” said Verna staring at Lurky, “it doesn’t say anything about bodies who were not male OR female, ok? So, the male went by the nickname Adam (a very popular one, as you may already know), but his real name was Joseph Paul Jernigan, a death-row inmate sentenced for having murdered a man who had found J.P. burglarizing his home.”

“...another terrible consequence of the times when every home was a private property,” interrupted Lurky.

Verna stood near the stove with the book opened and continued reading. “J.P. was 39 when he received the lethal injection, got scanned when his corpse was still fresh, was frozen to -70 °C, then rescanned and cut into quarters, and then into slices. The history of the female body is not as clear; apparently, the woman had died of a heart attack and her body was donated to the Visible Human Project by her husband. The imaging technology they used to accomplish this project was called MRI (magnetic resonance imaging) and CT (computer tomography).” Verna took a deep breath and closed the book.

“That’s creepy,” Lurky exclaimed.

“I know.” Verna left the book on the bed and looked back at Lurky with a serious expression. “That technology must have been very convenient for some medical practitioners, as they presumably had the command of not touching a living human body unless it was absolutely necessary.” Verna winced and started to put everything away.

“Really?” asked Lurky.

“Absolutely. They based their practice mostly on visual data, so some of them eventually came up with this idea of learning from visual stuff instead of touching,” explained Verna. “It’s hard for me to understand their ocularcentrism; it looks as if mostly all representation was only based on visual devices. I think their reliance on visual perception made them blind.”

“But it allowed them to create a 3D world. I’ve never had a taste of it, but a place without gravity must be an amazing place to be,” exclaimed Lurky.

I shifted in my chair. “No gravity means no closeness, no intimacy, no perspective. I wouldn’t call that amazing.”

“Having a taste of that kind of reality might have been what eventually led them to a resistance to change, symbiosis, situatedness,” added Verna.

“Always jumping to conclusions. Don’t write any of this in your report, please,” I said to Verna, angrily.

“And what about this imaging technology?” asked Lurky.

“What about it?” I had the impression that Lurky’s sudden chatter was intended to distract us from our task.

“Is it still in use in their hospitals?” continued Lurky.

I was about to lose my nerve. “What do you mean by ‘their hospitals?’”

“Come on! You’ve also heard about the hidden Villa up North,” claimed Lurky. “That place used by La Resistencia to heal their 21<sup>st</sup> century’s bodies.”

That was the last straw. “Why don’t you go outside to get some air? Maybe too much coffee for you, guys, don’t you think?”

Jest looked up, finally. “Ok. Give me five more minutes and we’re out.”

### 3.

Verna rubbed per eyes and squinted at the door. Per notebook lay open abandoned on one of the large tables next to the switched-off computer; per backpack full of books waiting to be picked up from the bed. I stood up and walked to the door with faltering steps.

“You won’t find them standing behind the door. They’re gone for good,” Verna said.

“And they took a copy of the arc\_Hive project with them. What are we going to do now? How could I have been so confident?”

“Let’s get out of here.” Verna shouldered per backpack and headed for the entrance.

I went back to one of the chairs, sat down and buried my head in my hands. “What are we supposed to tell the dean, eh?” I bubbled.

Verna was standing near the entrance as if the excursion was over and we were all going home for a hot bath and a deserved dinner.

“You don’t look very worried. Did you know it right from the beginning?” I asked in earnest.

Verna looked down ashamed. “There’s nothing to tell anybody. I think we should leave now!”

“Why did the dean give *me* this task, if you guys were aware of the robbery from the start?”

“I don’t know... Perhaps as a kind of *modest witness*?” Verna sighed. “Listen, I’m sorry, but there’s a lot of food in that artwork, any art gallery of the metaVerse should pay a fortune for it!”

“And what do you get from all this?” I blurted out, meeting Verna’s gaze. “The HM are going to trade it in La Resistencia, for their worlds with no atmosphere, no light, no water, no gases, no carbon, no nothing...! But you? I assumed you were the ethical warrior here!” I felt so angry! How dare any of these people act like this? I hated the HM and their smuggling with the metaVerse, even if they did it to get food for their people. I hated the dean, trying to use us to get the material ‘for free.’ I hated myself for being so foolish. But what I hated more was Verna’s role — per was supposed to be the lighthouse, not the storm.

“I got a copy for the Antiverse community. Sometimes things work two ways simultaneously, sometimes we need to get involved in the dark side to bring some light into our lives.”

Verna approached me and placed a hand on my shoulder. “Listen, there’s so much valuable information here. That ‘*Drosophila titanus*’ project? And the cultures of fungi and bacteria? They could really mean something for all of us. The disclosure of the research behind this website could help our farm go deeper into some issues we’ve been studying for a long time now. No matter La Resistencia can have a bunch of artwork to get themselves distracted, it’s a good price to pay. I’m sorry, friend, but tending these digital ruins could make a difference.”

I stood up and collected myself. “Maybe you’re right. Maybe I am the problem, I am the one who spent too much time alone in this basement, I am the one who doesn’t have a farm to go back to, I am the one who doesn’t belong to any particular community,” I moaned.

“Yes, you do! Go back to the farm where you were raised, you know we are always

welcome to return. Go and share what you've learned from the debris of the olden days." Verna grabbed my shoulder and bubbled something in an unfathomable tongue.

"I suppose this is a goodbye."

"It certainly is, as we'll meet each other back soon. And for the dean? Don't worry! *She* will be left with nothing, at least not for free!" Verna blurt out laughing. "Now, I think you should leave — the sooner the better." Per waved and left, leaving the door open.

#### 4.

The smell of salt in the air, my bare toes covered with sand.

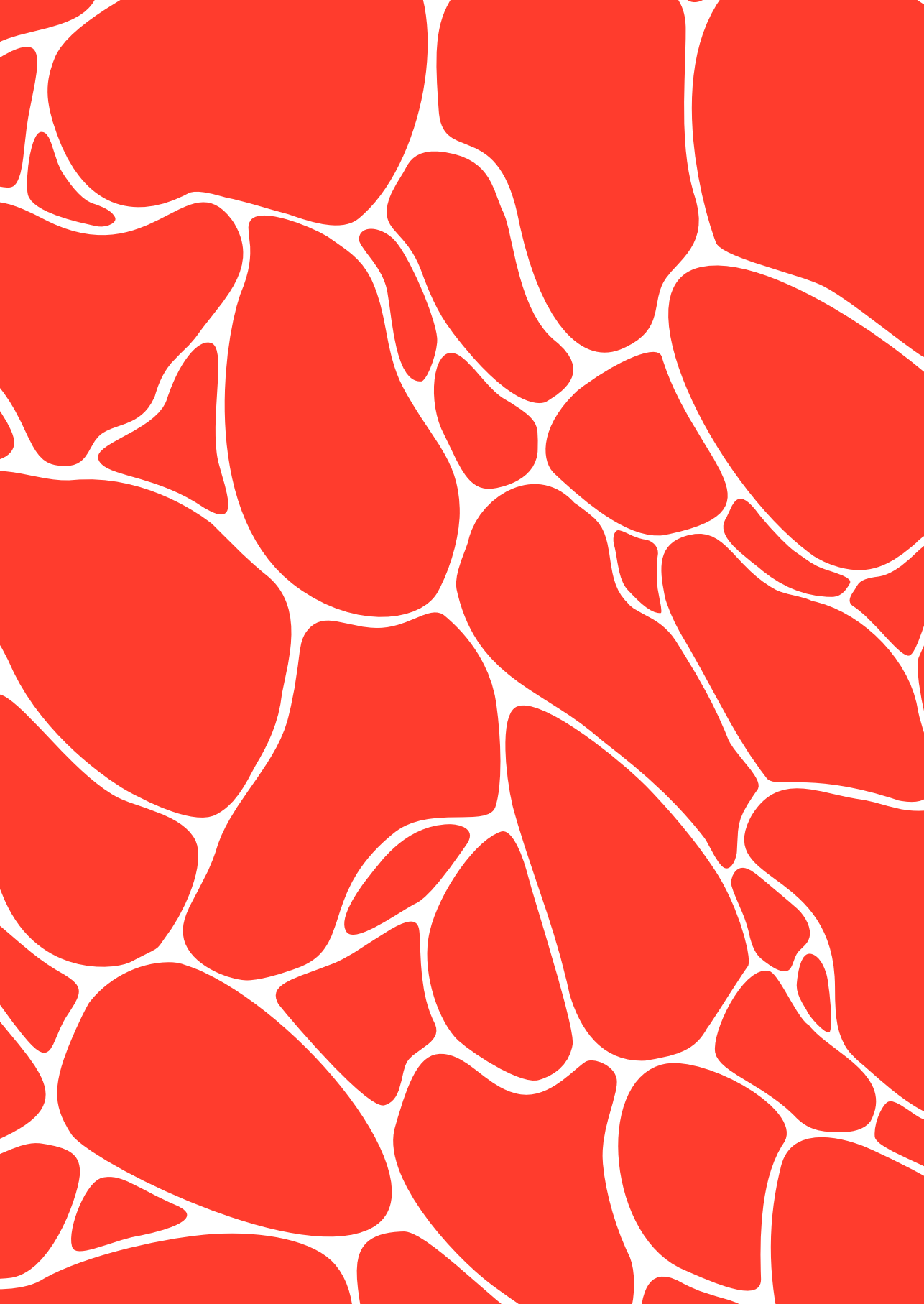
At the beginning, living on the farm was not easy — I felt dumb, my knowledge was useless here. But after a while and with everybody's help, I started to learn the ropes of community life.

It was long ago that I left the city and the debris of the Anthropocene Era; perhaps not long in time, but certainly in experience. Now I know better, my perception less polluted by shiny screens, all my senses open to the mystery of life.

I hear an albatross crying out. Tomorrow is the first day of Cleanup Week. Maybe Verna would come as part of the cleaning crew gathered to collect plastic. It looks like an endless task, but so it is with life — a constant evolution, a sympoiesis, a making-with.

So tomorrow at Midway Farm we will celebrate Life and Death, the Lost and the Living, and we'll mourn and dance as nobody in any metaVerse could ever do — with our bodies, sweat and tears, warm and cold, flesh and blood.

**Helen Torres** is a social scientist, translator, writer, and educator, focusing on the articulation between language, arts, and politics. She works as an independent researcher, holding seminars and lectures, and facilitating workshops. Informed by Haraway's cyborg, she has developed a theoretical framework on women with functional diversity, geolocated sound narratives, interactive installations, collective books and speculative writings. She has translated into Spanish Haraway's "Modest\_Witness@Second\_Millennium", "The Chthulucene Manifesto", "Staying with the Trouble", and "Making Kin in the Chthulucene: Reproducing Multispecies Justice" as well as the SF novel "Woman on the Edge of Time" (Marge Piercy, 2019). She published the novel "Autopsia de una Langosta" (2010) and the anthology "Relatos Marranos" (2014).



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ARC-  
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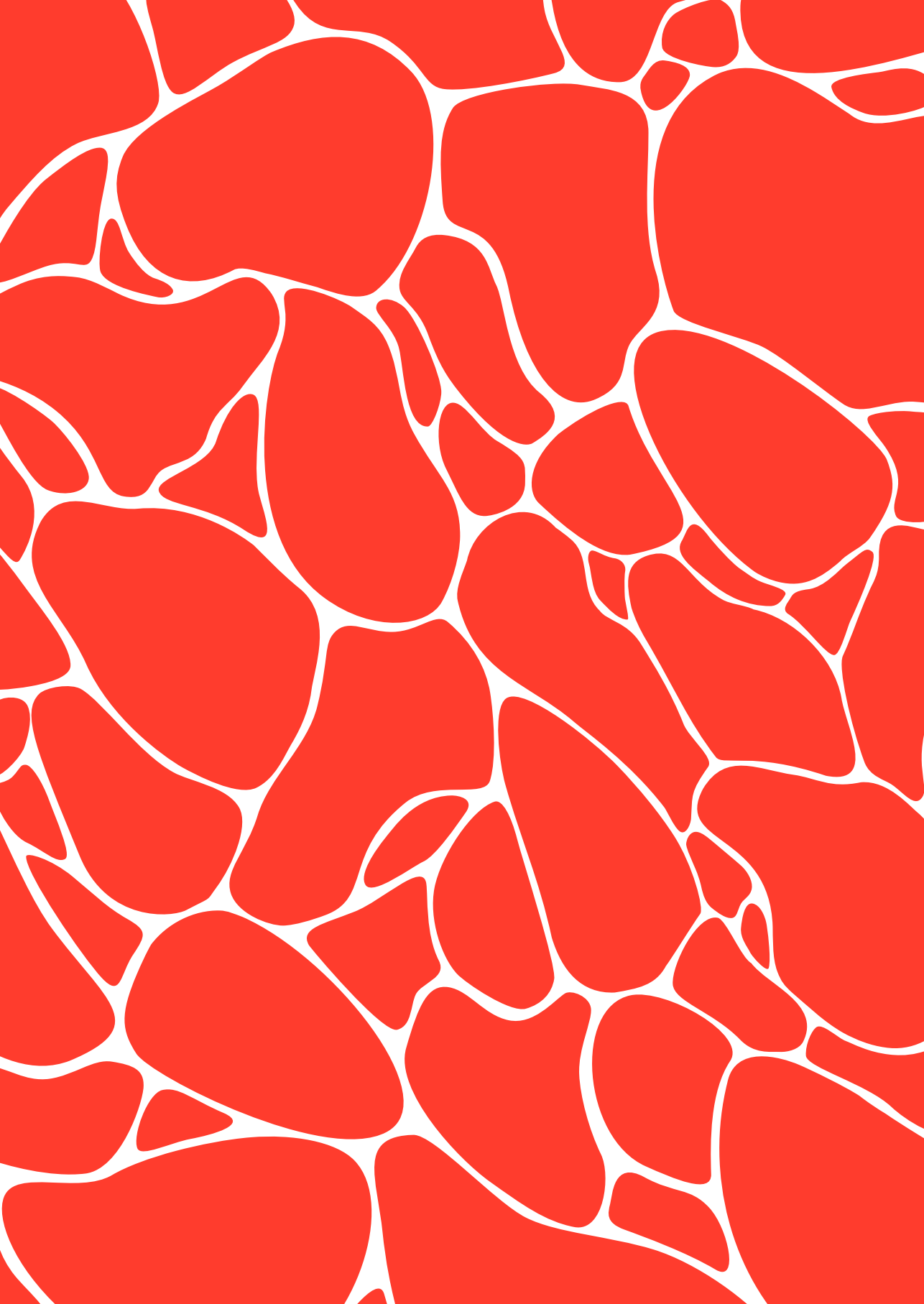
LIFE  
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# ARC-HIVE: LIFE AS AN OBJECT

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# Introduction — Life as an Object

Olga Majcen Linn

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The *Life as an Object* publication strives to create a complex discursive endeavor as a result of a symposium organized in Ljubljana by Kersnikova Institute (both symposium and publication being part of the Arc-hive project).

The symposium was inspired by curatorial and artistic experiences and discussions that had previously occurred before in private and unofficial spaces — museum and festival hallways, bars, homes. Developed and formal versions took center stage with the aspiration of creating a moment of critical change, recorded in this publication.

*Life as an Object* tackles three different themes equally important and urgent. The first is dedicated to defining the field and establishing relationships with a suitable vocabulary describing art on the intersection with life sciences/technologies. The term *bioart* has been present for years, but many practitioners agree that is not entirely adequate to define its explicit subject, not being complex or layered enough, or perhaps simple enough, to make various artists identify their practice entirely with the term. So, if the main term we are using is blurry and not describing the media, the approach, the techniques, how are we then going to define the field we are talking about? Some of the main practitioners — artists, curators that are simultaneously working as administrators, archivists, publicists, producers and so on, were invited to get involved in a critical debate about defining the field. Even though contributions and symposium proceedings seem to radiate in different directions, in the end they form a cohesive and complemented discourse.

The outset of the paper by Oron Catts is his contribution in the *Posthuman Glossary* by Rosi Braidotti and Maria Hlavajova, where he had composed the entry titled biological/living art. He explained his reluctance when doing so because defining something usually also means setting frames and boundaries that include one sort of practice and exclude the other sorts. But nevertheless, in his paper Catts profoundly shifted the notions of the field towards *life* as a crucial topic and, at the same time, the medium of *biological arts*. Coincidentally, this year, the Ars Electronica festival with its long-term dedication to the innovative field of *hybrid arts*, changed the title of this category into *life art*, and buried the initial term. A simple change can have radical implications of posing essential questions about the very nature of the art involved.

Artists Howard Boland and Thomas Feuerstein discuss the terminology of the field from the perspective of their own practice. Boland draws on the construction of origins and development of terminology in the field, especially dedicated to the term *bioart*, and illustrates his own artistic approach to the field. Feuerstein devotes his writing to analyzing the relationship between life and death, and translating these terms to contemporary art practices. Finding historical roots of the idea of creating life within art in Greek myths and western literature, he questions the role of the museum while encountering live, *metabolic art*.

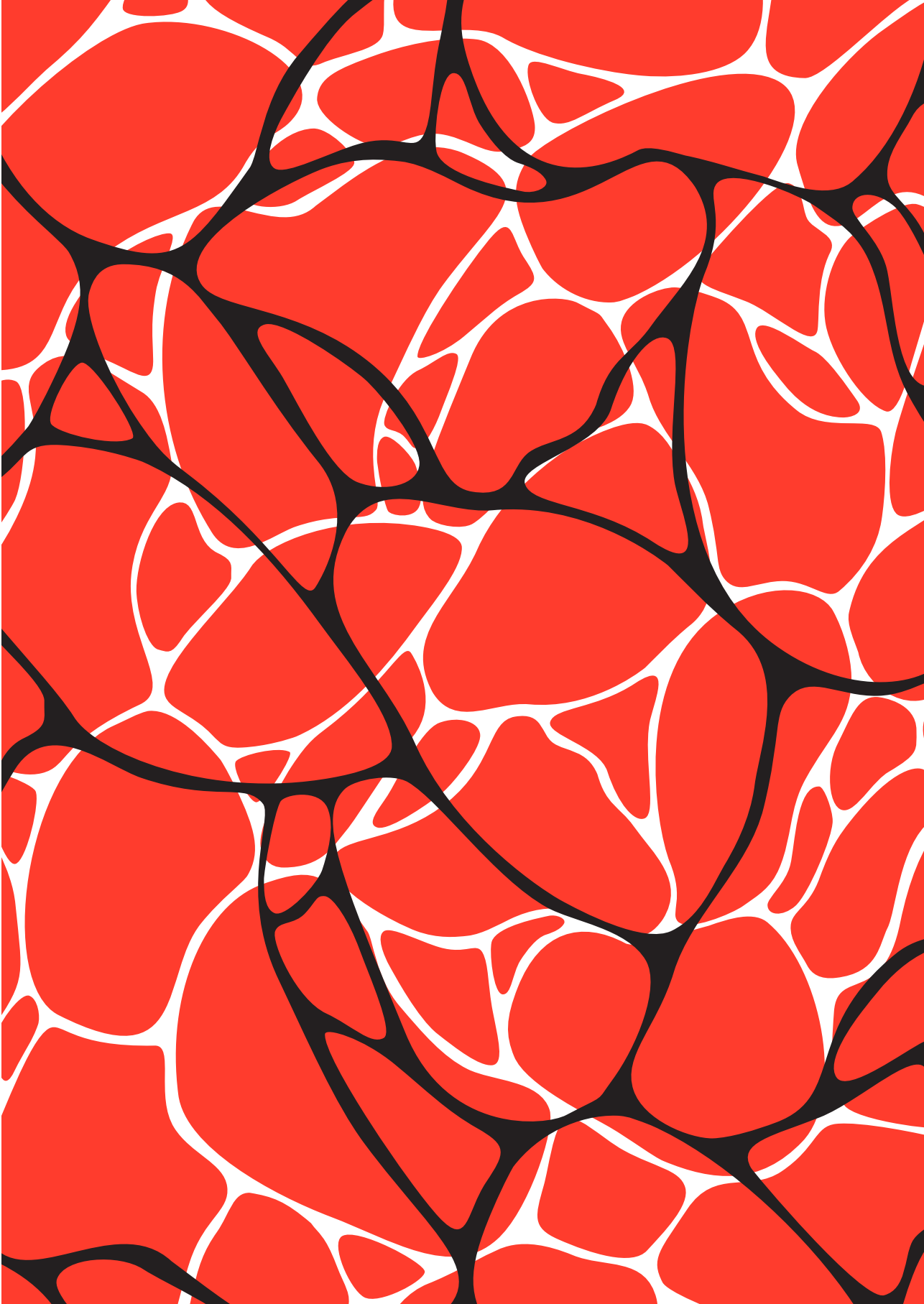
Metabolic art happens to be one of the descriptive expressions that curator and theoretician Jens Hauser agrees on with Feuerstein, but he mainly uses the term *biomedia art*, thus shifting the definition towards media itself, in addition recalling the phrase *moist media* by Roy Ascott. Being an inventor of many concepts and terms in the field, Hauser establishes a fluid relation between biomedial art and performance art. His own term, *microperformativity*, describes the processual nature of the art within the field. Besides dealing with content deriving from the staged presence of manipulated life, he also touches upon his curatorial experiences and problems in exhibiting biomedial art, intertwining questions of definitions with those of care.

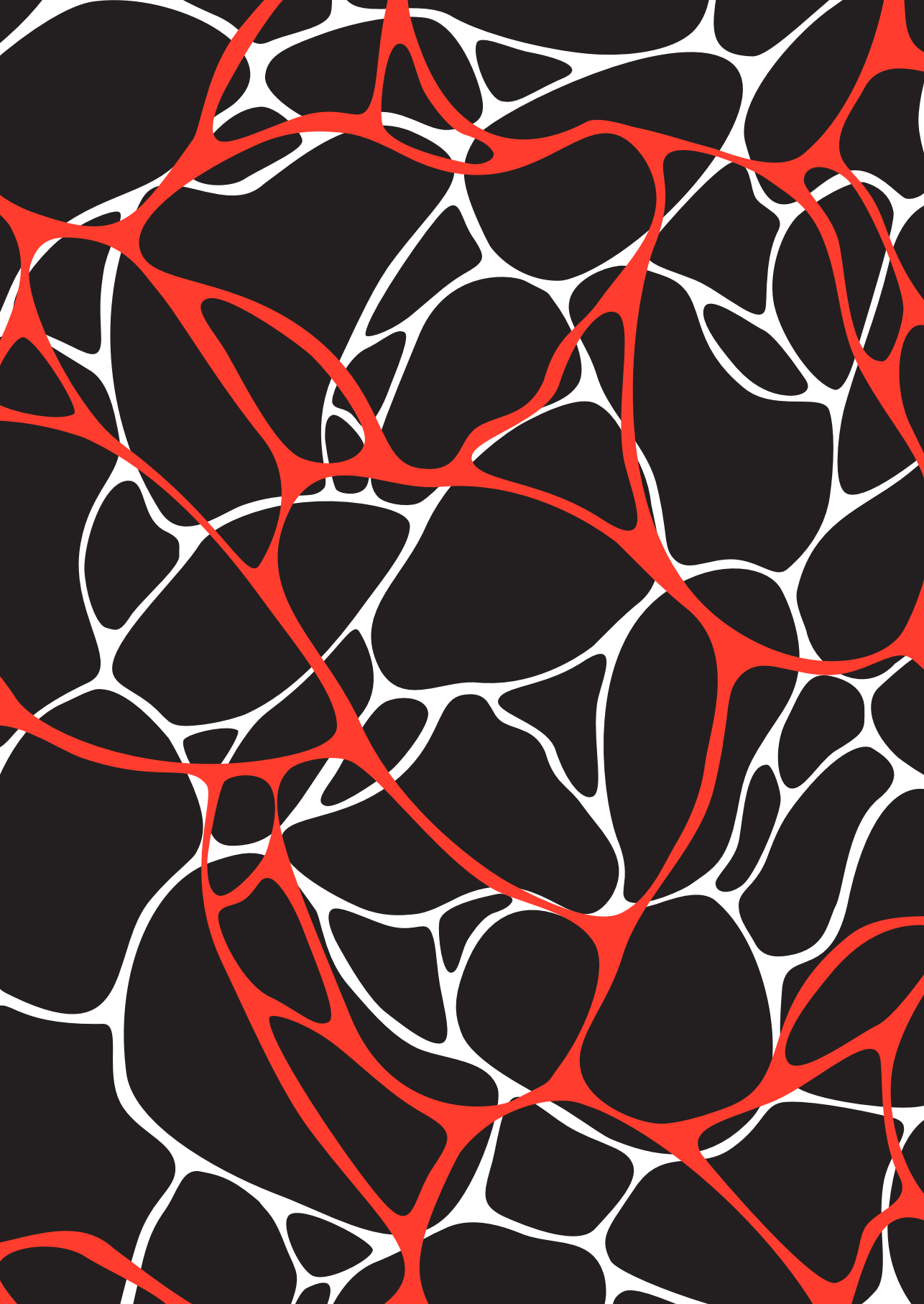
Caring for the field is the second topic most explored by artist Ionat Zurr, who exposes all the paradoxes of exhibiting life and, at the same time, objectifying it. Maintenance, care, conditions to present out-of-context life, is a very difficult, and sometimes almost impossible process. Sunčica Ostoić and I consider the idea of establishing guidelines for exhibiting life as art. There is a tension between fluid and metabolic processes and firm methodologies, but in our opinion, flexible guidelines could help with many difficulties regarding exhibiting artworks, especially the issues that are not properly addressed in most tech-riders. Guidelines in that sense serve the function of a contingency plan, which helps the curator, production team, artist, and everyone involved to bear with the exhibited fragile piece of life as art.

The third topic of the symposium was titled Learning from others. Slovenian professionals and organizations shared their decades-long acquired know-how in creating open archives in other fields. Ida Hiršfenfelder analyzes and systematizes her practical knowledge from the position of working on the digital archives projects of the Museum of Contemporary Art Metelkova. Her insightful approach offers a very serious tone to understanding archives. Rok Vevar explains his enthusiastic and hobbistic initiative of single handedly creating and managing Slovenian dance archives. Barbara Borčić elucidates the archival project DIVA station that is dedicated primarily to Slovenian video art, but also to new media art and short films.

The word “definition” has the same root as the word “definitive” or “finite”, connoting ‘the end’. Perhaps defining something gives us more clarity, sharpness, and precision by imposing exact rules and relations, but it could also close chapters making things look finished. That is why it is important to pose a question: is this going to bring more light to the field, or just more chaos and entropy? Is it going to establish a new order or more disorder? Are the manifold terms we invent still going to be carelessly attached to a fundamentally disparate artistic approach?

We hope that, with this publication, we have opened a different sort of discursive operation, with respect to the metabolic, processual, and variable nature of life as art. One that employs ontological indeterminacy, radical openness, and different regimes of representing and understanding life. One that deepens our knowledge and enables a better understanding and facilitation of the presentation and archiving processes regarding biomedial artworks. The reflection and development of understanding the field itself and its representational and care & maintenance strategies, could, in the end, affect our sensitive societal relationships.





# Post-promethean Art

Oron Catts

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In the year 2018, I was asked to contribute an entry to the Posthuman Glossary, edited by Rosi Braidotti & Maria Hlavajova. They asked me to define the field of Biological Arts/Living Arts (Catts, 2018).

Working in this area since 1996, training and hosting many artists through residencies, academic courses, and workshops as part of my role as the Director of SymbioticA, a biological arts research lab I had co-founded in 2000 and directed ever since, it seemed as a reasonable request. However, at SymbioticA, we never strived to define or limit access to the practice of art that engages with living biological systems. Therefore, like with this very essay, I found this task daunting and potentially counterproductive. I did eventually agree to provide my entry, which will be outlined later in this text. Firstly, I would like to dwell on the choices we have made at SymbioticA regarding the acceptance of researchers and artists to our various programs. Later in this paper, I will describe the links between biological arts and two interpretations and metaphors that arise from the mythological figure of Prometheus. I will deliberately avoid referring to specific artists and artworks in order to maintain a general sense of the field and allow the reader to interpret biological artworks they encounter without bias.

## **SymbioticA and its (somewhat hesitant) role in defining the field of artists working with the manipulation of life**

SymbioticA, being the first artistic research lab to offer institutional support and hands-on access to the tools of the life sciences, had to chart its own course. Based within a biological science school at an intensive research university, it was important to set it up in a way that would be familiar to our scientific colleagues with whom we shared

the building and research resources. An important lesson that Ionat Zurr and myself had learned after four years of artist-initiated residencies in scientific labs, was that we needed to address the uneven power balance between artists and scientists in such settings. When we initially approached scientists with our ideas of using their tools (tissue engineering in our case) for our own artistic explorations, we were treated like guests who were asking for favors from the proprietor. Even though the people we worked with were very accommodating, we felt that our artistic integrity was running the risk of being compromised, and our autonomy was always in question. Not to mention the need to constantly pay back favors with unpaid labor in return. Usually by doing mindless design jobs, such as posters and websites. Establishing SymbioticA as just another research lab in the science school where we were housed meant that power dynamics could be shifted to a position in which artists are considered as equals to other researchers. No more asking for favors and doing favors in return. The scientific school of which SymbioticA is part has many shared labs and resources, to which SymbioticA and its researchers have access, in addition to its own level 2 wet biology lab and equipment procured by the core researchers and other sources. All of these resources, as well as access to other labs and experts at The University of Western Australia, have been made available to residents, researchers, and students of SymbioticA. Therefore, when it comes to selecting artists and scholars who are invited for a research residency at SymbioticA, the main consideration is how well they will use these resources that are rarely offered to non-biologists. There are other considerations that we also take into account; such as the prospects of the project, getting institutional ethics clearance, and health and safety clearances. The interest has always been to deal with the broader cultural and societal issues for our newfound knowledge about life, and our ability to manipulate it. Maintaining our focus on artistic research also meant that we favored non-utilitarian projects. By this I mean that solutionist projects, such as those that claim to heal, find cures, or develop consumer products, had no place at SymbioticA. Occasionally, we would receive applications that seemed to try to use the fact that we are based in a science setting to attempt to validate pseudoscientific ideas. We had to assess carefully whether these proposals were serious or satirical. We accepted the satire. All projects needed to include an intensive hands-on lab component.

For a number of years, SymbioticA had been the only place in the world where artists could come and engage in biological arts research, in an environment where they could operate as co-equal researchers in biological labs, without the need to initiate or negotiate access. While trying not to be prescriptive, and being careful not to be biased towards types of research projects, agendas, and motivations of the artists, we were aware, to a certain extent, that our choice of who is allowed in and who is kept out would have a role in defining the field of artists working with the manipulation of life.

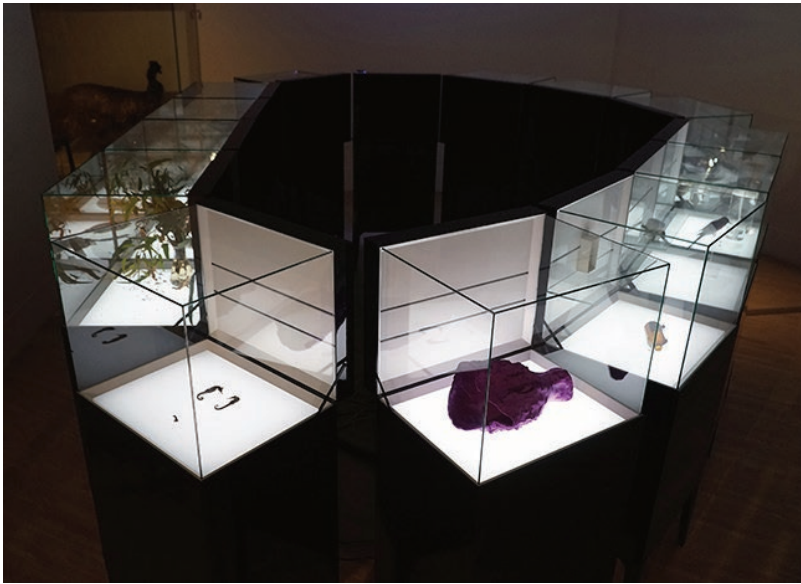
### **Extracts from and additions to the Biological Arts/Living Arts Posthuman Glossary entry**

With this in mind, I set down to write my entry to the Post Human Glossary. I started by stating that Biological Arts is:

An artistic practice that involves the use of living biological systems; in most cases the biological systems are manipulated and/or modified by the artist using technological/engineering biology as opposed to traditional modes of biological intervention. It is linked to the notion of emerging knowledge and emerging technologies. Biological Arts seem to work on the spectrum from the speculative to the actual, from the hyperbole to the disappointing, from the techno-utopian to the contestable, while using living biological systems as part of the process of art making. (Catts, 2018:p.66)

I feel that, in some way or another, most artists and most biological artworks deal with the fundamental question of what life is, and what we can do with it. To a wide extent, this





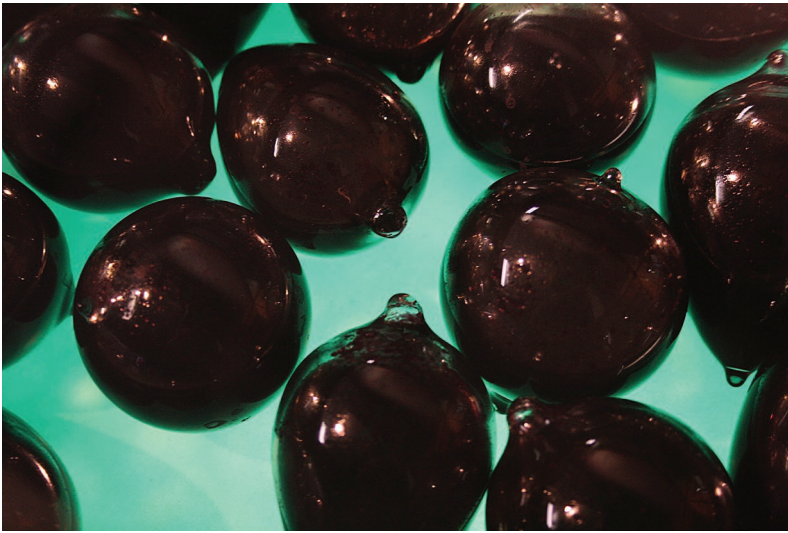
The Tissue Culture & Art project, *Biomess*, installation view, Art Gallery Of Western Australia, 2018. Image: Bo Wong. Courtesy of: Ionat Zurr and Oron Catts.



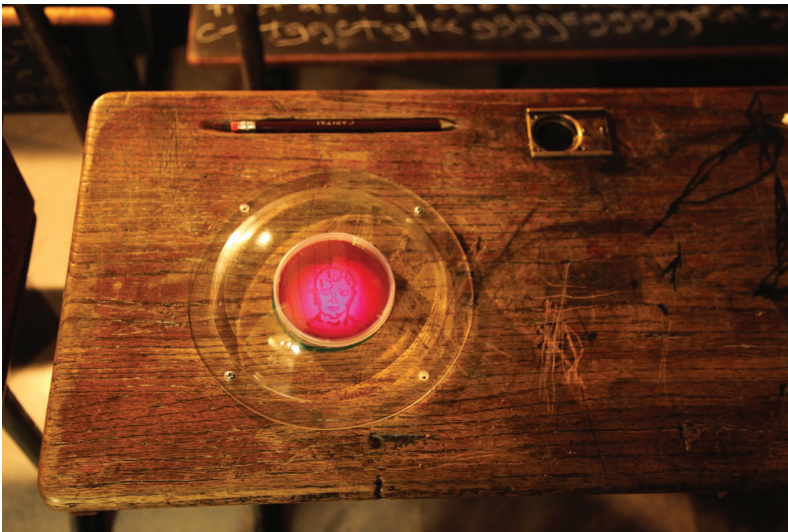
BioKino (Tanya Visosevic & Guy Ben-Ary), *The Living Screen*, 2008. Researched and developed at SymbioticA. Courtesy of the artists.



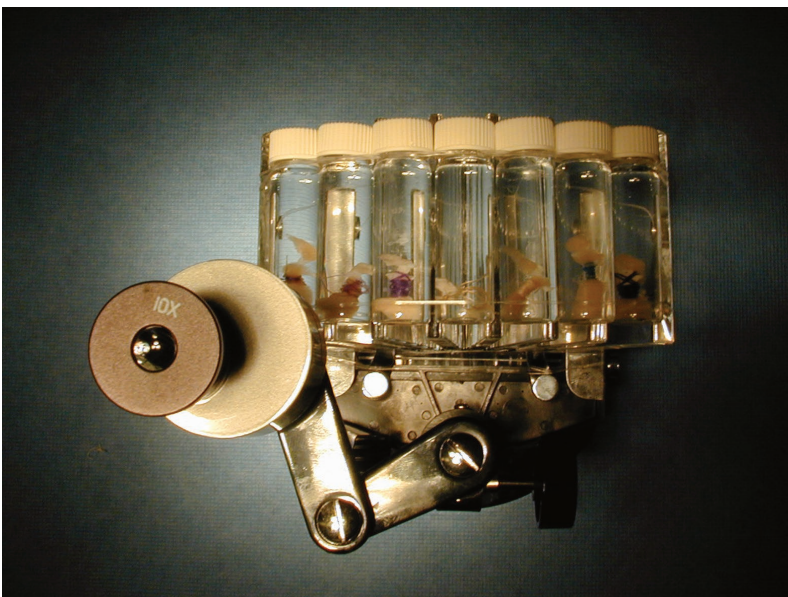
Plant tissue culture workshop led by Sebastian Cocioba at SymbioticA, 2016. Image: Chris Cobellis.



Kathy High, *Blood Wars*, Science Gallery Dublin, 2011. Image: Patrick Bolger. Courtesy of: Kathy High.



Andre Brodyk, *Proto Animate*, Science Gallery Dublin, 2011. Image: Amin Weber. Courtesy of: Andre Brodyk.



The Tissue Culture & Art project, *The Semi Living Worry Dolls*, 2000 installation view, Art Gallery Of Western Australia, 2018. Image: Bo Wong. Courtesy of: Ionat Zurr and Oron Catts.

is a fraught question, as it stems from the acute poverty of our language(s). We have one word to describe this very complex, nuanced and, sometimes, contradictory thing we call Life. Much of what happens in biological labs is confronting our long-standing cultural ideas as to what life is. This becomes apparent when “life is becoming a technology, a raw material waiting to be engineered; thus, providing a new palette of artistic expression in which life is both the subject and object.” (Catts, 2018:p.66)

Scientists and engineers are engaged daily with radical approaches to life, driven by a very focused mindset of control. In many cases, decisions about what is done to life seem to be taken haphazardly. This makes sense, as much of this research stems from reductionist, narrow, and specific “problem solving” scientific and engineering methodologies. Nevertheless, the accumulated impact of the small changes to life expose unintentional *ontological breaches*, and call for the urgent need for cultural and artistic scrutiny of the concept of life. This scrutiny goes beyond the Human to involve nonhuman agents, through direct and experiential engagement (Catts & Zurr, 2014).

Therefore, Biological Arts deals with the theory, practice, application, and implications of the life sciences. Creating a platform that actively engages in raising awareness, by proposing different directions in which knowledge can be applied and technology employed. This can be seen as cultural scrutiny in action, articulating and subverting our ever-changing relations with life. Much of the work of biological artists seems to be transgressive, trespassing into areas where ‘art should not go’. It is important to note that biological arts do not generate much new biological knowledge, but culturally frame and articulate meaning to the manipulations of life that have become commonplace within the scientific laboratory.

This aesthetically driven and confronting treatment of life by artists can create an uneasy feeling about the levels of manipulation offered to living systems. This uneasiness seems to stem from the fact that current cultural values and belief systems seem to be ill prepared to deal with the consequences of applied knowledge in the life sciences. Life is going through some major transformations, even if that might be more perceptual than actual. Through rigorous, critical, and playful explorations in the life science laboratory, Biological Arts jumpstart a dialogue that engages with the extraordinary potentials and pitfalls of our new approaches to life itself.

Arguably, Biological Arts are not a movement with a coherent manifesto; they are merely an umbrella term to describe art that uses life and living systems as both its subject and object. In 2017, a Bioart Manifesto was published, and signed by only six artists (Kac, 2017). The document seemed like closing the stable door after the horses have already bolted. It was an attempt to draw borders as to who is allowed to be called a ‘bioartist’. Interestingly, some of the signatories on this manifesto would not qualify.

There are number of artistic areas that employ Biological Arts as part of their practice, such as:

- *Critical/tactical media arts* in which the artists actively critique, question, and problematize the developments regarding our relationship to life, as well as the socio-economic contexts in which they operate (da Costa & Philip, 2008).
- *Promoting transhumanism*; different from the posthuman approach, the transhumanist agenda serves the interest of the human (or some humans) in the quest to become a ‘better’ human and, thus, transcend through advancement in science and technology into a seamless amalgamation of a technological human.
- Following a more *traditional approach*, some Biological artists follow the Formalist approach. In this approach, life becomes a raw material for aesthetic expressions concerned with form, perspective, color, composition, etc., which is supposedly devoid of socio-political context. It is interesting to note that many works that are created by people who are trained as scientists and claim to be artists fall under this category.
- *Public engagement* with life science/engineering in which the artists are seen as either

raising awareness of techno-scientific developments, or as promoting technological developments and suggesting current and future scenarios. Some initiatives have been actively trying to recruit artists to create public acceptance for technologies not yet realized.

- Biological Arts have links to other forms of art that touch upon life – for example, live art or performance art, where the human is the organism on display and serves as a subject and object; eco or environmental arts in which landscapes are being manipulated and explored. All these forms of art, like Biological Arts, are ephemeral, transient, in which they leave relics of remembrance by the end of the performative duration (Catts, 2018).

Some may trace Biological Arts to Media Arts, where the artist's engagement with new technologies and their effect on bodies and societies are the point of interest. In the case of Biological Arts, these technologies are that of the life sciences (although not all of them are new technologies!) and, therefore raise some unique considerations, sensitivities, ethics, and applications. Biological Arts are different from Speculative Biology in that they work directly with living biological systems. Avoiding the notion of the 'speculative' (with its capitalist associations), it tends to align more with the notion of materiality. Therefore, Biological Arts will be positioned on the spectrum of the actual, authentic, and contestable expressions, and further away from a fictionalized and speculative approach.

Biological Arts are sometimes referred to as bioart; however, the term 'bioart' seems to encompass more than Biological Arts, in that bioart also includes, among other things, traditional art expressions that loosely deal with the future of life, speculative Photoshopped images, and, in some cases, other branches of science not directly linked to biology.

### Biological Arts as a Promethean activity

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As human scientific knowledge about living systems increases, so does our tendency to control and shape life for human-centric wants and desires. Life is not only increasingly becoming a raw material to be engineered, but in new and complicated ways, manipulated life is being used as a cultural object and subject. Artists, scientists, designers, and engineers all play their part in this transformation of life itself. Their Promethean tendencies create a range of ontological conundrums and fantastical expectations as to what life could be, and what life can do.

Living things existed as cultural objects in all human societies throughout history, as utilitarian, ritualistic, and symbolic objects. Domestication shifted the power dynamics between humans and the non-human living world around them, resulting in anthropocentric aesthetics (Altman et al, 2022) and emotional biases driving some of the selection pressures on domesticated organisms. However, it was only at the end of the twentieth century that artists started to experiment, in a serious yet playful way, with the manipulation of living biological systems, organisms, and their parts. This might not be surprising, as the human perceived ability to manipulate living systems, from the molecular to the ecological level, becomes systemic, more predictable, more reproducible and, simply, easier. It is important to qualify this assumption, as this view is very shortsighted. In the long term, the cascading impacts of these newfound ways to manipulate life are nothing short of messy, unpredictable, and reproducible. The complexity of life and its interaction with itself and the environment is still out of the grasp of the human ability to comprehend, let alone to control. However, some forms of life manipulation have become easier and more available for artists to explore and use as a medium for artistic expression.

Using two of the ways in which Promethean metaphors have been employed might be helpful in exploring and exposing the motivations, methodologies, and outcomes of Biological Arts. There are quite a few versions of the story of Prometheus in Greek mythology, but in all of them, the Titan provided humans with the technology of fire. As

Adrienne Mayor, Research Scholar in the Classics and History and Philosophy of Science, at Stanford University tells us:

“The technology of fire gave humans some autonomy from their divine creators – now they could invent language, plan cooperatively, make tools, protect themselves from the elements and from each other, and increasingly manipulate the world around them according to their own desires. In time Prometheus’ gifts were expanded to include writing, mathematics, medicine, agriculture, domestication of animals, mining, science – in other words, all the arts of civilization. We might say that by giving men and women this basic technology, Prometheus opened the door for humans – themselves products of divine biotechné – to begin engaging in their own biotechné.” (Mayor, 2021)

She also reminds us that in Ancient Greek, Prometheus means “Foresight”, and “For the ancient Greeks, hope was not a blessing but an obstacle to realistic Foresight”.

Still, in his 1997 book “The Politics of the Earth: Environmental Discourses”, political theorist John Dryzek popularized the term Prometheanism. Dryzek’s take on Prometheanism is that, as an environmental approach, Prometheanism considers Earth as a resource for human needs and wants, where human innovation and technology will solve environmental problems (Dryzek, 1997). In this case, Prometheus no longer stands for foresight, but is rather more akin to hope in the form of techno-optimism/techno-utopianism.

Prometheus’ punishment for giving humans god-like powers is also relevant for our discussion. Tied to a rock, his liver was devoured by an eagle every day only to be regenerated by morning to be eaten again. This curse of regeneration will be considered later on. Artists working with living systems seem to occupy a spectrum, ranging from critical foresight to celebratory techno-utopianism. Most are deeply invested in the new ontological possibilities of life being both the object and subject of their artistic expression. They are acutely aware of the complexity associated with the use of living biological systems for human needs in a time of human-made ecological and health crises. More than this, artists are acting as philosophers in the wild, identifying, sometimes even without being fully aware, gaps and areas that require cultural scrutiny. Considering that contemporary life sciences and engineering are engaged with the most radical redefinition of what life is and what can be done to it and with it, artists seem to gravitate towards exploration, attempting to both make sense and nonsense of life.

Life on Earth seems to be in the midst of a perfect storm. On the one hand, life is facing its sixth extinction event, brought about mainly through human actions (and inactions). On the other hand, life is increasingly becoming a raw material in an ever-growing extractive economy. Through newly found promethean powers, humans bring into being lifeforms and living systems that never could evolve and exist otherwise. The ontological, cultural, and societal impacts of this new biology have far-reaching implications that cannot be fully grasped yet.

One of the most striking images of the late 20<sup>th</sup> century was that of a mouse with a human ear growing on its back. Made by a group of scientists in Boston, it first appeared in a 1995 BBC documentary titled *Test Tube Bodies* (Wood, 1995). The “poster kid” of tissue engineering (also known as regenerative medicine) became an overnight media sensation. The mouse with the ear on its back represented something far beyond the demonstration of scientific and technological advancement it pertained to portray. It had a strong resonance with historical artistic representations, from cave paintings, through the Dutch artist Hieronymus Bosch, and to surrealist expressions. Throughout history, human cultures have depicted a human animal chimera in one way or another. The end of the 20<sup>th</sup> century literally brought this creature to life. With its implied reference to Prometheus’ legacy and fate, it is not surprising that artists were immediately drawn to this ear-mouse. The demonstration that we can now sculpt (change the form of) a

living, breathing animal (as opposed to the slow and less accurate selective breeding or pruning of plants that have had their form shaped by humans for eons) was too difficult to ignore. This did not escape the attention of Professor Charles Vacanti from the team responsible for the ear-mouse, who, against the advice of his colleagues, chose to show the ear-mouse to the BBC journalist. Later, Professor Vacanti cut the ear from the back of the mouse and cast it in a resin block as a museum-ready cultural object. Unfortunately, and quite shortsightedly in my opinion, no museum agreed to accept it. It may be that the strangeness and newness of this type of biological/cultural object might have been too much for museums to comprehend.

In 2006, eleven years after the image first appeared, and after numerous artistic and popular culture depictions of a mouse with a human ear on its back, Professor Vacanti did another curious thing. He submitted and received a USA copyright registration for depicting the ear-mouse as a sculpture, photograph, and drawing (Vacanti, 1995). Through this action he tried to control the cultural manifestations and public imaginaries of this significant life as a cultural object. Needless to say, he was too late, and as lawyers advised me, it was a futile exercise. The ear-mouse maintained its resistance to be confined to the prescribed narrative of its human creator, like with the gift of fire, or Frankenstein's creature, its fleeting existence as a living Promethean object opened so many new and uncontrollable possibilities. Even though artists such as Joe Davis (Wikipedia contributors, 21<sup>st</sup> December 2021) and George Gessert (Wikipedia contributors, 24<sup>th</sup> February 2022) have been working with biology since the 1980s, the late 1990s saw a growing number of artists begin to explore a wide range of biological technologies as their medium of artistic expression (Catts & Zurr, 2017). Arguably, the ear-mouse, a tangible example of the realization that humans can sculpt living biological beings, acted as a creative trigger to imagine the extent of the possibilities of things to come.

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Thirty years on, tissue engineering, the same technology that brought about the ear-mouse, is still struggling to fulfill its original promise of providing spare body organs on demand. Even a relatively simple organ, such as the external ear, has not been successfully implanted into a human. In the last decade, more and more tissue engineers have pivoted tissue engineering technologies to the production of non-medical products. They call it *cellular agriculture* (New Harvest, 2022). One of the stated aims of cellular agriculture is to grow animal products without the animals; products such as meat, milk, and leather are to be grown in culture, and not as part of the body of an animal. As Isha Datar, CEO of New Harvest, one of the main organizations that promote cellular agriculture, put it in her 2021 TED talk: “Rather than raise a whole chicken with beaks, feather, sentience, we grow meat directly from muscle cells” (Datar, 2021). This notion can be compared to the idea that one of the 18<sup>th</sup> and 19<sup>th</sup> century industrial revolutions’ outcomes was to transfer labor from sentient biological agents – workers, slaves, and working animals – to non-sentient machines. This resulted in a massive reorganization of human societies, labor relationships, and ideas about the Other. Cellular agriculture considers itself to be part of the so-called fourth industrial revolution. Part of the rhetoric of the fourth industrial revolution is the promise to bring sentience to the machine through artificial intelligence and autonomous technologies while, as Datar points out, removing sentience from biological entities through biotechnology and synthetic biology, for the sake of increasing productivity and efficiency. This reversal of roles concerning sentience raises a range of issues that require a new set of tools in order to engage and understand the implications of the human relationship with the ideas of sentience, bodies, and life itself. Artists have identified this ontological minefield as early as the mid-1990s.

This is but one of a range of areas explored by artists working with biology in the last three decades (Catts & Zurr, 2018), and it comes at a very interesting time. A time when the roles of various actors dealing with redefining our relationship to life is in somewhat of a flux. In retrospect, and with quite a lot of romantic nostalgia, the 20<sup>th</sup> century looked like a time during which different professions had defined their roles in knowledge production, application, and meaning making. A time when science was about making



Symbiotica Bioart  
Workshop, Stavanger  
Norway, 2008. Image:  
Tuur Van Balen.



Symbiotica Art  
Biotech Workshop,  
RMIT Melbourne,  
2009.



The Tissue Culture &  
Art project, *Biomess*,  
installation view, Art  
Gallery Of Western  
Australia, 2018. Image:  
Bo Wong. Courtesy  
of: Ionat Zurr & Oron  
Catts.



Janet Osborne, *Making Sin*, 2005. Research undertaken at SymbioticA. Image and courtesy: Janet Osborne.



Oron Catts isolating cells at Harvard Medical School 2000. Image: Ionat Zurr.



The Tissue Culture & Art project, *Biomess*, installation view, Art Gallery Of Western Australia, 2018. Image: Bo Wong. Courtesy of: Ionat Zurr & Oron Catts.



verifiable knowledge, making facts. Art was about making sense and meaning by making strangeness. Technology and engineering were translating knowledge into useful things, and design was making needs and wants, translating meaning and use into desires, while remaining firmly grounded in reality (Catts & Zurr, 2020).

The 21<sup>st</sup> century is witnessing a kind of a collapse of these idealized social contracts. There seems to be a crisis of reproducibility/replicability in science, where, in some cases, up to 70% of published research cannot be replicated. Furthermore, scientific discoveries now make strangeness more than any artwork ever did. Art, in particular the type that deals with emerging knowledge and knowhow, seems like a neoliberal tool with which to sell the innovation paradigm. Technology/engineering is plagued by Silicon Valley's "fake it till you make it" attitude, and there seems no limit as to how much it can exaggerate and imagine. Design, meanwhile, is losing its grounding in reality, and becoming a speculative hype-engine (Catts & Zurr, 2020).

When it comes to technological approaches to life, techno-fetishism tends to overshadow the context in which life operates. It seems that the biological milieu is transformed into an abstract technological instrument of control, where life is just another raw material to be engineered. Decontextualised life has been reconfigured, mixed and remixed, re-appropriated, and instrumentalised to such an extent that the technologically imagined potential of life stands for life itself. The fantasy or the illusion of control over life is growing in prevalence as the extractive gaze is being turned towards life.

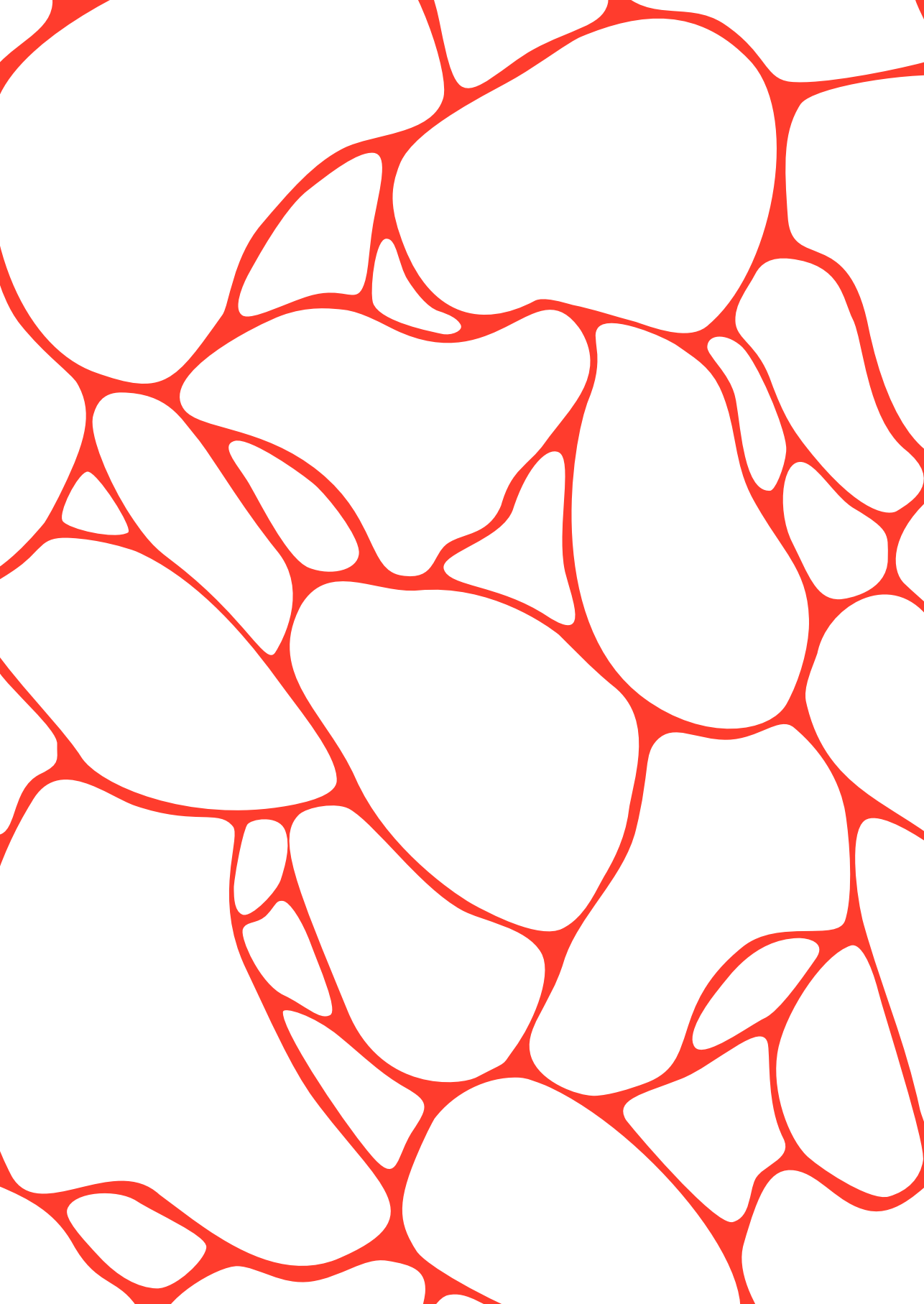
Artists working with living biological systems seem to be co-opted, willingly and unwillingly, into the rhetoric of Prometheanism. Works that were originally conceived by artists as contestable objects for cultural contemplation, or as cautionary tales, are used as part of a narrative of value extraction and control of life. Some artists prescribe to such a rhetoric, believing that engineering living systems will somehow bring about a change for the better in human, nonhuman, and ecological futures. But others argue that any interactions within unequal power structures, when one side (humans/artists) attempts to impose their will over the other, is by definition a violent act. The romantic idea that biological art is an act of cooperation and companionship between the artist and life as an object should be questioned.

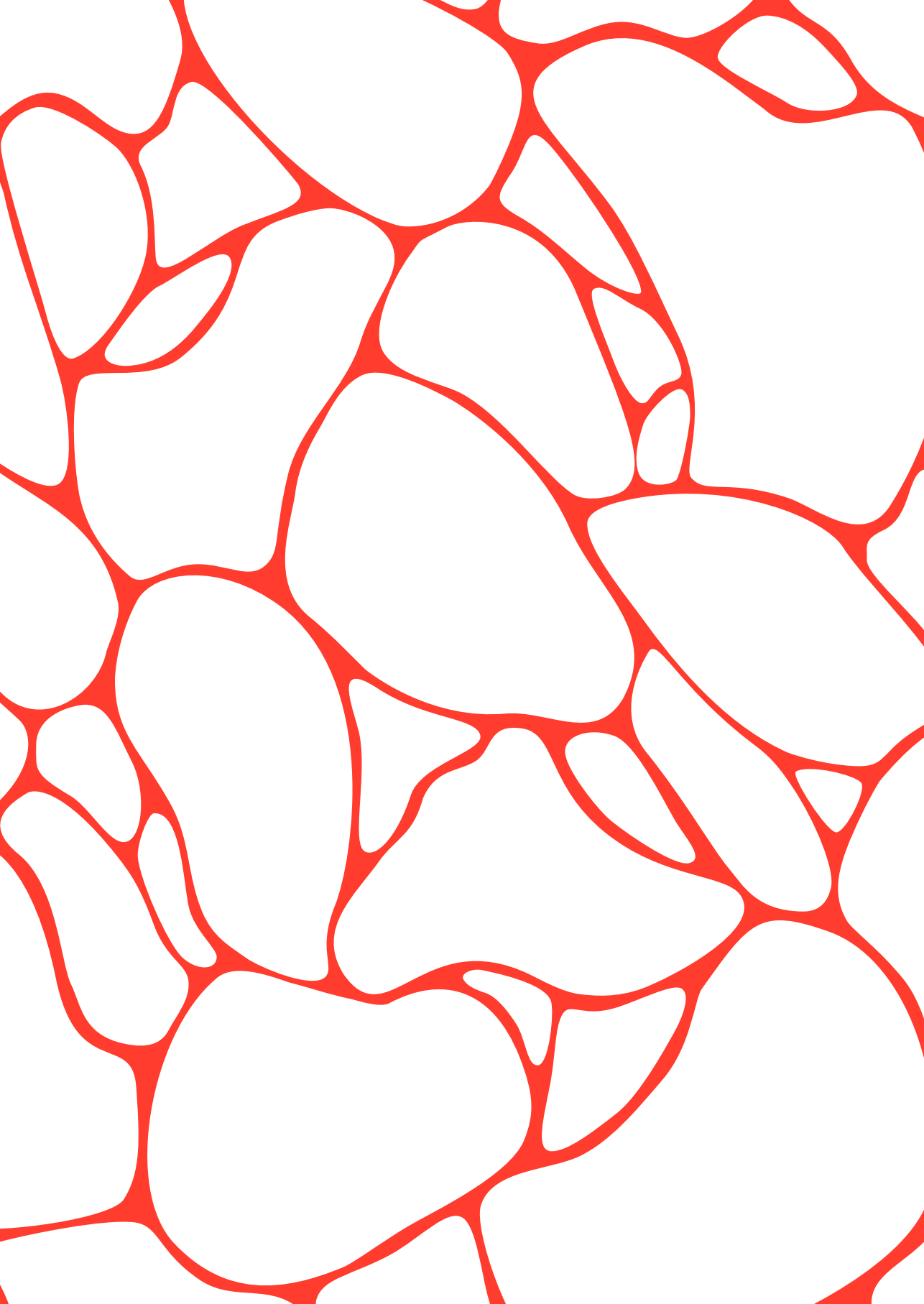
Prometheus' shadow looms over the different manifestations of technological and artistic interventions with living systems. Life as an object and a subject of artistic expression requires us to go beyond different readings of Prometheus, or any other god or titan. Divine *biotechne* might not be the right metaphor for the perceived and actual power humans exercise upon life. It is time for post-promethean art to emerge; art armed with foresight and humility.

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**Oron Catts** is the Co-Founder and Director of SymbioticA: The Centre of Excellence in Biological Arts, School of Human Sciences at the University of Western Australia (UWA), and was a Professor of Contestable Design at the Royal College for the Arts, UK. Together with Ionat Zurr, he founded the Tissue Culture & Art Project. From 2000 to 2001 he was a Research Fellow at The Tissue Engineering and Organ Fabrication Laboratory at Harvard Medical School. Catts curated thirteen exhibitions, published/co-edited four books, published more than seventy book chapters and journal articles. His work was featured in exhibitions at venues such as MoMA NY, Centre Pompidou, Mori art Museum, Science Gallery London and Dublin, Yerba Buena Center for the Arts, Ars Electronica, National Art Museum of China, and more.





# Bioart: An Immersive Perspective

Howard Boland

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Biosciences' systematic investigation into life processes has opened fascinating opportunities for artists. Captivated by these malleable prospects of manipulating life, artists have responded through an array of contributions using both traditional and contemporary media. A small but growing community of artists often referred to as bioartists have sought to explore the living as an artistic medium itself. However, this approach requires specialised skills and access, leaving many to rely on scientific collaboration. Few artists have adopted scientific methods but still, these outcomes tend to address metaphorical concepts and do little to reveal any meaning on a biological level. To move beyond the metaphorical use of living media requires weaving artistic and scientific understandings. The implications of connecting these aspects generate a different type of presence that aims to expand the understanding of the non-human. Immersive biological art practice is an investment in resources and, while nascent, it is needed to create a similar opportunity space as artists working deeply within digital media.

Bioart is an area where art meets biotechnology. It deals with living matter from a post-biological perspective with its new material conditions emerging from modern biotechnologies such as tissue engineering, genetics and nanobiotechnology. The ways in which artists find their place in the vast knowledge area of the biosciences suggests there are many different readings of bioart depending on the type of engagement.

While debates suggest that bioart's subject boundary lies in the manipulation of biological matter at a specific level (e.g., genes) and towards artistic purposes, neither the definition (below) nor the use of media remain unchallenged.

[Bioart] is first and foremost an ephemeral and process-based art of transformation *in vivo* or *in vitro* that manipulates 'biological material at discrete levels – be it cells, proteins, genes or nucleotides – creating displays which allow audiences to partake of them emotionally and cognitively' (Hauser, 2005: 185; Kac, 2007) and whose status is still largely unclear (Hauser, 2006).

Bioart, as an interdisciplinary hybrid art practice, deals with knowledge processes that impinge on the biosciences.

In recent years, biotechnology has dramatically increased our ability to transform life (Mosier & Ladisch, 2011:p.3). Moreover, 'the greater understanding of life processes has also brought an increasing potential to control and exploit them' (i.e., genes are now routinely transplanted from one species to another) (Goldsmith & Zimmerman, 2001). Projects like the Human Genome Project with the sheer volume and complexity of data generated have made the biosciences dependent on developments in computation (e.g., DNA sequence analysis) and generated a hybrid field known as 'bioinformatics'. These developments have opened the field to public controversies and generated fascinating but unsettling notions surrounding technology and life. How this knowledge is disseminated affects our attitudes on many levels. This is also where art can play a significant role through its ability to deliver empathic, reflective and provocative ideas. For bioart, such notions are taken further in the sense that artists become immersed in the biosciences in order to scrutinise and retrieve a sense of ownership of what is at stake.

Bioart has a fluid subject boundary and many terms have been used to describe art practices involving the biosciences (e.g., 'genetic art', 'transgenic art' and 'biotech art'), reflecting the many entry points and adjoining areas. For instance, prior to the use of 'bioart', George Gessert, an artist and theorist in the field, employed the term 'genetic art'<sup>1</sup> to describe a broader artistic area that included paintings of chromosomes, breeding projects and transgenic organisms. However, 'genetic art' has also been understood as a specialised area requiring scientific expertise and used to describe computer 'simulate[d] processes of life' (Gerbel & Weibel, 1993).

The development of multiple terms is indicative of specialised areas forming within the umbrella term of bioart such as 'biotech art' and 'bio-ecological-art' (Gessert, 2010:p.xix). The term 'bio art' is claimed to have been coined by artist Eduardo Kac in 1997 (Kac, 2007). Its definition points to the use of 'discrete manipulation' and can be seen as an expansion of the term 'transgenic art' (also coined by Kac):

Transgenic art, I propose, is a new art form based on the use of genetic engineering techniques to transfer synthetic genes to an organism or to transfer natural genetic material from one species into another, to create unique living beings. (Kac, 1999:p.1)

Kac's formulation situates bioart practices within the realm of modern biotechnology and moves conventional uses of bio matter to the fringes of its subject boundary. Many scholars have proposed differentiating 'bioart' and 'biotech art' to separate artworks employing modern biotechnology as a more specific area of bioart (Bureaud, 2002; Tomasula, 2002).

Even definitions that consider bioart to involve *in vivo* and *in vitro* techniques that manipulate biological matter at discrete levels are thrown into question when considering how deeply integrated certain branches of biotechnology (i.e., genetics) are with information technology. Combining these ideas, media theorist Eugene Thacker has proposed the term 'biomedia' as a concept that reminds us that manipulation of bio matter is a configuration that takes place in both digital and biological domains.

The first widely recognised artwork that manipulated living matter on a genetic level was Steichen's Delphiniums<sup>2</sup> by the renowned photographer Edward Steichen (Gessert, 1993). These giant delphinium blooms – the result of Steichen's mutagenic breeding practice – were described as 'breathhtaking' (Gedrim, 1993).

<sup>1</sup> Appropriated from Computer Art (Gessert, 2012:p.120).

<sup>2</sup> Exhibited at Museum of Modern Art, New York, 1936.

Whilst bioart has ties to ‘ecological art’, ‘land art’ and ‘animal art’<sup>3</sup>, it was only in the mid-1980s that a few subsequent artists<sup>4</sup> started exploring the manipulation of biological matter as art. During the 1990s and 2000s, the number of artists had become significant enough to discuss these activities as a field<sup>5</sup>. Coming into the 2000s, there was an expansion and proliferation of interests amongst artists from various adjoining subject areas<sup>6</sup>.

Several artists have used recombinant bacteria to produce visual art.<sup>7</sup> The most iconic of genetic artworks to date is Kac’s GFP Bunny (Kac, 2000), which paved the way for art involving genetically modified animals. Whilst GFP Bunny remains speculative in its production and presentation (Davis et al., 2006:p.2; Anker & Nelkin, 2004:p.95), Kac later developed *The Eighth Day* (Kac, 2001) featuring a terrarium of living transgenic organisms (transgenic mice, bacteria, fish and plants) borrowed from scientists. Despite many early ‘bio artworks’ involving living organisms, most lend themselves to traditional art practices rather than adopting scientific methods. Such focus on representation alone tends to circumnavigate actual material engagement, biological meaning, and provide a limited if not anthropomorphic account of biological media.

Bioart cannot be discussed without accounting for performance artists using their bodies as a site to explore biomedicine and ownership.<sup>8</sup> It has been argued that there is a structural relationship between performance and bioart, which are connected through the ephemeral nature of the material and their methods of preserving artworks (Hauser, 2005:p.184). Indeed, the subsequent expiry date or cessation of life means that bioart often ends up as inert or in the form of documentation. Like performance art, documented bioart shares a reference back to its authentic process — the living. While it removes the presence of the living, documentation can provide bioart with much-needed mobility given financial, legal and material constraints of reproducing such works across countries and regulatory frameworks.

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The increasing number of artists drawn to bioart and the problem of laboratory access has led to the escalation of DIY bioart practices and further, the novel subversion of scientific tools (e.g., Rüdiger Trojok) to produce alternative representations. These artists reflect on how these practices often need to build their tools, representations and aesthetics different to those born out of the biosciences. However, much use of actual biological material (i.e., tissue, bacteria and viruses) is under legislation limiting this type of practice.<sup>9</sup> An additional challenge for DIY practices is the ability to process material in an iterative and consistent manner that often requires expensive and highly specialised equipment.

3 Through artists such as Alan Sonfist, Joseph Beuys, Agnes Denes and Hans Haacke in the 1960s and 1970s.

4 Of note, Gessert developed an Iris breeding practice (Gessert, 2002) and artist Joe Davis embarked on a practice employing genetic engineering with his work *Microvenus* (Davis, 1986) where synthetic molecules of DNA were presented as art.

5 Noteworthy contributions include: Oron Catts and Ionat Zurr tissue engineering practices at Harvard University (2000-2001); Adam Zaretsky’s work with Davis using bacteria (Nadis, 2000:p.670); and Kac’s collaboration with scientists to produce several transgenic artworks (Kac, 1999; Kac, 2000; Kac, 2001).

6 E.g., Marta de Menezes used micromanipulation techniques to create patterns on butterfly wings (de Menezes, 2000). Natalie Jeremijenko and Eugene Thacker explored bioinformatics, ‘personalised lab’ and aspects of DIY genetics (Thacker et al., 2004).

7 E.g., Davis (Davis, 1986), Kac (Kac, 1999), Al Wunderlich (Wunderlich, 2001) and the activist art group Critical Arts Ensemble (CAE) with Beatriz da Costa (Critical Art Ensemble and da Costa, 2001)

8 E.g., Stelarc, Orlan, Jennifer Willet, Adam Zaretsky and Kira O’Reilly.

9 The most well-known case involved the prosecution and later acquittal of the US-based artist Steve Kurtz, member of CAE. The case illustrates the challenges involved in developing research using biological materials and tools outside the confines of laboratory spaces (Gere, 2005; Lynch, 2007).

While many bioartworks use naturally occurring organisms and phenomena, few practices engage in the manipulation of bio matter in formal scientific contexts. In its brief history, bioart has seen multiple modes of expression but continues to focus on speculative approaches which reveal that the production and manipulation of organisms on discrete levels is not within the range of most artists outside collaboration with scientists. This suggests a need and opportunity for artists to explore bioart potentials through deeper assimilation of scientific aspects into their art practice.

## Matter, mediation and presence in bioart

### Post-biological & Bio matter

The period leading up to the 2000s was underscored by a media frenzy with imagery and discoveries suggesting that the biosciences were radically transforming nature. Prominent examples include the Vacanti Mouse, Dolly the Sheep and The Human Genome Project (Gaskell & Bauer, 2001:p.4). Artists influenced by these signs (e.g., DNA, chromosomes, genes, etc.) and opportunities sought to express themselves using different media ranging from traditional depiction<sup>10</sup> to computational art<sup>11</sup> and the use of biological media itself. One of the key questions was whether artworks responding to the post-biological using thematic representation should be included in the classification of bioart or only those using biological media. As will be discussed, the use and presence of living matter constitutes a significant departure and should be used to define bioart.

Artists exhibiting an interest in the processes of life is hardly a new phenomenon. For instance, much of the art production of the 1950s and 1960s was concerned with the 'blurring of art and life'<sup>12</sup> (Kaprow, 2003). Interactive and participatory practices also served as models for computer-based or 'digital art'; however, the representational function of computer-based systems is less fixed than earlier representational forms (e.g., animated pictures or film sequences) (Heibach, 2000) and includes biological approaches using 'genetic algorithms' towards the production of 'artificial life'. It has been argued that in light of programmatic strategies in 'networks',<sup>13</sup> 'genetic art' as in computer-based art is 'almost totally devoid of meaning' (Hauser, 2005:p.184). However, the integration of information technology in modern biotechnology complicates this separation in that they both configure biological materiality. Biomediality as an alternative concept to bioart refuses to separate this domain and suggests that biological materiality encompasses a dual investment in the capacity of informatics to enhance biological materiality (Thacker, 2004:p.6). Instead, biomediality is a configuration between the digital and biological through information flow that becomes internalised in the biological and mediated as biological processes. This is different to hybrid configurations (e.g., mechanical prosthesis) where the biological is partly replaced or extended by technology; rather, as Thacker puts it, with biomediality, "technology" appears to disappear altogether' (Thacker, 2004:p.6).

To discuss biomediality as a medium in itself is therefore to account for the processes and functions of the biological and to inquire both technically and philosophically into the question of "what the body can do?" (Thacker, 2004:p.6). This is critical to the understanding of how bio matter is dealt with in my practice – that is, as a medium involving techniques that enable a different order of extended capacities (i.e., novel expressions or properties) in the living to emerge. Notably, even for the artists adopting a material practice of bioart, the suspension between material and information captured in biomediality is seldom employed or discussed; instead, the material distinction in bioart is argued

<sup>10</sup> Paintings such as Alexis Rockman's painting 'The Farm' (Rockman, 2000).

<sup>11</sup> E.g., Ken Rinaldo's 'Machinic Diatom'.

<sup>12</sup> From 'Fluxus Art' (e.g., John Cage, Beuys and Allan Kaprow) and later with 'dematerialised art' (Lippard, 1973:p.43) and 'conceptual art' where 'the idea becomes a machine that makes art' (Lewitt, 1967:p.1).

<sup>13</sup> Such as transgenic art and cloning.



more broadly through a presence of the living.

Whilst virtual representations are of metaphorical, conceptual and symbolic nature, bioart presents the audience with the living, a presence that shifts both the artist's and the audience's positions in that the living matter is expressing an extended capacity (of a different order) staged by the artist. Presence is here understood as what is tangible to the human body (Gumbrecht, 2004: xiii) in the sense of occupying the same space. It suggests that presence is part of the aesthetic of bioart and that to produce such a presence is to create an experience of the living through media rather than through representation.

The contradistinction between representation and material presence involves discussions of complex ontological issues. However, if we consider a 'standard approach' to mean a 'type of experience' (Floridi, 2005:p.657), then in terms of bioart the produced presence would be an experience of the living as media rather than a representation. This suggests that bio matter in its presence is an aesthetic component of bioart.

The nature of bio artworks has opened a series of questions around authenticity as it is difficult for the audience to verify what is going on, leading some artists to 'stage an authenticity'.<sup>14</sup> Claims that the artists working with speculative and even hoax-like aspects of bioart are profiting from 'the impossibility of certifying biological processes as genuine' (Hauser, 2005:p.185). It suggests that bio artworks are indeed tapping into genuine biological processes, but are unable or unwilling to disclose evidence of that. Certainly, it can be challenging for an audience to verify claims, and artists may purposely choose to equivocate when it comes to methods and the nature of a work. The need to 'stage an authenticity' is indicative of bioart involving epistemological and ontological questions surrounding our ability to verify such outcomes.

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Materiality in bioart involves a departure from immaterial concerns (e.g., thematic representation and genetic algorithms in digital media) towards a focus on living material as a subject in its own right. Thacker's proposed 'biomedia' concept reminds us that, while different from new media, the manipulation of bio matter (e.g., genetic engineering) is a configuration that takes place in both the digital and biological domain. In addition to bioart having metaphorical signification that fuels specific ethical, political and social debates, bioart is also capable of partaking in processes that deal with the biological signification of the material itself. In this sense, my practice, as discussed in what follows, is more aligned with Thacker's idea of biomedia by investigating extended capacities in bio matter.

## An Immersive Practice: Art & Synthetic Biology

My strategy has been to engage in a material approach that requires the adoption of specific contemporary scientific methods, that is, synthetic biology. Synthetic biology is a fast-moving field that brings both new methods and materials to molecular biology by adapting engineering approaches. My specific use of synthetic biology involves standardised parts that make it possible to change genetic components more readily and further access a library of exchangeable genetic parts (Endy, 2005). The laboratory context of my practice aims to explore how language, material and methods can extend artistic possibilities by investigating scientific processes. As such, in the case of my practice, the scientific involvement has been profound, challenging and time-consuming.

To move beyond the metaphor of using living matter requires a specific braiding of artistic and scientific understandings. Thus, the practice attempts to graft scientific

<sup>14</sup> E.g., TC&A's *Pig Wings* (Catts & Zurr, 2000) where audiences were invited to touch what is displayed.

methods onto the artistic practice in a manner that accounts for biological significations and suggests a different mode of bioart that has ontological implications that can open a broader set of biological expressions concealed from our usual sensory experience. My practice explores both modified and natural organisms. In working with modified organisms my focus is on eliciting behaviours of molecular origins, whereas using natural organisms has been about understanding how natural capacities can be redirected to create experiences.

### Transient Images

*Transient Image* (Image 1) explores how bacteria are capable of degrading a textile dye known as azo-dye that can be mutagenic and cytotoxic. Using bacteria (mostly *Clostridium*) donated by the London sewer system, the work involved creating images at varying speeds of degradation by changing the amount of bacteria added to a grid of small bottles each containing a dye-media mixture. The image forming process hinted at a slow forming 'bio pixel' where an image briefly appears in an 'in-between' state forming a sort of 'transient' image. From an exhibition point of view, the slowness suggested a need for supporting documentation (i.e., timelapse) as biological processes often take time to manifest, which shifts our focus from the living to the screen. Here, the presence of the living and the timelapse act together by bridging a gap in time and history while still highlighting the presence of its present state. The use of sewage bacteria in image production and the extended capabilities of bioremediation offer a contrasting experience to their repulsive smell of rot associated with grit and dirt.

### Bacteria Compass

Time and scale impose barriers to experiencing the presence of bio matter in real-time at a microscopic and molecular level. My practice has sought to make a tangible connection to bridge these vast scales separating humans and bacteria by asking: What does this scale feel like and what possible interactions can be afforded? *Bacteria Compass* (Image 2) uses magnetic nanoparticles as a way of steering individual bacteria. To see the bacteria, a red fluorescent 'program' was incorporated from my work with synthetic biology, making it possible to see the bacteria using a fluorescent microscope. *Bacteria Compass* allowed the audience to rotate bacteria in real-time using a handheld magnet and enabled a tactile experience of these organisms despite the difference in scale.

These works were the starting points to reach into the molecular and elicit meaning processes by connecting us to what is otherwise imperceptible in terms of scale and time. Real-time phenomena in bacteria can sometimes be experienced with the naked eye, and combining this with real-time interaction (in the human sense) offers an immediate presence of a different order.

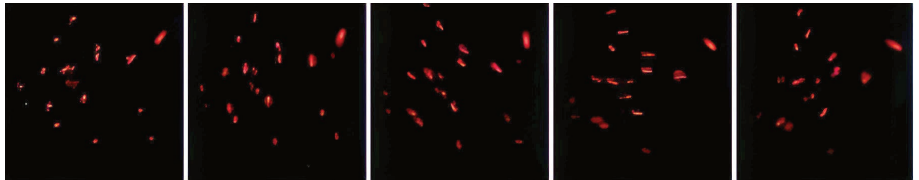
### Living Mirror

Magnetic bacteria are also found in nature and use this ability to swim along the Earth's magnetic field to achieve an optimal position in the microaerophilic gradient. Exposing these bacteria to a changing magnetic field causes their bodies to reorient and, in doing so, scatter light. In liquid culture, the scattering can be observed as a visible shimmer resulting from a change in how light passes through them. Exploring this phenomenon was the beginning of the work *Living Mirror*.<sup>15</sup> The response time, being immediate, meant we were looking at real-time living behaviour emerging from a collection of bacteria. Being fastidious, these bacteria require developing specific techniques to cultivate at high yields and while the magnetic quality persisted beyond cessation, care must be taken to avoid contamination by faster-growing bacteria. *Living Mirror* involved designing

<sup>15</sup> Developed with Laura Cinti and AMOLF.



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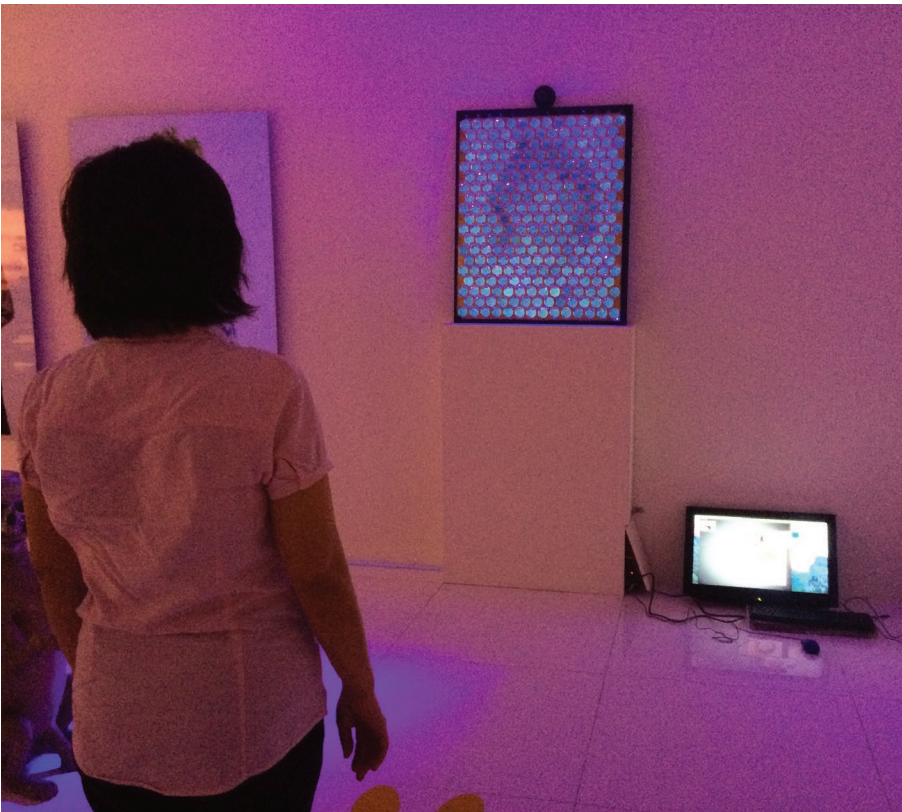
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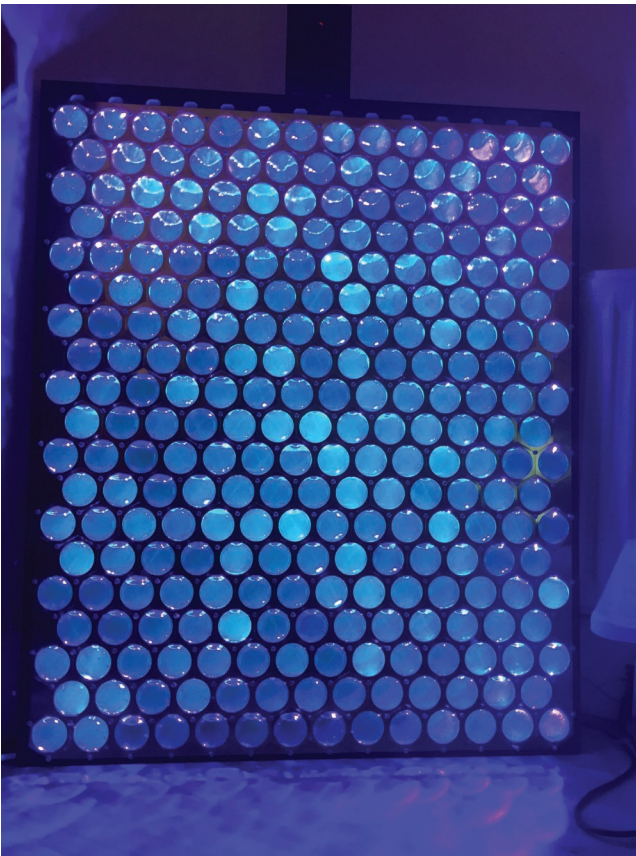
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- 1 *Transient Images*, 2011, Art from Synthetic Biology, Royal Institute of Great Britain, London, UK. Image: Howard Boland.
- 2 *Bacteria Compass*, 2012, a series of five frames from microscope video showing *E. coli* responding to a magnetic field using an external magnet. Image: Howard Boland.
- 3 *Living Mirror*, 2013, Age of Wonder, Natlab, Eindhoven, The Netherlands. Image: Sas Schilten.

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4-5 *Living Mirror*, 2013, modular setup.  
Image: C-LAB

individual magnetic coils that could be controlled by computer software. We built an imaging system that could reproduce low-pixelated visuals of people's faces in real-time. To create the mirror, a camera captures a person's image and a program translates darker and lighter points into numerical values and, in turn, triggers the coils to programmatically harmonise hundreds of light pulses to re-represent images in real-time. From a conceptual perspective, the work draws on the idea of water as our first interface predating today's screen-based digital technologies. It points to the myth of Narcissus who fell in love with his own image. Drawn into the image, he tragically drowned - a reminder of how we continue to immerse ourselves in similar mirrors as we extend our identity into the virtual. The work also highlights how contemporary science has shattered the idea of our own body by recognising that we are mostly made up of nonhuman bacterial cells. These ideas have shaped digital and biological understandings of our human self and are technically and conceptually reflected in *Living Mirror* (Images 3 and 4).

### Stress-o-stat

My interest in synthetic biology is aimed at understanding and eliciting processes and behaviours from within the living. As an area deeply entrenched with information technology, it is the combination of bioinformatics and molecular biology that enables the manipulation and insertion of genetic 'programs' into cells. To visualise invisible processes inside cells requires a tight integration of these subject areas, which in my case involved modelling, designing and manipulating bacteria. This work emerged from observing single colonies on plates forming branch-like structures as they grew. Biological processes taking place during food deprivation provide clues to this behaviour where a lack of essential components can disrupt the cells' electron transport chain, causing the release of oxygen radicals that can damage cells. To counter this effect, cells produce an enzyme known as Catalase that can capture these molecules and turn them into water. Understanding the genetic component involved in promoting the production of this enzyme allowed me to create a genetic program that, instead of Catalase, would produce a green fluorescent protein (*gfp*) during stress response. From a bioinformatics perspective, a public gene database (NCBI) was used to locate the gene *katE* known for producing Catalase and molecular analytics to locate its promoter. By amplifying the region from the genome and combining it with an existing *gfp* gene from a library of genetic parts, the 'program' could be inserted back into bacteria to visualise stress response. The process involves many iterative steps and typically requires genetic sequencing and analysis to confirm that the parts are incorporated. *Stress-o-stat* uses a liquid culture for controlled release of food, and a spiral tube was used to visualise the changes which would light up when the bacteria starved (Image 5). When parameters (i.e., food) changed, a flickering light could be observed.

Later, a time-lapse was used to create a set-up on plates. This involved changing the reporter gene to a red fluorescent construct. As a way of making the process of food deprivation visible, the time-lapse captures how the growth pattern produces a blushing glow around the edges (Image 6).

### Banana Bacteria

Using synthetic biology can provide a way to visualise processes inside cells but is not limited to visual indicators and can also be revealed using olfactory senses. For instance, *Banana Bacteria* (Image 7) involved using a genetic program that converts alcohol into banana oil and allows the audience to experience the strange and confusing sensation of bacteria smelling like bananas (as bacteria change growth phase).

## Exhibiting GMOs

The production of bio works involves a great deal of learning, and subsequent challenges follow when attempting to publicly exhibit these works. For instance, in the UK, it involved me having to undertake regulatory work to enable the UK's first public exhibition involving genetically modified organisms (GMOs).

While tissue culture has been exhibited on several occasions, GMOs had never been publicly exhibited in the UK - at least not legally. On the one side, there are conflicting understandings around regulations when it comes to exhibiting human tissue and GMOs, on the other, natural organisms have frequently been exhibited and in most cases do not require artists to negotiate regulations. In my case, exhibiting works involving GMOs included requesting an ethics approval and completing a set of forms to certify and comply with the use and understanding of controlled substances hazardous to health and GMOs. Through these negotiations, formal approval was obtained to exhibit these works. With the backing of the Royal Institute of Great Britain, it was possible to stage the UK's first exhibition featuring living bacteria with novel visual expressions using synthetic biology.

There are many factors at play when wanting to exhibit this type of material; for instance, in Denmark my exhibition was halted due to concerns of having negative effects of an impending GMO licence for the University, and in the Netherlands my plans of using GMOs for the work *Living Mirror* needed to be published in the newspaper (in case of public outcry) to obtain a certificate of approval. The approval in the Netherlands was also the first of its kind, suggesting much effort is still needed for this type of work to be exhibited broadly.

Since regulations vary from country to country, a number of exhibitions involving GMOs have taken place (e.g., the United States) on institutional premises. An additional factor is the need to re-produce bioartworks for exhibitions abroad by working with local laboratories and undertaking time-consuming preparation of material.

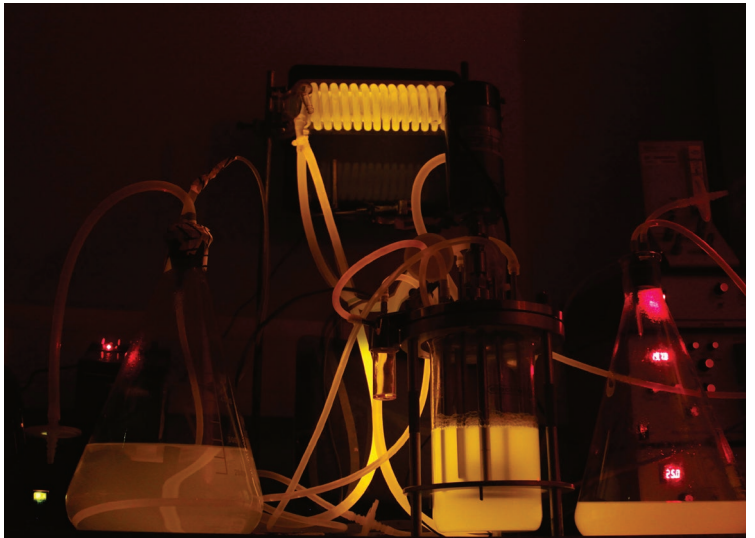
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Exhibiting these works as living offers a tangible sense of life as it becomes increasingly enmeshed in biotechnology. For curators and organisers wanting to include such works, there is equally a need to appreciate the different parameters that come into play when exhibiting GMOs requiring special access and preparation. These variables provide a background to why artists often choose to exhibit documentation and conceptual objects rather than the living.

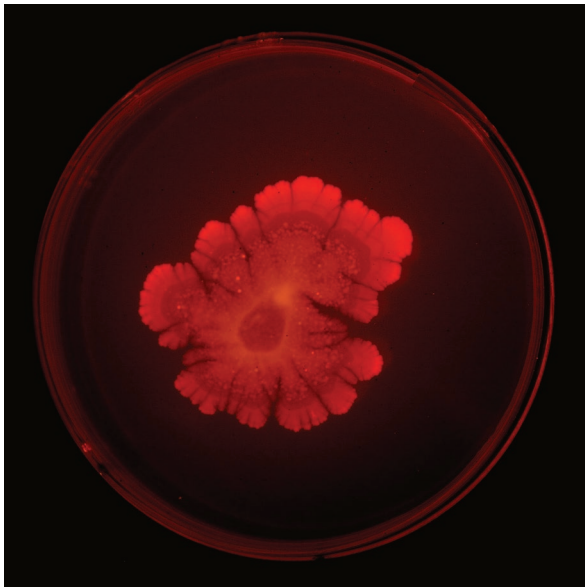
While the status of bioart remains uncertain given its sporadic history and limited set of artworks, the field has seen a growing interest in recent years. A plurality of terms has been used to describe biological art practices and its subject area remains temporal. Bioart can be thought of as an umbrella term for art practices involving biosciences. Its current status focuses on art practices dealing with the post-biological and material approaches; with the presence of the living forming an aesthetic component of bioart. Bioart has provided a rich set of debates using metaphors and staged presence of the living, but prompts the question of whether the living presence has any biological significance outside metaphorical readings and further questions: What is then the role of the living if such preoccupation is dominated by metaphorical aspects?

This paper proposes that new opportunities within the biosciences (particularly in synthetic biology) can expand bioart practices by engaging in deeper scientific understandings. Although many artists and theorists would argue that bioart practices involve an equal fit of metaphorical and cognitive approaches (that actively takes account of knowledge processes), the question here is the extent to which a cohesive evidence platform is maintained to support the cognitive aspect or if these processes are merely drawn from subjective artistic understandings (a common method in traditional art practice) that fail to take scientific processes seriously - despite employing the latter to imbue a

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- 6 *Stress-o-stat*, 2011, University of Westminster, London, UK. Image: Howard Boland.
- 7 *KatEred*, 2012. Image: Howard Boland.
- 8 *Banana Bacteria*, 2011, TechFest 2012, IIT Bombay, Mumbai, India. Image: Howard Boland.

cognitive status in the work. Indeed, it can be said that if art is to stake claims in terms of research and be taken seriously as an inventive discipline, does authenticity not then become a valuable commodity?

My practice aligns with Thacker's notion of 'biomedia' as an investigation into extended capacities in biomatter. To achieve this, there is a need to develop a deeper braiding of artistic and scientific practices. In this context, the presence of the living is understood through transformative parameters that open evidence-based insights capable of revealing hidden biological aspects.

My position concurs with the importance of presence; however, the presence of living matter alone as a play between the real and the metaphorical does not properly account for what is mediated.

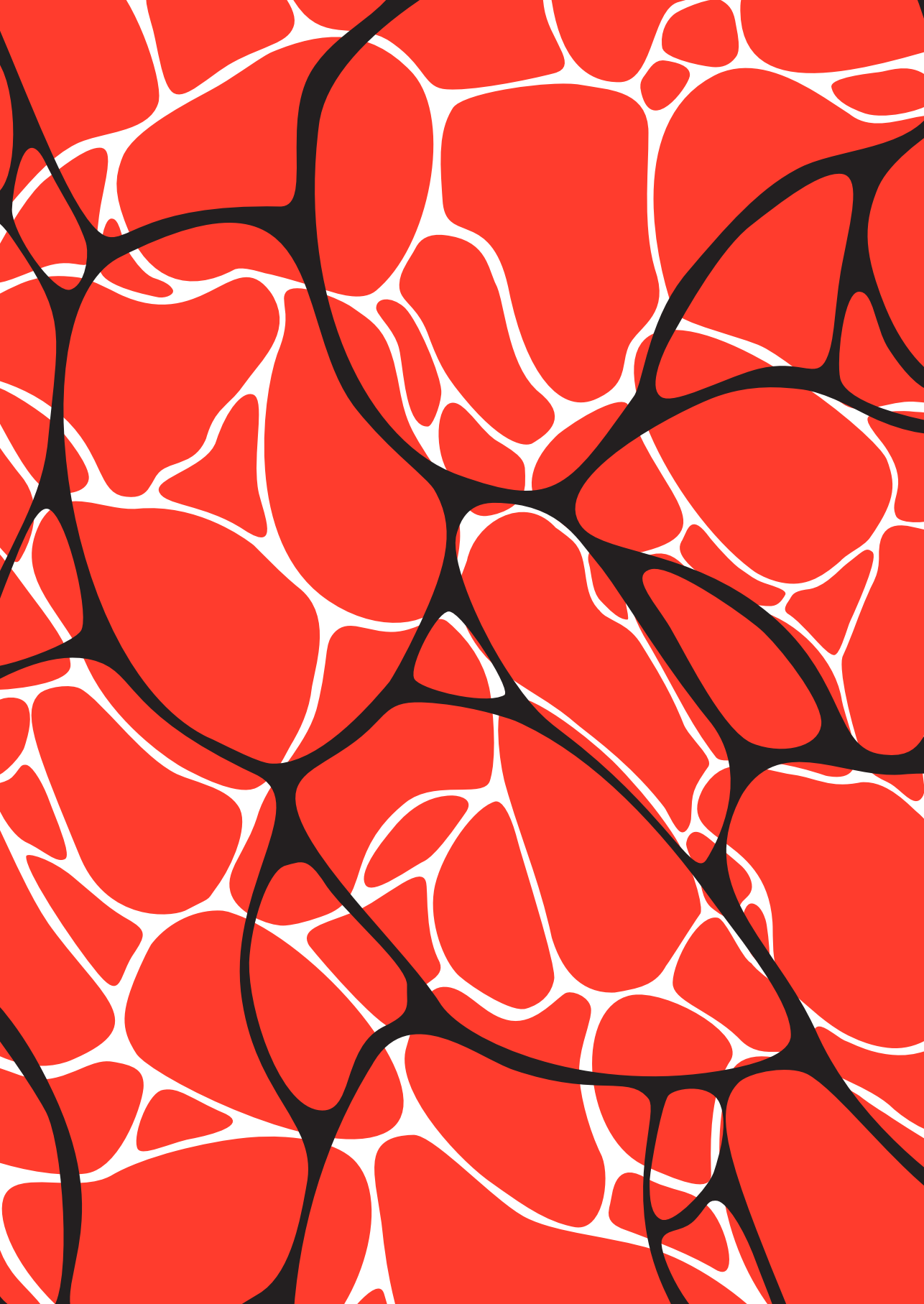
Working with bacteria on a molecular level has prompted me to consider what types of meaning processes we are engaging with from intricate systems of encoding practices that operate on discrete, behavioural and environmental levels. Unlike the idea of subjectivity, cultural references and meaning processes, the use of genetics should not be merely an aesthetic tool, but should be understood as a network of interactions that can be tapped into to reveal (biochemical) messages and states. Unfolding these layers as an art practice is an attempt to move away from an increasing and perhaps worrying obsession with using biological organisms to reflect on human conditions that do little to increase our understanding of the non-human.



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**Dr. Howard Boland** is a multidisciplinary research-based artist working with biological and digital media. His innovative research in synthetic biology has produced novel visual expressions in bacteria culminating in the UK's first ever art exhibition featuring living, genetically modified microorganisms. He is co-director and co-founder of the internationally recognized art-science collective and organization, C-LAB, and his interdisciplinary artworks have been exhibited and presented worldwide. With strong technical and creative skills, his experience spans from artistic to scientific contexts, where he has led award-winning projects.



# Life in Death and Death in Life

Thomas Feuerstein

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## Canvas and Petri dish

Works of art in museums and collections offer evidence of diverse transformations in which life is transformed into dead matter. Bodies become sculptures of marble and bronze, green landscapes become mineral and often toxic pigment surfaces. Life and art seem diametrically opposed: life transforms matter into organic life, and art transforms life into inorganic materiality.

Myths of art tell of an inverse relationship and the desire to create life. In Greek mythology, Prometheus is the first sculptor to form man from clay, and in Ovid's *Metamorphoses*, Pygmalion's obsessions turn a sculpture into flesh. The archetype of the artist is associated with creation and creativity. The "genius" artist is in league with higher powers and is possessed by a *furor divinus* that empowers him to create "living" art. Even though creativity and "kréas" (Greek for 'flesh') have no common etymological root, they form a close alliance, and continue to shape our concept of art today. In modernity, especially from the Romantic period onwards, the link between creativity and flesh becomes acute under a new sign. Enlightenment, science, and technology become the central theme of art and establish new, mostly gruesome myths, such as Victor Frankenstein's modern Prometheus.

In the short story *Life in Death*, Edgar Allan Poe tells the story of a painting that depicts the wife of a painter. Jealous of her husband's art, as he spends more time with his paintings than with her, she sits for him as a model for a portrait. As his passion for the work grows and the painting progresses, the model begins to age and her beauty fades. As the painting becomes more radiant and vibrant, it sucks the life forces out of the woman's body. The painter must watch as the tones of skin and cheeks are transferred to the portrait with each brushstroke. Like a vampire, he sucks the blood out of her veins, which on the canvas has become colour, and breathes animistic life into the picture. When the

painting is finished, “he grew tremulous and very pallid, and aghast, and crying with a loud voice ‘This is indeed *Life* itself!’ turned suddenly round to his beloved — *who was dead*. The painter then added — ‘But is this indeed *Death*?’ (Poe, 1842:p.201).

Four decades later, Oscar Wilde wrote *The Picture of Dorian Gray*. Like Edgar Allan Poe’s *Life in Death*, the novel depicts the fatal interaction between art and life. *Symbolic Exchange and Death* (Baudrillard, 1976) is once again negotiated as an incarnation of imagined vitality and, conversely, as the retroactive toxicity of art in the organic body. The story of Dorian Gray is well known, but one detail that illustrates the immediate effect of colour on the body is worth recalling. Dorian’s lover, Sybil, fails as an actress after learning about real life and true love, and takes her own life with white lead. The pigment that stands for purity and innocence on canvas becomes deadly black in the body.

Life in death and death in life is the antagonistic formula of dark romanticism that paradoxically regulates the relationship between art and life. Art pays homage to the living, but only becomes aware of it in death. We owe this insight to the art of the Romantic period, but also to the longing to allow what is real to flow into art, and to transfer it into work materially, organically, and processually. The turn towards what is real subsequently gave rise to new art movements that, among other things, programmatically bear the name Realism. But, above all, new artistic methods, and aesthetic approaches to the world of form developed.

Dark romanticism is often attributed as an inclination towards the irrational, macabre, and morbid, madness, escapism, chimaeras, *doppelgängers*, death, decay, melancholy, and drugs. Modern horror literature grew out of the chills, but also out of a new relationship among man, art, technology, and nature. The 19<sup>th</sup>-century romantic has one foot in antiquity and the Middle Ages, and the other in the modernity of the 20<sup>th</sup> century. This disjuncture already heralds the posthuman and transhuman, as well as an anthropocentric turn. Technology is not understood solely as a social and cultural productive power, but as a universal transformative force that leads human beings into a new order.

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In Romanticism, genius is exorcised from the artist’s body, as if it were a demon, and placed inside the work itself. The work of art proves to be less genius and more generative. It takes on animistic features and transforms from object to subject. It becomes a carrier of action, acquires an independent power of agency, it becomes performative and a spooky entity independent of humans.

In the modernity of the 20<sup>th</sup> century, art begins not only to give expression to the ideas, longings, and obsessions of its time, to accompany, reflect, and document them, but it also begins to involve itself and become an acting agent of real change. Art contingently tries out transitional potentials, tests possibilities, and does so not only fictitiously, but in reality. Art is not content to act as a transmitting medium, it becomes a medium itself in the sense of a field experiment, laboratory, bioreactor, or Petri dish. Instead of illustrative and symbolic representations on stage or on canvas, which double the world in the mode of the as-if, art becomes a place to negotiate the real. Fernand Léger is enthusiastic about new forms of painting in *Un nouveau réalisme, la couleur pure et l’objet*: “Scientific research has also enabled artists to discover a new reality. Underwater plants, microscopic animals, a drop of water with tiny creatures magnified a thousand times, these open up new pictorial possibilities (...)” (Léger, 1935:p.10). Wassily Kandinsky had been fascinated by microorganisms since the 1930s, and in 1940 he painted *Parties diverses*, which shows amoebas in front of pastel-coloured surfaces. In 1987, the Austrian artist Peter Gerwin Hoffmann took this painting as the starting point for his project *Kunstwesen*. Hoffmann had smears taken from Kandinsky’s painting in the Lenbachhaus in Munich, which were examined in a bacteriological institute in Graz. Bacteria that had

previously been cavorting invisibly on the painting layer grew in Petri dishes<sup>1</sup>. The paradigm shift that began in Romanticism and Modernism comes to a head here. Microbes manifest themselves not symbolically, but metabolically as living organisms. The Petri dish becomes a canvas and the bacteria a paintbrush. Whereas Edgar Allan Poe, Oscar Wilde and Wassily Kandinsky metaphorically associated their paintings with life, the Petri dishes, constellated into an expansive pictorial installation, carry out real changes in the living.

### Museum and sarcophagus

*Museums, collections, and archives preserve the bones of life and the dust of history. As sarcophagi, they devour the flesh of reality and preserve the blood of life in paint and solidified bronze. Statues and paintings remain in a state of supposed eternity and celebrate the static of life. Visits to museums resemble morbid forays through flower-decked graveyards and urn tombs.*

This, or similar to it, is how the parkours of museum objects are perceived emotionally. The busy efforts to open museums and collections to everyday life and the present, to convey them pedagogically and to market them in terms of events, are primarily committed to the visitor quota and not to the programmatic orientation. This is not in itself reprehensible, for the museum's function as a repository opens up a historical and melancholic depth and, in the spirit of dark romanticism, connects life with death. But nostalgia will not save us.

Culture fears nothing more than transience and entropy. This concern for cultural memory gives rise to the idea of the modern museum. We are afraid of ageing, trying to protect cars and machines from rust and wear, and feel threatened by the decay of goods and our own bodies. Museums, in their effort to stop entropy, give us cultural and psychological stability. Everything that resists transience, and the longer it exists, accumulates value over time. Art is capital and the museum is the bank that protects us from the inflation of material decay, and serves to pay dividends on values.

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In the process of their creation and in the context of their time, works of art are today more than ever living entities with a subject status attached to them. It is only in the art trade and museum that they are transformed into objects. Here, subject status does not conjure up an identity between artist and work, but on the contrary, an essential independence and self-sufficiency of the works. Works of art follow their own logic beyond anthropocentric nostalgia, acting as narrative and processual knots. They condense life and act as enzymes and catalysts for culture, but also for processes, principles, and phenomena in nature and science.

For a long period of time, art had the function of depicting the world symbolically in the form of gestures, iconographic representations, or abstract ideals in an anthropocentric way. The imperative of occidental art was to transform the "metabolic" into the symbolic and, thus, to preserve it permanently. But life is metabolism, change, and transformation. The crisis of the museal is rooted in Romanticism and its enthusiasm for the ruin, accelerated in the 20<sup>th</sup> century, becoming precarious in media- and bio-technical works of contemporary art. Museums are responding to this in a variety of ways, trying to reform themselves from a place of documentation to one of production. When the Zeitz Museum of Contemporary Art Africa in Cape Town moves an entire artist's studio into gallery rooms in order to let the public participate in the creative process, (Szántó, 2020) that is reminiscent of a weakened form of postulates of Russian cosmists (Fedorov, 2005). Nikolai Fyodorov saw the museum of the future not as the burial place of dead artists, but as the

<sup>1</sup> The Petri dish was invented exactly one hundred years before Hoffmann's project in 1887 by the German bacteriologist Julius Richard Petri.



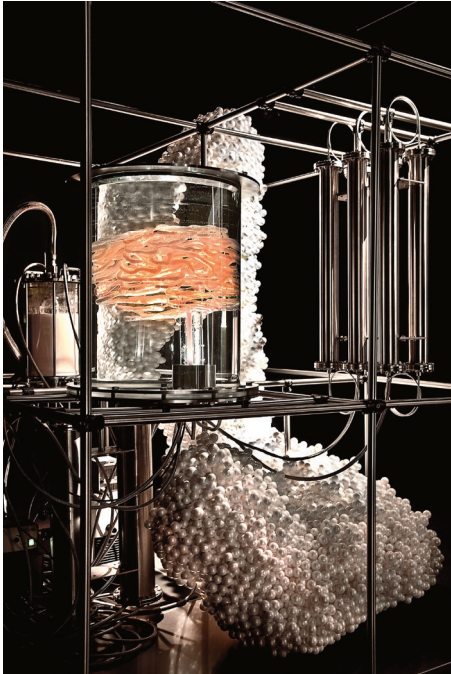
*One and No Chair*, 2002 – 2008  
Timber, *Serpula lacrymans*, plexiglass, stainless steel,  
aluminium, 170 × 65 × 65 cm  
Mycological support: Christian Ebner, Department of  
Microbiology, University of Innsbruck  
Collection MAK Museum Vienna

*Pancreas*, 2012

Glass, stainless steel, plastic, technical equipment,  
immortalised glial cells, bacteria, 230 × 800 × 200 cm

Exhibition view: Galerija Kapelica, Ljubljana 2014

Biotechnological realisation: Thomas Seppi, Department of  
Radiotherapy and Radiation Oncology, Medical University  
of Innsbruck



place of their resurrection and technical reanimation. He anticipated the Extropians' and Transhumanists' dream of wresting life from transience and transforming it into a technical transcendence. His comrade, Nikolai Rozhkov, had a concept for this that seems more crucial than ever today in the age of data surveillance: all documents, texts, and works of a deceased person were to provide the basis for a virtual simulation. In the context of today's technology, the artist continues to exist algorithmically as an artificial neural network and generates unlimited new works. Artificial Intelligence mutates into Artificial Identity. Whereas in the past the works survived the artist, now the artist himself becomes the work and survives himself. Salvador Dalí was quoted as saying, "(I) believe in general in death, but in the death of Dalí absolutely not" (Wallace, 1958). As AI, the artist has actually been experiencing his reanimation in a museum dedicated to him in St. Petersburg, Florida since 2019 (Salvador Dalí Museum, 2019). The cosmists' dream becomes a nightmarish Disneyland.

The fact that in the future the museum will turn from a cemetery of history into the Olympus of the undead can make sense as an ironic, or even serious commentary, on artistic projects. As a museological concept, it is unsuitable because it perpetuates traditional notions of the artist as genius, as well as the myth-forming identity of person and work and does not match current production conditions of art. Artists work in groups, changing constellations, involving scientists, systemic data flows, living organisms, natural and social processes in their projects, which leads to an expansion and simultaneous marginalisation of human authorship. What is needed instead are museological concepts that promote the turn from the symbolic to the "metabolic", from representations to processual arrangements, as well as networking with extra-museum sites where reality is negotiated and produced.

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A uniform method for the presentation, collection, and documentation of process-oriented works would limit the diversity of the media and actors involved. Microbes, fungi, plants, or somatic cells require a continuous supply and are subject to natural cycles. Fruiting bodies of fungi are often only visible for a few days, while the mycelium in the soil grows largely invisibly throughout the year. Animal or human somatic cells can be cultivated in the laboratory for weeks and months, but require intensive care. The permanent cultivation of living systems usually contradicts biological life expectancy and is only potentially possible for immortal organisms and cell types. While the costs of maintenance and operation are often low for work with bacteria, fungi, and plants, they can be substantial for bioreactors in which animal or human cells are grown. For example, in 2006 biologists worked with me to develop a project for growing a tapeworm to a length of several metres in a transparent nutrient medium in a glass gut. To achieve this, it would have taken at least five years of operation with a daily requirement of about two litres of fresh culture medium, which was beyond both the duration of an exhibition and the budgetary possibilities of a collection.

### Symbol and "metabol"

An artist's studio, laboratory, exhibition, and collection are different biotopes. When I began to create works in the laboratory with scientists in the early 1990s, few within the art system were interested in biotechnologies. The question of how to present projects in an exhibition or permanently in a collection was not posed. The projects were fragmentarily documented and conceptually recorded, but rarely installed as exhibits in a processual way. As fascinating as laboratory work and research are, artistic and epistemic questions rather than the illustration of science are still in the foreground for me today. Transferring scientific practice, methods, and techniques from the laboratory to art are directly linked to artistic experiments that are integrated into an expanded narrative. Art ties disparate dispositives into narrative knots that condense cultural productive and transformative forces into works, and makes them speak symbolically as well as processually, materially, and molecularly. From the beginning, my interest in the living was connected to digital and biological processes that condition transformations and



transmutations of information and matter. Metabolic processes in particular interest me artistically, as they not only represent and depict the world symbolically, but also incorporate real processes of reality, making them the material of art.

The meaning of the Greek *metabolē* is ‘transformation’, and today in biology it describes processes of metabolism as the very basis of all life. When we eat and drink, we consume molecules and transform them into energy and body cells. In addition, we consume symbols and data to “metabolise” them into information, knowledge, and experience. In addition to the biological metabolism and the economic metabolism of resources, energy, goods, and commodities, we can also speak of a cognitive and informational data metabolism, which is becoming increasingly evident in machines, especially in the field of machine learning. If one wanted to add another turn to the linguistic, pictorial, or material turn, it would be the metabolic turn. In the field of art, it describes specific forms of *poiesis* in the sense of making, producing, or transforming something. Metabolism implies growth and dissolution, materialisation and dematerialisation, life and death, and thus includes artistic processes as performative moments of time, transformation, and media and material translation.

The metabolic interplay between entropy and negentropy becomes clear in works with bacteria and fungi that produce their organic material by breaking down others. As an example, I take the work *One and No Chair*, which, on the fine line between complete decomposition and material existence, implies its preservation as a collection exhibit. (Feuerstein, 2022) The work was begun in 2002 with the cultivation of a wood-degrading fungus in the laboratory. *Serpula lacrymans* is considered a harmful species and is sometimes referred to as the terror fungus, as it can cause entire houses to collapse by infesting beams. The mycelium, cultivated in a liquid medium and later sawdust, was initiated from a table and a chair and allowed to grow in an air-conditioned tent. After six years, the cellulose of the wood had largely metabolised, and the chair and table were as light as balsa wood. The static function had gone, but what remained was the form, at least that of the chair, for the table broke into pieces under its residual weight. In the process of drying, the fungus stopped growing, which resulted in a natural preservation. The title *One and No Chair* refers to the work *One and Three Chairs* by Joseph Kosuth, which in turn can be read as a commentary on a passage in Plato’s *Politeia*. While *One and Three Chairs* exemplifies the linguistic turn, *One and No Chair* embodies an example of the metabolic turn.

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In European art history, matter in the sense of Plato was considered a deficit and shortcoming of art. In the Middle Ages, visual art was counted among the *artes mechanicae* and not among the *artes liberales*. Art genres such as music and literature took priority because they were disembodied and immaterial, and seemed unaffected by the dirt of matter, transience, and decay. The bleaching or darkening of pigments and binders disturbed the viewing of images and was only technically positivised via the development of photography. In the course of the Industrial Age, former deficits of the material became a specific quality. Since the 1960s at the latest, materialities have been understood as an integral part of visual art and made productive as physical, chemical, and biological processes. It is precisely this aspect that updates visual art across society in the context of the biosphere, climate, the Anthropocene, biochemistry, and biotechnology. Metabolic art tells stories about the world not only symbolically. It performs realities through processes and makes them speak as participatory agents beyond linguistic and pictorial levels.

### Life and death

I would like to discuss the hypotheses, based on two works realised in the last ten years, that artworks with living materials imply the possibility of their sustainable presentation or preservation conceptually and technically.



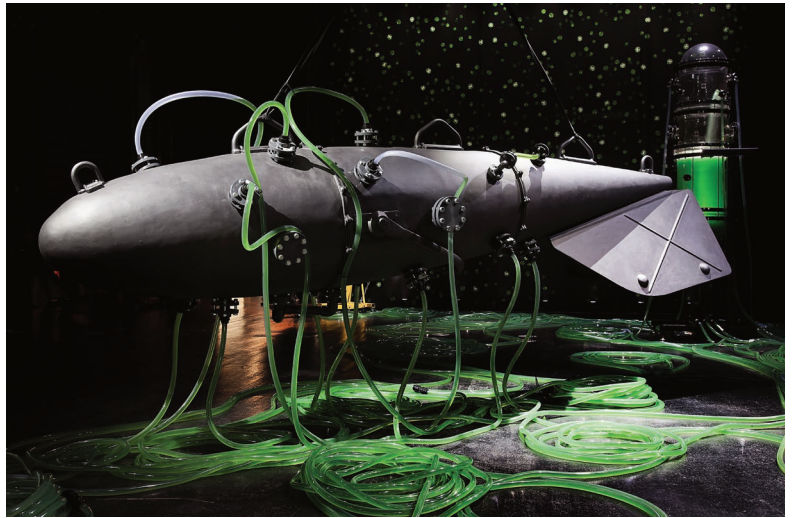
*Prometheus Delivered*, 2017  
Marble, plastic tubes, stainless steel tub, europallet, scissor lift table, chemolithoautotrophic bacteria (*Acidithiobacillus ferrooxidans*), 280 × 145 × 85 cm  
Biotechnological realisation:  
Thomas Pümpel, Anna Arthofer,  
Christian Ebner, Department  
of Microbiology, University of  
Innsbruck  
Exhibition view: 15. Biennale de  
Lyon, Lyon 2019  
Collection MAC Lyon



*Hydra*, 2021

Steel, plastic, glass, green algae (*Chlorella emersonii*), pump system, dimensions variable

Biotechnological realisation: Thomas Pümpel, Christian Ebner, Department of Microbiology, University of Innsbruck  
Exhibition view: Muffatwerk Munich, 2021



*Sarcophagus*, 2012

Glass, heater, base, glucose (derived from paper cellulose), water, yeast, 225 × 63 × 63 cm

The processual sculpture *Pancreas* feeds and digests cellulose into sugar comparable to a cow's stomach (Feuerstein, n.d.). Instead of grass, paper in the form of printed texts and books is shredded, mixed with water, and pumped into a fermenter. Enzyme-producing bacteria break down the cellulose into glucose and provide the nutrient for a cell culture in a glass bioreactor. The fact that the text selection is limited to Hegel's *Phenomenology of Spirit*, that human brain cells grow in the cell culture and that the shape of the bioreactor is an allusion to the thought experiment of a brain in a vat, should only be mentioned in passing. In the context of preservation, glucose plays the central role. As the fuel of life, glucose serves as a universal energy and carbon supplier for all cells and organisms. Like no other molecule, glucose stands for life and metabolism. In *Pancreas*, it makes the cells grow, but it also preserves them by being fermented by yeast fungi and distilled into alcohol in the sculpture *Sarcophagus*. Comparable to a wet specimen in an anatomical collection, the alcohol fixes the cells in the bioreactor after the growth process is complete, preserving them permanently. Growth and preservation are based on the same molecule in *Pancreas*: glucose becomes biochemically and metaphorically the dialectic of life and death.

In exhibitions, there are different ways to keep biological processes running. Artists can take care of their cultures themselves, train lab assistants or interested volunteers, automate bioreactors by means of measurement and control technology, and the like. But disruptions due to a lack of sterility, power breakdowns, or maintenance problems must always be planned for. Exhibition venues are usually hostile deserts in which neither houseplants nor pets, not to mention technically complex living systems, can survive permanently. The consequence is to make death and stillness a conceptual part of the work, or to make transience, dissolution, and entropy aesthetically productive.

In the *Prometheus delivered* project, stone-eating, so-called chemolithoautotrophic bacteria feed on pyrite (Feuerstein, n.d.). Their metabolism produces sulphuric acid, which is diluted with water and pumped over a marble sculpture. The lime reacts to the acid, lowers the pH value of the process water and ensures constant conditions for the bacteria, which would otherwise stop growing if they were too acidic. A close relationship develops between the marble sculpture and the bacteria, as can be observed geobiologically in nature, for example in the formation of limestone caves. Over time, the marble transforms into calcium sulphate or gypsum. The sculpture, a replica of Nicolas Sébastien Adam's *Prométhée enchaîné* (Prometheus bound), changes its shape through the "acid chisel" of the bacteria and slowly dissolves. The bacteria act as sculptors and create macroscopic effects through their micropervasivity. If the process is interrupted, the bacteria go into a permanent state and can survive long periods of time, even in a dark storage depot. In the end, there is nothingness, the ultimate dissolution and liberation from all physical chains of the bound Prometheus through the biochemical act of sculpting.

The Russian mineralogist Vladimir Vernadsky discovered the connections between the bio- and geosphere in the 19<sup>th</sup> century. The seemingly dead matter of mountains and landscapes turns out to be the work of microbes that work the earth's crust like sculptors. From the atmosphere to the hydrosphere to the deep lithosphere, metabolism acts beyond the processes in individual cells to transform matter and shape form. These metamorphoses of the biosphere form the scenes of life that art likes to make the motif of in its symbolic representations. But an art that understands metamorphoses beyond the allegorical as dynamic systems of matter, energy, and information links the sphere of metaphors with the real spheres of life. From this perspective, works from art history that are primarily interpreted iconically and linguistically can also be read quite differently. The sculpture *Die* (1962) by Tony Smith, a steel cube with a side length of six feet, alludes to the phrase "six feet under". As a negative space, it marks a void and, in the manner of Minimal Art, reflects on questions of sculpture from the Vitruvian man to building and production processes in steel construction. In contrast to Richard Serra's sculptures, which appear soft and fluidly rusting away, but are made of indestructible Corten steel, in *Die* death is actually carried out as dissolution through corrosion. Apart

from the obvious reading as a symbolic memorial of transience, *Die* could also be seen as a materially internalised process of entropy. The matter-of-fact physical description, which is without anthropocentric symbolism, opens up poetry as *poiesis*. If *Die* were not regularly lubricated by conservators, the sculpture would dissolve according to its title — and with it its capitalist value in the collection and the art market.

### Nulla linea and non-finito

For me, exhibitions are factories that symbolically produce meanings and metabolically generate materials and works. As semantic and metabolic networks, exhibitions point beyond the accumulation of works, becoming active in their own right. When I think of a factory, I think historically of the Italian *fabbrica*, the sculptor's workshop of the Renaissance, on the one hand, and the factory as a site of labour and machine, on the other. The factory functions as a matrix (womb) for almost all things in our everyday life. In it, as in living cells, the metabolism of industrial and consumer culture takes place. While the factory in industry has a Fordist or linear character, in the current project *Metabolica*, for example, I am thinking of a cyclical model that biotechnologically cultivates a material for artistic works, processes it, breaks it down, and returns it to the process. Alongside permanent preservation or fixation (*Pancreas*) and final dissolution (*Prometheus delivered*), *Metabolica* exemplifies a cycle in which growth and progress, rather than being linear, feed on themselves. The *fabbrica metabolica* is *nulla linea* and *non finita*. It is not suspended in one state, and its works are metabolically in permanent change, in a transitional state of form and anti-form (Morris, 1968).

*Metabolica* traces a narrative from the history of whaling to the age of petrochemicals, to current and future scenarios of alternative resources. Threads from the history of art and industrialisation interweave via biological processes with science and bio-fiction to a turn from petrochemistry to biochemistry.

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*Metabolica* transforms the exhibition space into a post-industrial landscape. Based on chemical and biological interactions, the exhibition leads visitors into a metabolic factory where sculptures and installations perform cycles of the living. Bacteria become collaborators in an artistic process in two ways. In a figurative sense, they function simultaneously as the sculptor's quarry and chisel. Bacteria produce material for new sculptures, and they work on them by participating in the form, decomposing and digesting it.

The production cycle starts molecularly and narratively in the sculpture *Hydra*, a hybrid of a whale, a submarine, and a photobioreactor. Green algae circulate in a labyrinthine conduit system to absorb light, multiply, and store fats and sugars in their cells. The algae's biomass is continuously filtered inside the sculpture, as if by the whale's baleen, and fed into large glass fermenters. In the sculpture *Mr. and Mrs. Mol*, bacteria convert the algae's nutrients in polymer or plastic, which served as nature's storage material long before humans and chemistry. The bacteria accumulate the biopolymer Polyhydroxybutyrate (PHB)<sup>2</sup>, which is harvested, separated from water, and dried in the sculpture *Refinery*. The result is a fine powder processed into new sculptures by the large-scale 3D printer, *Sculpture Machine*, developed for this specific purpose. Like stalactites, the sculptures grow downward during printing. They are immersed in an aqueous medium containing bacteria that begin to dissolve the shape immediately after it has been created.

- 2 The biopolymer PHB has properties like petrochemical-based polypropylene (PP), which is widely used in the automotive and food industries, among others. Comparable to human body fat, PHB serves bacteria in nature as an energy store. Processed as a bumper or plastic packaging, the durability of the material is not limited. Only in an environment in which PHB-consuming bacteria, algae, or fungi occur naturally, such as river water, seawater, or soil, is the bioplastic degraded without residue.

*Sculpture Machine* acts as a sculptor, dialectically producing artefacts simultaneously as the sculptural addition and sculptural reduction of material, creating an antagonism of becoming and decay. A cycle of autotrophic growth, metabolic transformation, and digestion takes place under the observation of the visitors. *Metabolica* forms a living organism subjecting forms and materials to permanent change. The relationship between growth and entropy generates an aesthetic transferring artistic authorship into a collaboration with molecular processes.

*Metabolica* creates a processual work as a model for a post-industrial holobiont by connecting microorganisms, machines, and humans. The exhibition becomes the medium of a trans-systemic and trans-boundary organism that performs progress and growth cyclically as arising, changing, and passing away. *Metabolica* leads from the past of aristocracy via the present of democracy into the utopia of an “robocracy,” a culture producing itself through self-digestion, self-renewal, and self-sufficiency. The natural substance PHB, evolutionarily old, is becoming the real practice and material allegory of a paradigm shift for a new cultural metabolism.

There will not be a general answer to the question of how to present, preserve, and conserve processual works in collections. However, if one questions works and projects individually, they often speak of possibilities that correspond to their *poiesis* and take it a step further.

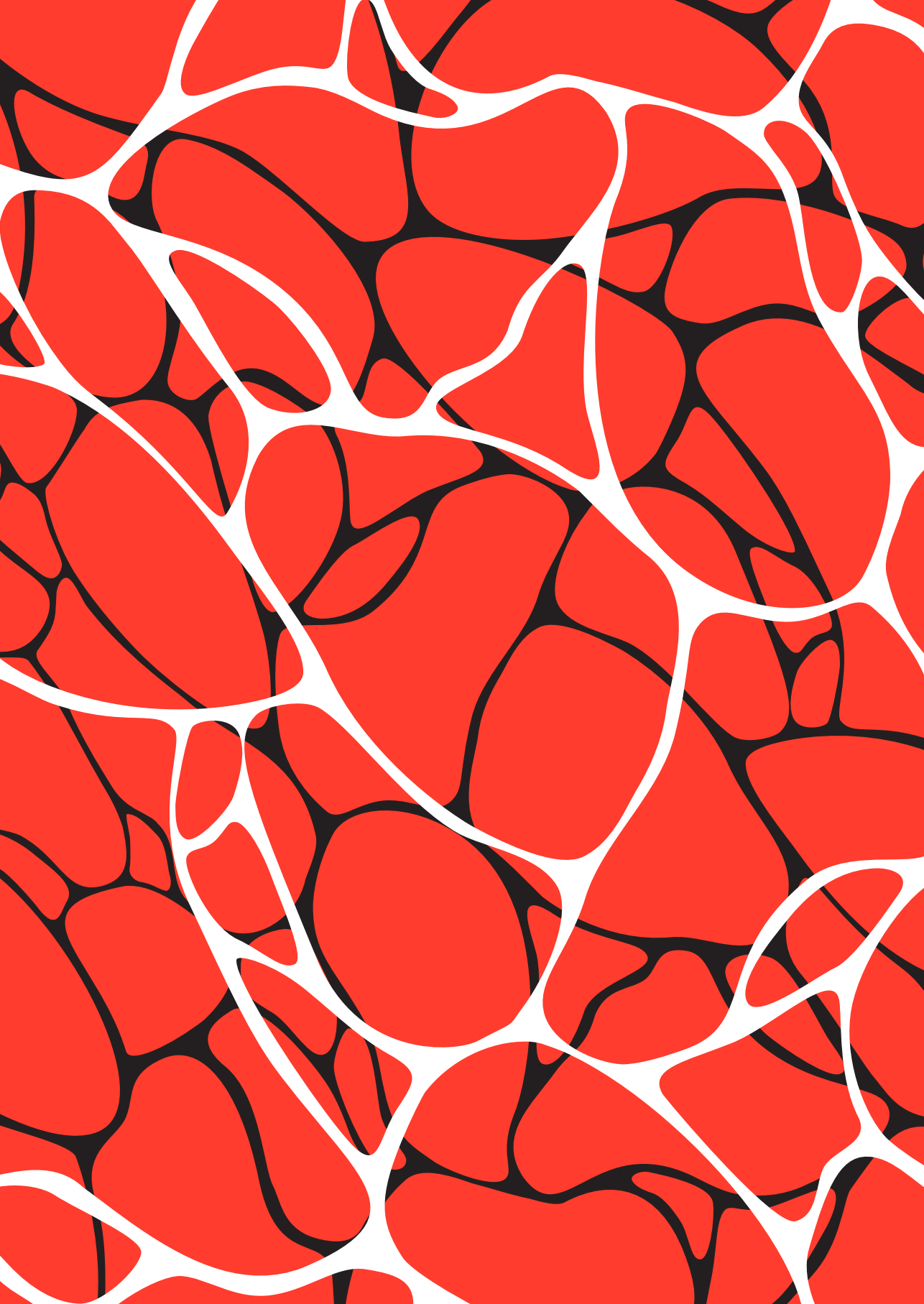
Life in death and death in life outline a dialectic of biotechnological art. The death of the living as temporary immobilisation or permanent preservation can also mean a liveliness in death via adequate contextualisation. It is not a matter of sucking life out of nature and the body’s cells as in the metaphor-rich stories of Edgar Allan Poe and Oscar Wilde. Nor, conversely, of driving life out of the works through museum conservation. Rather, it is about preserving the vitality of art and understanding its change not as a flaw, but as a qualitative value, without letting the works degenerate into relics and devotional objects. Life and art in death and death and art in life do not aim to petrify works into fossils. Life in death and death in life strive for a presence that understands art as a seed or germ cell, and allows the possibilities to grow potentially and contingently.

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- Thomas Feuerstein** was born in 1968 in Innsbruck and lives in Vienna. He studied art history and philosophy at the University of Innsbruck, where he received a PhD in 1995. From 1992 to 1994 he was a co-editor of the journal *Meiden. Kunst. Passagen.*, with Klaus Strickner. The journal was published by Passagen Verlag in Vienna. In 1992, he founded the Office for intermedia communication transfer and the Association *medien.kunst.tirol*. In 1992 and 1993, he led research commissions from the Austrian Ministry of Science on art in electronic space and art and architecture. Since 1997, he has worked as a lecturer and as a visiting professor at the University for Applied Arts in Vienna, the University of the Arts in Bern, F+F Schule für Kunst und Mediendesign in Zurich, Hamidrasa Faculty of the Arts, Beit Berl College, Sandberg Institute in Amsterdam, University of Innsbruck, Applied Science University in Vorarlberg, and the University Mozarteum in Salzburg. He currently holds a professorship for artistic discourse at the Institute for Experimental Architecture at the University of Innsbruck. Feuerstein has been awarded several art prizes, most recently the Austrian Art Prize for Media Art in 2019.
- Thomas Feuerstein's work bridges the interface of applied and theoretical science, and his projects combine complex bodies of knowledge from philosophy, art history, and literature with biotechnology, economics, and politics to create a "conceptual narration". His artistic projects involve linguistic, pictorial, and algorithmic layers, as well chemical, biological, and cybernetic processes. He focuses on the interplay of verbal and visual elements, the uncovering of latent connections between fact and fiction, and the interaction between art and science. Feuerstein's works range from installations, drawings, paintings, sculptures, photography, and radio plays to net and bioart.

Since the early 1990s, digitization, networking, and biotechnology have been a central focus of Feuerstein's projects. Algorithmic works emerged from 1990 onwards, including network installations and projects with artificial neural networks. From 1995 onwards, an intensive examination of biotechnology and tissue engineering began, and works with algae, bacteria, fungi, myxomycetes, and human cells were developed.

Feuerstein's works were exhibited in various museums and Biennials, including Frankfurter Kunstverein, Lyon Biennale, and Chronus Art Center in Shanghai, and are represented in numerous museum collections.





# Only in Transit? Organ Trade? Murder at MoMA? — Paradoxes and Obstacles in Maintaining and Staging Biomedial Art

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Jens Hauser

The liminal character of literally a/live art, in the biological sense of the term, or art that uses organic material's inherent functions in actual biotechnological practice, explores uncomfortable 'betwixt and between' zones and 'neither here nor there' situations that force cultural practitioners, curators, conservators, and collectors into states of enhanced self-reflexivity.<sup>1</sup> Such art seems to update, at least at first sight, art historical tropes of 'aliveness' and 'creation' as a vanishing point of a persistent artistic quest that delineates a biotechnological desideratum – nostalgic and metaphoric, utopian and metabolic. While museums and collectors traditionally deal with the ontological paradox that aesthetic *representations* made from dead matter can, indeed, *appear* alive, their strategies fail with regard to artistic modes that insist on the authentic *presence* of their staged

<sup>1</sup> The trope of liminality has been a guiding concept of the *sk-interfaces* exhibition at FACT, Liverpool, in 2008, which predominantly consisted of biomedial art works. The concept was adapted from Scottish anthropologist Victor Witter Turner and his concept of the rite of passage, an emotionally uncomfortable period of transition within which major shape shifting transformations can occur – for example, during an initiation ceremony. (Hauser, 2008; Turner, 1977)

biological agents, functions, and processes. Biomed art that appropriates and subverts the most recent and diverse technologies of the life sciences – such as cell and tissue culture, genetics, micro and molecular biology, neurophysiology, synthetic biology, but also involving self-experimentation and trans-species relations – pose unprecedented challenges in terms of *staging*, *transport*, and *conservation*. From the standpoint of media theory, art history, and science and technologies studies, based on two decades of curatorial experimentation and experiences in this field, this chapter aims to:

- analyse and classify the manifold ways in which biomed art works, which insist on the authenticity of its inherent biological materials, functions, and processes that require specific attention, while neither general established guidelines, nor curatorial education for this field exist. It will be discussed in how far existing protocols, both in contemporary and in software and hardware based digital ‘unstable’ art, could be adapted to deal with wetware-based works; (Hauser, 2016a)
- give an overview of different case studies from my own curatorial practice and – successful and unsuccessful – experiences with regard to issues related to *staging*, *transport*, and *conservation*. The question emerges how such biomed art practices also constitute cases of a new kind of institutional critique, since artists often even wilfully challenge institutions’ status as art depositories or ‘cemeteries’;
- compare biomed art works and the challenges they pose in relation to performance art, resulting in the notion of ‘microperformativity’ (Hauser 2014b & 2015, Hauser & Strecker, 2020) [Image 1], a conceptualizing tool for analysing alternative animated agencies beyond anthropocentrically established criteria, such as intelligence, consciousness, or language;
- illustrate the general shift from *performance art* to *performativity in art*, which makes comparisons between archival modes of performance & body art or choreography, on the one hand, and performative biomed art, on the other, problematic. This also poses challenges with regard to who are the ‘gate keepers’ and ‘agenda setters’ of what appears to be a new form of ‘performative archives’, and how users in and outside institutions would be enabled to ‘perform archives’.

Unlike previous concept-based art forms that employed organic matter or putrefaction processes in an attempt of material semantics, for two decades now art has been shifting from *representation* via materials of the organic to a staged *presence* of manipulated biological organisms, functions or systems, which go hand in hand with the manipulation of various nonhuman and techno-scientific agencies of microperformativity involved in such artworks. ‘Moist’ media art (Ascott 2001) with *wetware* remains largely devoid of any institutional advocacy, even more than media art that uses *software* and *hardware*. While conceptual challenges are philosophically most inspiring, it appears that in the approximately 20 exhibitions and festivals I curated within this realm, the most energy has been absorbed by negotiating lab infrastructures, endless legal paperwork, shipping problems, and technical issues of maintenance. From a curatorial standpoint, this means that a large part of an exhibition budget is dedicated to re-growing rotting and fragile ephemerals, since works at the threshold of microperformativity and necropolitics (Lushetich, 2018) constantly face the threat of contamination, deterioration, death, or disappearance.

### Challenges of increasingly ‘alive’ arts

It is indeed useful to place contemporary challenges in a larger historical context first. From an art historical perspective, the creation of lifelike appearances has always been a persistent feature, from early anthropomorphic statues and myths of artists’ works ‘coming to life’, to notions of the artwork as an organism in itself, to robotic and software simulations of digital media art, and to more recently, artistic artefacts created in bio-scientific contexts. By means of *form*, *material*, or *process*, art has *imagined*, *represented*, *mimicked*, then *simulated* and, quite recently, actually *manipulated* living beings and systems for real, since genetics, tissue engineering, DNA chips, and so-called synthetic *BioBricks* have entered the repertoire of experimental artistic strategies. Three primary

typologies of ‘alive’ artworks exist today, the criteria of which sometimes overlap and create, technically speaking, hybrid forms:

- 1) representational and concept-based contemporary art, including organic matter;
- 2) process-based ‘dry’ media art using software and hardware, such as informatics and robotics, to simulate lifelike behaviours via media that are not biological;
- 3) process-based ‘moist’ media art with wetware that uses biotechnological methods to manipulate organic systems, organisms, or their constitutive parts in an aestheticized technical framework.

For the first and the second categories, conservation treatment and training methodologies have been established in order to maximize both usability and longevity; in both cases, relevant methodologies have been elaborated for or by institutions, which possess related collections of objects or technical displays.

The first category is by far the most represented<sup>2</sup> and includes the use of biological and perishable materials, such as bodily fluids, food, intentional or unintentional putrefaction or decay processes, in an attempt to attribute semantic value to unstable materials. These potentially fragile works are likely to pose serious ethical and logistical challenges for display and shipping, but above all for preservation. However, most of these issues can be solved through established best practices of conservation treatment – for example, a methodology such as the one popularized by Barbara Appelbaum’s publication from the year 2007, which consists of first characterizing an object, including its history and ideal state, followed by the creation of a realistic treatment goal, accompanied by the complete documentation of all steps – a methodology that claims to be “universally applicable across the conservation profession” (Appelbaum, 2007, p. xxii). Such an approach pays attention to the dual nature of art objects – material/technical and non-material/cultural. Appelbaum therefore proposes a four-quadrant grid [Image 2] “with material aspects on the left and non-material aspects on the right, information specific to the object on the top and generic information on the bottom” (Appelbaum, p. 10). Quadrant I contains information about the physical state of the actual object, quadrant II relates to materials and science-based knowledge about the chemical and physical properties beyond the actual object. The third quadrant relates to the specific cultural history of the actual object, while quadrant IV is concerned with general art historical contextualisation and the changing cultural reception over time – “this kind of information is more important to treatment than is often acknowledged” (Appelbaum, p. 11-13).

The second category can be addressed according to methodologies for preservation and re-enactment of performative, digital, or time-based media art. These have been recently developed, since the urgency of conserving and collecting technological art has been recognized, for example in Bernard Serexhe’s compendium *Digital Art Conservation* from 2013, or by the *Matters in Media Art* [Image 3] platform, (Matters in Media Art, 2015) supported by Tate, MoMA, and SFMOMA, to deal with works of art that have moving image, electronic, and digital elements. The Guggenheim also runs a platform with similar assistance (Guggenheim, 2022). Here, software and hardware conservation, accompanied by artist interviews, is key when faced with rapid technological obsolescence, deterioration, and future incompatibility. Process and communication-based art, often with expanded concepts of artistic authorship, “reduce the hitherto valid collecting criteria of longevity, authenticity, and intrinsic value to absurdity” (Serexhe 2013, 24). The *Matters in Media Art* condition report template differs from comparable reports established for more conventional works of art (Matters in Media Art, 2015). Beyond the

2 At the three-day conference *Living Matter: The Preservation of Biological Materials Used in Contemporary Art* held by the Getty Conservation Institute in June 2019 in Mexico City, roughly three quarters of the 24 contributions fell into this first category (The Getty Conservation Institute, 2019).



- 1 Cover image 'On microperformativity', featuring Yann Marussich's performance *Bleu Remix*. Hauser, J. & Strecker, L. (ed.) *On Microperformativity*. *Performance Research* 25 (3). 2020. Image: Axel Heise.
- 2 Characterization Grid according to Appelbaum, B. *Conservation Treatment Methodology*. Oxford: Butterworth-Heinemann, 2007, p. 12.
- 3 Time-Based Media Works of Art Structure and Condition Report provided by the Matters in Media Art platform, a collaborative information resource on the care of media art, launched in 2005 between the New Art Trust (NAT), the Museum of Modern Art (MoMA), the San Francisco Museum of Modern Art (SFMOMA), and Tate.
- 4 Edward Steichen's *Delphiniums* installation at the Museum of Modern Art, New York, June 24<sup>th</sup> to July 1<sup>st</sup>, 1936. Image: Steichen Carousel.

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### The Characterization Grid

	Material aspects	Non-material aspects
<b>Object-specific information</b>	<p><b>II</b></p> <p>INFORMATION: Observed phenomena and their interpretative materials identification, determination of structure.</p> <p>SOURCE: Object.</p> <p>STRATEGY: Physical examination analysis, imaging, testing.</p>	<p><b>III</b></p> <p>INFORMATION: History of the object current value, projected future.</p> <p>SOURCE: Custodian, others.</p> <p>STRATEGY: Interview, consulting institutional records.</p>
<b>Non-object specific information</b>	<p><b>IV</b></p> <p>INFORMATION: Methods of manufacture, material properties, deterioration studies.</p> <p>SOURCE: History of technology, material science, conservator's knowledge of similar objects.</p> <p>STRATEGY: Consult conservation literature.</p>	<p><b>I</b></p> <p>INFORMATION: Information about related objects, art history, general cultural information.</p> <p>SOURCE: Allied professions, conservator's prior knowledge.</p> <p>STRATEGY: Review literature, consult allied professionals.</p>

Fig. 1. Information to be included in a full characterization

Quadrant II contains information that is material-based but not specific to the object. This relates to the chemical properties and physical behavior of the component materials of the object, and often comes from materials science. Another category of information in this quadrant is the history of technology of this type of object and its expected methods of construction. Together, this information enhances the conservator's understanding of findings from the physical exam by explaining signs of the object's creation and phenomena related to aging. The physical examination is a snapshot of the object at a particular moment in time, but data from materials science allow us to extrapolate from the object's current state both backwards and forwards in time to produce a picture of the object's material life.

Quadrant III contains information specific to the object but not material-based. An important category of information is the values

**TIME-BASED MEDIA WORKS OF ART  
STRUCTURE AND CONDITION REPORT**

<b>ARTIST:</b>
<b>TITLE:</b>
<b>ACCESSION NUMBER:</b>
<b>DURATION:</b>
<b>DESCRIPTION:</b> <small>Brief description of the work and what is important</small>
<b>KEY ARTWORK INFORMATION:</b> <small>Please see prompt sheets for information that should be entered here about the artwork.</small>
<b>LIST OF COMPONENTS SUPPLIED AS PART OF THE PURCHASE PRICE OF THE WORK</b>
<b>MEDIA:</b> <small>Please list the status of the media elements, describe its condition and enter key cataloguing information. Cheat sheets are available for different types of media</small>
<b>DISPLAY EQUIPMENT:</b> <small>INVENTORY</small> <ul style="list-style-type: none"> <li>- Please list all the hardware which came as part of the purchase of the work</li> <li>- Please list all additional equipment required in order to display the work</li> <li>- Assess the status of the equipment</li> <li>- Enter key cataloguing information</li> <li>- Assess condition and risks</li> </ul> <small>Prompt sheets are available for different types of display equipment</small> Computer Playback Video Projector Video or Computer Monitor/ screen Film projector Slide projector
<b>SCULPTURAL ELEMENTS:</b> <small>Please describe the condition of the sculptural elements and enter key cataloguing information.</small>
<b>PACKING AND CASES:</b> <small>How are the elements packed. Describe the cases.</small>
<b>WHAT ADDITIONAL ELEMENTS WERE MADE FOR ARCHIVAL PURPOSES?</b>
<b>WHAT ELSE IS NEEDED FOR THE DISPLAY OF THE WORK?</b> <small>Indicate whether it was purchased or will need to be purchased before it goes on display</small>

**DESCRIPTION OF HOW THE MEDIA ELEMENTS WERE MADE:**

Provide a description of how the work was made. For example the work was shot on 16mm film by the artist, the footage was selected prior to editing and then edited on computer (AVI) and output on digital betacam. For display the gallery has provided a standard definition DVD which was encoded at 4.8 Mbps. The gallery then provided a Digital betacam clone and a copy of the DVD to the gallery as part of the acquisition.

**STATEMENT OF SIGNIFICANCE:**

This statement is based on the views of the artist, the curator and the conservator as to what is important about the work. The aim is to provide a statement which will help guide future decisions about the ongoing care and display of the work. This statement will be drafted early on but amended once key processes are completed such as the artists interview. For example has installation they shoot for the artist, Phil Collins, has said that the volume should be equivalent to a night club so that the viewer feels a rush of excitement as they enter the space. In other examples key aspects of the significance of components might relate to a link an historian or curator has made to the themes of a work, its technology, the way one enters the space, a colour used, or the context or historical moment in which the work was made etc.

**ASSESSMENT OF THE GREATEST RISKS:**

**DISSOCIATION OF INFORMATION**

Inadequate installation instructions (see installation template for the level of information considered adequate)  
 Inadequate information about the status, dates and origin of the media elements (see below for catalogue information required)

**RISK OF OBSOLESCENCE OF KEY DISPLAY EQUIPMENT OR TECHNOLOGIES**

Having established that an item of display equipment or a particular technology is key to the ability to continue to display the work without significant loss assess the risk of obsolescence (already obsolete, obsolete in the next five years) against its unique contribution to the work. For example a Gary Hill computer control system and media playback system can be migrated with no significant loss whereas the inability to show his monitor based works without cathode ray tube monitors would represent a significant loss.

**RISKS ASSOCIATED WITH POOR MANAGEMENT OF MEDIA ELEMENTS AND DISPLAY EQUIPMENT**

A high risk of this type is where the condition of master material is poor and/or it is on obsolete formats and has not been migrated onto new formats.  
 Similarly for display equipment a high risk would be associated with equipment which was very important to the work but that it had not been serviced and maintained, no service manuals etc were provided and no spares were available.

**RISKS ASSOCIATED WITH THE DETERIORATION OF SCULPTURAL ELEMENTS**

In this case a high risk of no longer being able to display the work would be associated with sculptural elements being in a poor and unstable condition.

**CONSERVATION PLAN**

This will relate to the risks identified above. Priorities will be set by the level of risk and the value of the component at risk.

**SIGNED:**

**DATE:**

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collected information about sculptural and display elements, a description of how the media elements were created is required, as well as a section about the risk of obsolescence of key equipment or technologies and, in addition, a risk assessment with regard to poor management of media elements, such as the impossibility to display work because of obsolete formats or the loss of service manuals, etc.

The third category still lacks any coordinated methodology, since these practices cut across many disciplines, from art to natural history, medical and design museums, media art and performance, biotechnology and bioethics, and are still only supported by a few collectors ready to engage in the subsequent challenges beyond conservable objects. Some of the challenges of biomedial art may present similarities to those of performance art – especially as their actual presence may not only be re-enacted, but ‘survive’ in the form of documents or physical remnants (Hauser, 2005). However, the various nonhuman and techno-scientific agencies of microperformativity involved in such artworks destabilize human scales (both spatial and temporal) as the dominant plane of aesthetic experience, and link together the machinic and the organic. The shift from organic representation to biological manipulation results in technical, institutional, regulatory, legal, ethical, bureaucratic, philosophical, and aesthetic issues regarding museum infrastructures, the status of living organisms, tissues, and genetically modified organisms (GMOs), and their fragility when maintaining, conserving, re-enacting, or shipping them. And for these challenges, cultural institutions remain dramatically ill-equipped.

### From biotic appearances toward biotic functioning

Both with regard to the second and the third category of conservation and archiving methodology significant changes can indeed be traced back to much earlier evolutions in artistic practice in the 1960s and 1970s, which, at a closer look, conceptually anticipated the different bio(techno)logical agencies increasingly occurring since the late 1990s. The general shift from object-hood to process-based art linked to the cybernetic paradigm in the second half of the twentieth century was described by Lucy Lippard as a phenomenon she called the “dematerialization of the art *object*,” which did not mean to call for the absence of any materiality, but rather for placing a greater focus on conceptual artistic thought and processes rather than on collectible objects (Lippard, 1973). Similarly, Jack Burnham’s *Beyond Modern Sculpture* (1968) aptly anticipates what biomedial art would later become in an era of technical media competence, interest in scientific insights, awareness of ecosystems, and the desire to biotechnically create ‘aliveness’. Burnham examines the evolution of sculpture over the last twenty-five hundred years and states that art’s survival will depend on its transition “from a psychically impregnated totemic object toward a more literal adaptation of scientific reality via the model or technologically inspired artefact,” then to “life-simulating systems through the use of technology” and “away from biotic *appearances* toward biotic *functioning* via the machine”. (Burnham, 1968:p.76) Influenced by cybernetics, environmental concerns, and Ludwig von Bertalanffy’s systems biology (Bertalanffy, 1949), Burnham hopes that such art will encourage spectators to adopt a holistic view and develop environmental consciousness – not *contra*, but *qua* technology. It is, however, unlikely that he had anticipated the incredible variety of biology-related and biotechnology-based art forms today, which draw on and exploit the extremely large spectrum of characteristics that the allegedly self-evident notion of ‘life’ brings about. Is it enough to identify a single entity as being alive? In biology, the concept of ‘life’ means always at the same time the trans-generational preservation and evolution of individual organisms as ‘life flow’. It deals not only with the structure and behaviour of individual organisms (morphology, physiology, genetics, biochemistry, ethology), but also with their transformation in an intergenerational process (phylogeny), and their integration in superordinate systems (ecology). As an example, a definition that is both biologically and philosophically grounded has been established by Bernhard Rensch in his *Epistemology based Biophilosophy* (1971/1968), providing a very complete definition of ‘life’ as being manifested by a sum of characteristics, including some that one could also find in the inanimate world; all of these criteria, however, are *necessary* but not *sufficient*:

Living beings are *hierarchically organized, open systems* of predominantly organic compounds. They usually constitute *clearly delineated cellular individuals* showing a *temporary constancy*. Their cells are morphologically characterized by specifically functioning *organelles* (cell membranes, nucleus, chromosomes, ribosomes, mitochondria, or their pre-stages). With regard to their chemical constitution, they are characterized by *specific proteins und nucleic acids*. *Metabolism and exchange of energy* give rise to *activity* and maintain the organism in a state of *dynamic equilibrium*, determined by complex *structural and functional interrelationships* and controlled by particular *steering and feedback systems*. They show *specific reactions to external stimuli* [...]. All their structures and processes are mainly *purposive*, serving a rational functioning of the organs and the *maintenance* of the individual and the species, but *historically* conditioned by the *structure* of the organism's phylogenetic ancestors. *Reproduction* through totipotent cells is linked to *changes of form in the course* of the individual's life. Organisms undergo phylogenetic alteration through the *mutation* of hereditary factors. They are links in the continuous chain of cells that constitute the *stream of life* to which probably every species of organism ultimately belongs. *Progressive development* in many lines of descent made the *emergence of complicated psychological processes* possible. (Rensch, 1971/1968:p.54)

Within the *epistemological turn* in art today, art historians and media studies scholars are well advised to scrutinize the emphasis that artists selectively place on chosen characteristics of 'life', since these choices are likely to serve as indicators of both the philosophical and techno-scientific contexts within which they operate. Artists, when dealing with the notion of 'Artificial Life' or the criteria for 'bio art', must make aesthetic and epistemic choices among the many manifestations and characteristics of 'the living', and it can be sufficient to emphasize only a few of these characteristics to evoke or stage aliveness. Activity, metabolism, growth, reproduction, mutation... which characteristics of the living are being emphasized via technology, and when, how, and why? Practitioners of 'dry' robotic art may focus on *activity, regulation, and irritability*, those with an interest in digital simulation of populations on *reproduction, evolution, and mutation*, and practitioners of 'wet' biotechnological art on *metabolism, dynamic stability, or protein-based materiality* of their displays.

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### Materials, media, and paratexts: toward evolving and adaptive archives

These preferences translate into the chosen art media via which the agents of aliveness are coupled and made present, constantly resulting in the most diverse difficulties regarding *staging, conservation, and transport*. However, these challenges should not be treated as just a straightforward grid of practical problems to solve in order to enable museums to stage new 'living images.' They are philosophically most inspiring and point as much to profound changes in contemporary art practices as to institutions' incapacity to adapt and evolve accordingly. Phenomena that once took the form of artistic images are being fragmented into a variety of instances of "biomediality" (Hauser, 2014a; Hauser, 2016), which need to be considered an integral part of the aesthetic idiom – including the challenges, intended or not, prone to exasperate and disrupt the museum routine.

Interestingly, even the first reported historical case of genetically modified organisms exhibited as artwork in a major museum already anticipated the entanglement of today's challenges. In 1936, at New York's Museum of Modern Art, photographer Edward Steichen exhibited hundreds of living delphinium plants [Image 4] that he had bred and altered with colchicine, drawing parallels between the authentic aliveness of his photography and flower breeding. The exhibition followed his motto "art for life's sake"; the museum "reduced to showing 'art for art's sake,' to Steichen . . . [was] a mausoleum" (Gedrim 2007, p. 353). Steichen drove the blooms to MoMA in a refrigerated truck, and their display needed to be occasionally refurbished during the eight-day show. The museum took care, explicitly in their press release, to "avoid confusion; it should be noted that the *actual* delphiniums will be shown in the museum, not paintings or photographs

THE MUSEUM OF MODERN ART  
11 WEST 53RD STREET, NEW YORK  
TELEPHONE: CIRCLE 7-7470

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FOR RELEASE Monday, June 22, 1936

WEATHER PERMITTING!

Because of the recent cold, rainy weather, the dates given below may have to be postponed a day or two so that the delphiniums may be in full bloom. Please mention this weather-permitting clause and suggest that all interested persons consult their newspapers Wednesday for any postponement of the opening.

This release is for publication Monday, June 22. If the opening date should need postponing, all newspapers\* will receive word to that effect Tuesday afternoon, June 23.

The Museum of Modern Art, 11 West 53 Street, announces a very unusual one-man, one-week show which will be opened to the public Wednesday, June 24, at one p.m. It will be an exhibition of "Steichen Delphiniums"--rare new American varieties developed through twenty-six years of cross-breeding and selection by Edward Steichen. Although Mr. Steichen is widely known for his photography, this is the first time his delphiniums have been given a public showing. They are original varieties, as creatively produced as his photographs. To avoid confusion, it should be noted that the actual delphiniums will be shown in the Museum--not paintings or photographs of them. It will be a "personal appearance" of the flowers themselves.

Mr. Steichen is President of the Delphinium Society of America. His interest in cross-breeding and selection of flowers began thirty years ago, but in 1906 he became interested chiefly in the breeding of delphiniums. He now devotes ten acres in Connecticut to that purpose and uses about one plant in forty for cross-breeding. The rest are plowed under. Some day when he feels satisfied with his work he hopes to give the results of it to the world in a few rare varieties of delphinium.



of them” (Museum of Modern Art, 1936) [Image 5]. The artist’s desire to see purposeful genetic mutation applied to plant breeding recognized as art seems to be correlated with shipping and customs issues he had previously encountered. It is reported that Steichen was involved in an exhibition at MoMA for which he shipped Constantin Brâncuși’s *Bird in Space* (1923), which was refused both duty-free entry into the United States and status as a work of art because of its lack of representative qualities, since “no feathers were visible” (Gedrim, 2007:p.350). Steichen’s battle against the \$600 penalty is therefore to be seen as a part of a larger battle to redefine aesthetics. However, his delphiniums were not for sale as art ‘objects’, and his MoMA works ‘survived’ as unsalable photo documentation only before they later appeared beyond the confines of the art market, in the form of commercially available, affordable seed packs under the name *Delphinium Steichen strain mix*.

Half a century later, Steichen was rediscovered and rehabilitated as the precursor of biotechnological art by George Gessert, a painter who exchanged brushes for genetic plant hybridization in the early 1980s. In his installations of ‘inverted Darwinism’, Gessert selects plants diametrically opposed to dominant aesthetics and the ‘laws’ of the market (Gessert, 2003). Downplaying human centrality, he acknowledges “insects and wind” [Image 6] as equal nonhuman co-creators, and insists on keeping his seeds “out of the marketplace” and away from art collectors (Gessert, 4<sup>th</sup> August 2008). Instead, for him the “art to scatter” consists of inserting his hybrids into the ecological cycle: sowing seeds, sending pollen or plants to people, or transplanting them at unexpected urban or wilderness areas (Gessert, 1993), instead of trying to convince a white cube institution of the accuracy to exhibit living plants, as Steichen had insisted on some decades ago.

This first trans-historical comparison already bears many elements that are crucial to understand that, with regard to literally ‘a/live’ art, an archive would need to adopt an evolutionary and adaptive structure itself – not only collecting objects, materials, and technical media, but also continuing to include contextual information about social perception, acceptance, reactions, scandals, anecdotes, and ‘all things that can go wrong’, which feed into the aesthetic object itself, in and over time. Especially since most often only a very restricted audience has the chance to experience such artistic displays directly in exhibits or performance situations, biomedial art is – as I wrote elsewhere – “like a book that hardly anybody has read but everybody is talking about”, so that “wet biological art is mainly presented via, and judged upon, secondary texts, documentation, and other mediated paratexts” (Hauser, 2008:p.85). At the same time, this art has often been coveted by multiple socio-political actors for its ability to influence discussion on biopolitical and ethical issues, rather than being perceived ‘just as art’. It is, therefore, worth to point to the concept of ‘paratextes’ both for the *staging* and *conservation* of biomedial art works. According to the conceptual grid proposed first by Gérard Genette in 1987 in the realm of structuralist literary theory, paratexts act as thresholds between text and off-text, mediating between the relations of content and receiver, “to *make present*, ensure the text’s presence in the world” (Genette, 1997:p.1). Although Genette is interested in the relationship between books and readers, his grid can also be transposed onto a more complex, intermedial concept of artworks. In the case of ‘wet’ biological art, the concept is useful, since works are often mainly, or only, presented via, and judged upon, secondary texts, documentation, and other mediated paratexts. Genette defines paratexts as an equation of two categories: Paratext = peritext + epitext. The peritext includes elements inside the confines of the aesthetic object; the epitext denotes elements outside the aesthetic object. Transposed to art, peritexts would comprise elements such as the artist’s name (individual or collective, pseudonym), work title, artist’s statements and notes of intention, didactics, gallery size and type (art, science, or design museum), dedications, epigraphs (external quotations), parallel actions or displays that act as ‘footnotes,’ etc., and so on. What would qualify as epitexts is the following: public appearances such as reviews and interviews, public responses, media coverage, and symposia; or private epitexts such as letters and correspondences that are then, in turn, integrated into the work itself. Artists are actively shaping the modes of perception of their highly mediated

work – looping, programming, and inducing feedback to it, which on its own becomes part of artistic practice. In our field of study especially, artworks are rarely narrated based solely on intention, aesthetic appearance, and cultural references, but also on external reactions to it. Artists themselves often “measure the success of their efficiency less in gallery prices at the New York Chelsea art market than in its impact, prompting reactions from targeted, but also from randomly encountered authorities: ‘the French culture minister was offended,’ ‘the German beer police intervened,’ ‘the museum director prohibited the performance’” (Hauser, 2008:p.98), in addition to all technical and ethical hurdles, whose overcoming becomes part of the work itself.

### Disrupting routine: (nearly) all can go wrong

And there is a lot that can go wrong. The ideal-case scenario in which a work of biomedial art can be seamlessly shipped and staged alive and be functionally conserved in its potential to be re-enacted whenever needed, is a rare exception. Despite diligent curatorial work, which requires time and effort to be spent negotiating specific local laboratory infrastructures, sometimes more than a year in advance, one can hardly escape the endless legal and bioethical paperwork, the perpetual shipping and customs problems, and the manifold technical, ethical, and legal challenges to maintain literally alive art. Issues with *staging*, *conservation*, and *transport* [Image 7] use to overlap.

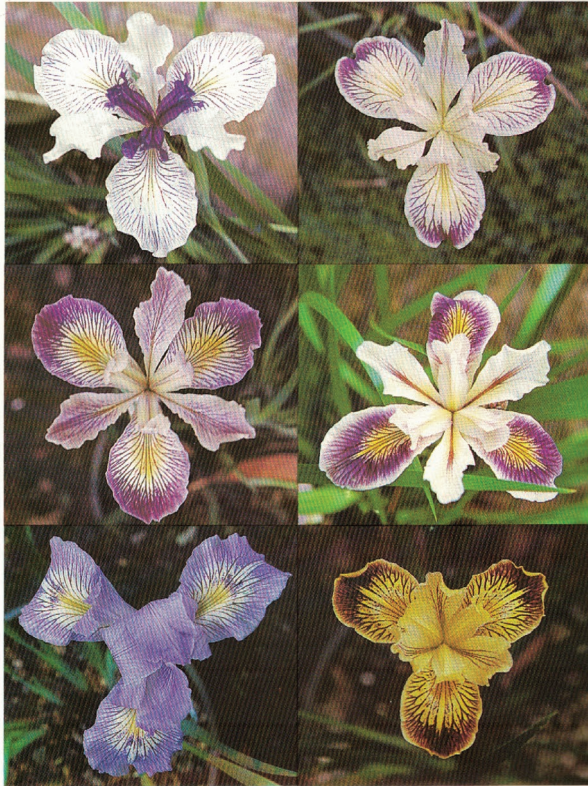
The *transport* of such works – including actual organisms, organic matter, or biological samples such as genetic sequences, plants, or tissue – often cannot be handled by regular art shippers. Instead, biomedical companies must transport them from lab to lab. Cryopreserved specimen or inflammable liquids, such as formaldehyde or ethanol, pose serious challenges to transporters; artworks are then often not insured as artworks, but simply as ‘biological specimen’, which turns out to be problematic in cases of loss or theft. Additionally, customs declarations may require different details to be reported when such art travels across international borders, conforming to national policies with regard to biodiversity, ethics, veterinary, phyto-sanitary, or pest regulations. This may even lead to absurd situations of customs declarations containing different labels on the way in and out for the same artwork, or artists driving GMO based artworks themselves over borders and exhibiting them in a legally grey zone ‘only in transit’ on the way to a lab where they will be officially autoclaved.

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*Staging* biomedial art is, technically, the most challenging when artists insist that their work must be exhibited alive. This often overexerts, and sometimes voluntarily challenges, a museum’s ability to provide the needed infrastructure for works that fall outside standard display methods. Regular care and maintenance by specially trained assistants is necessary. In addition, the health and safety and ethics regulations for the public display of materials, such as tissues or GMOs, are not the same in every country. Living organisms are sometimes euthanized by museums after an exhibition against the artist’s will in order to comply with animal health inspection and quarantine rules – even after organizing gallery talks that glorify interspecies empathy, leading to involuntary schizophrenia between artistic discourse, language of care, and the harsh legal and, sometimes, lethal institutional constraints. Legally, some GMO works cannot be shown outside the authorized labs where they originated, replacing them with non-GMO versions in the actual gallery situation. Common practices such as loan agreements or condition reports encounter obstacles when the work consists largely of ephemeral, living, or perishable entities and customized or borrowed laboratory equipment. At the same time, these institutional limitations push artists to consider exhibiting simulacra, documentation, or remnants instead of the actual ‘alive’ artwork.

*Conservation* of art that deals with the manifold characteristics of the living, such as metabolism, growth, reproduction, or mutation, unfolds per se as paradoxical. The functional preservation of artworks may be possible in cases where the artist establishes the precise

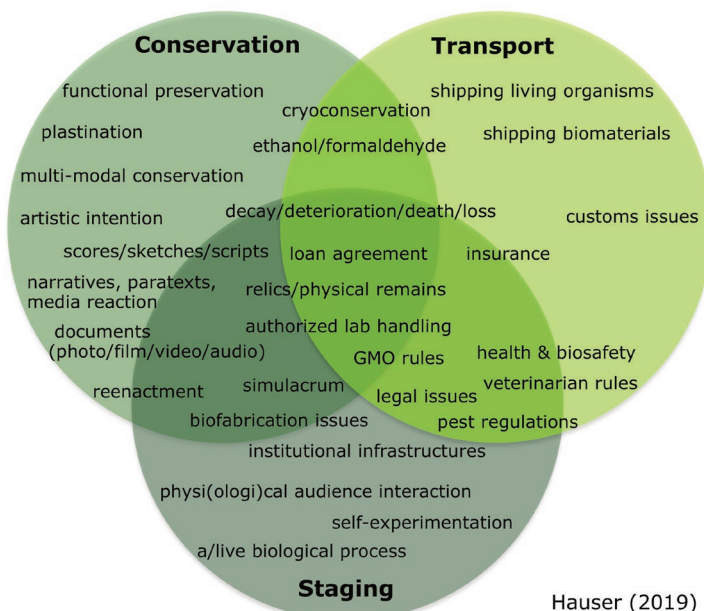
# PACIFIC COAST NATIVE IRIS



HYBRIDS BY INSECTS, G. GESSERT, AND WIND

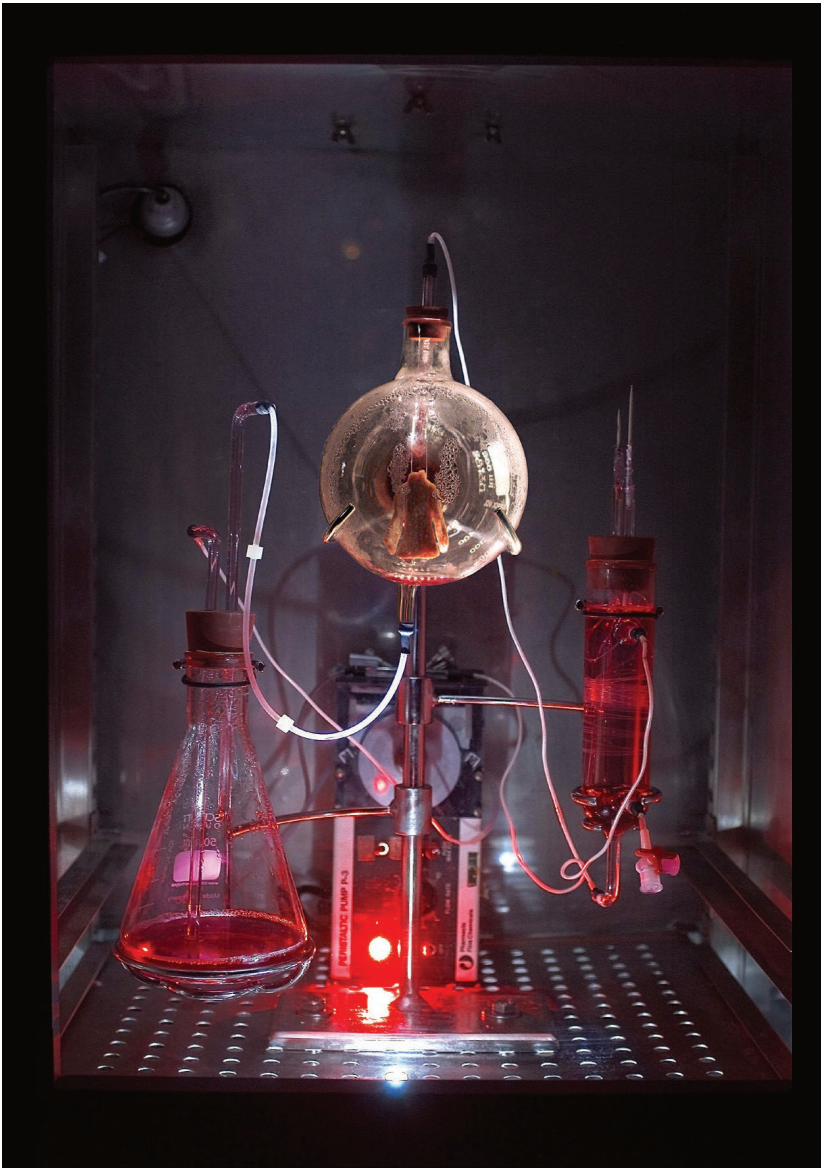
- 6 George Gessert, *Pacific Coast Native Iris*, seed pack, private collection. Image: Jens Hauser.
- 7 Overview of issues occurring with staging, conservation, and transport of biomediated art, contribution to the conference *Living Matter: The Preservation of Biological Materials Used in Contemporary Art* held by the Getty Conservation Institute in June 2019 in Mexico City. First published in Hauser, J. 'Conserving A/Live Art: Some survive, few are conserved, even less can travel: Paradoxes and obstacles in maintaining and staging alive biomediated art'. In: Rivenc, R. & Roth, K. (eds.) *Living Matter: The Preservation of Biological Materials Used in Contemporary Art*. Los Angeles: Getty Conservation Institute, 2022, p. 76.

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Hauser (2019)



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- 8 The Tissue Culture & Art project, (*for art is like a living organism*)... *Better Dead Than Dying*, display at the *Fabrique du Vivant* exhibition at Centre Georges Pompidou Paris, 2019. Image: Aniara Rodado.
- 9 The Tissue Culture & Art project, *Victimless Leather - A Prototype of a Stitchless Jacket Grown in a Technoscientific 'Body'*. Image: Tissue Culture & Art Project (Oron Catts & Ionat Zurr).
- 10 The Tissue Culture & Art project, *Victimless Leather*, tissue-engineered cell sculpture, plastinated by Gilles Desraisses, private collection, 2010. Image: Axel Heise.
- 11 A + B: Brandon Ballengée, *Species Reclamation Via a Non-linear Genetic Timeline - An Attempted Hymenochirus Curtipes Model Induced by Controlled Breeding*, 1998-2006, preservation and storage kit for collectors, private collection. Image: Axel Heise.

protocols for their re-enactment. However, an on-going debate among protagonists in the field is whether a biological entity should be preserved, plastinated, or taxidermied after its performative display, and whether intervening in processes such as decay or apoptosis can even be considered conceptual abuse in the name of conservation. In some cases, technical solutions are conceived for collectors to preserve the work's apparent 'aliveness' even in the event of its biological death. More often, instead of the actual performative artwork, documentation, scores, sketches, and other mediated paratexts are increasingly deployed and produced by artists aware of these institutional constraints. The following case studies illustrate some of the manifold issues occurring in parallel, and possible solutions.

### The artwork as a living organism: 'better dead than dying'?

It is understandable that artists who struggle for their work to be shown alive have a tendency to mock and thematically address museums' inefficiencies to provide the required infrastructure. Insisting that their work must be shown alive, requiring incubators, peristaltic pumps, and lab access, they increasingly conceive of their participation in large exhibitions as a deliberate institutional critique. A recent example shows how the Tissue Culture & Art Project, a protagonist of biomedial art for the last two decades, challenged the Centre Pompidou in Paris by exhibiting a work that brands museums as the ultimate necropolis. At the symposium accompanying the art and design show *La Fabrique du Vivant* at Centre Georges Pompidou in Paris in 2019, Tissue Culture & Art Project cofounder, Oron Catts, revealed in public the previous correspondence with the Centre Pompidou's curators: "I am afraid it would be difficult to realize a living installation work as part of the show *Designing the Living* at the Centre Pompidou." (Catts, 29<sup>th</sup> March 2019) In order to mock a large institution's tendency to make long name-dropping lists, to surf on the wave, but not to cope with the needed infrastructure, they staged an ironic work referencing Samuel Butler's *Erewhon* (Butler 1872): The piece (*for art is like a living organism*)... *Better Dead Than Dying* [Image 8] consists of a closed bioreactor where cancerous HeLa cells grow a miniature figurine shaped after Henrietta Lacks, the person from whom this cell line once originated. (Skloot 2010) However, the reactor is specifically designed with limited nutrients and without a waste removal system, so that it becomes, purposefully, a death chamber. Another piece by the Tissue Culture & Art project, *Victimless Leather* [Image 9], sparked headlines like 'Murder at MoMA' when the bioreactor growing miniature leather-like jackets out of immortalized animal and human cell lines had to be stopped due to unforeseen cell proliferation taking over the apparatus in MoMA's *Design and the Elastic Mind* show. (Yap 2009) While the art died a month into the exhibition, the institution turned their failure to stage the piece as intended into a popular selling narrative. However, *Victimless Leather* was successfully exhibited twice, just before and after the MoMA exhibition, as part of the *sk-interfaces* exhibitions in Liverpool and Luxembourg (Hauser 2008), with infrastructures organized many months ahead of time. Indeed, contamination with bacteria and fungi occurred even here, and the artists had to fly in from Australia for re-seeding the pricy, ironic, and very seasonal piece of *haute couture*. Another interesting aspect concerns the question of the 'afterlife' of the grown biotechnological garments, debated between the artists and the curator, resulting in the decision to have the surviving cell cultures plastinated [Image 10] by French preparator Gilles Desraisses (who learned his technique from Gunther von Hagens), but to keep them strictly for documentation purposes – neither exhibit them in place of the actual piece, nor sell them.

In contrast, the artist Brandon Ballengée has found a way to both carry out bio-artistic research and preserve material outcomes that can be collected. In his *Species Reclamation via a Non-linear Genetic Timeline* [Image 11 A & B], he aimed at phenotypically re-creating an extinct aquatic frog species using closely related extant species by resurfacing historically described physical traits, resulting in 'living sculptures'. They live their natural life span before being cleared and stained (a chemical process to reveal the animal's skeletal anatomy consisting of bones and cartilage), photographed, and sold as prints

or as conserved specimens, ready to be released into glycerine, where their translucent members seem to gracefully swim.

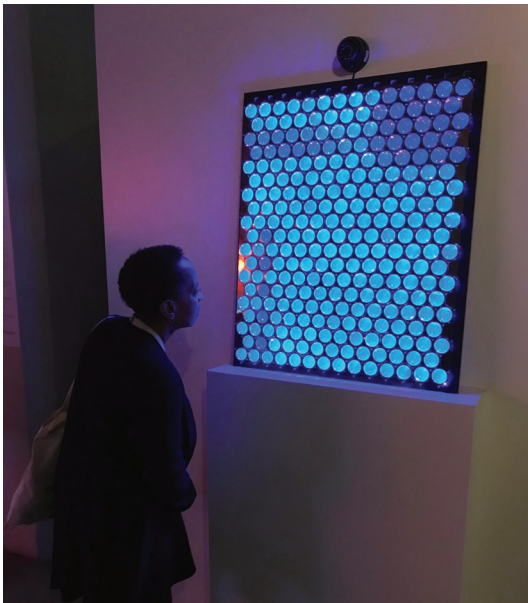
An exemplary case of the conservation of a complex synthetic biology-based work is *Living Mirror* [Image 12] by the artist duo C-Lab, which solves the challenge of optimizing a living biomedica piece so that its function is preserved in potential perpetuity, and with the aim that it can even be sold to a collector in order to potentially function without any time limit. *Living Mirror* uses magneto-tactic bacteria's ability to swim along the Earth's magnetic field in order to create a living mirror image of the silhouette of its observer. Once an input image is translated into a magnetic field, the bacteria reorient their bodies in real time, causing light to scatter and create an image in a liquid bacteria culture. The piece draws on the myth of Narcissus, who fell in love with his own image in the water's reflection, and at the same time emphasizes the contemporary scientific discovery that human bodies are made of a majority of nonhuman bacterial cells. The development of a collectible version in which this shimmer effect persists over time took several years – with, according to the artists, bottles available for replacement in case of anomalies. Even if the bacteria died, whatever nanomagnetic chain they created would remain intact after their death.

### Anticipatory obedience – stretchable regulations

A striking example of how GMO regulations affect biomedica art differently, even across countries within the otherwise homologized space of the European Union and associated countries, is Jun Takita's bioluminescent sculpture *Light, only light*. The work is meant to be experienced by visitors in total darkness, and consists of a 3D print of the artist's brain covered in moss containing a genetic sequence from the firefly. Confronting the viewer with a light-emitting plant, materializing the historical association of light with life, Takita presents the transgenic as an ambiguous cognitive achievement of the human brain. The brain shape is strongly reminiscent of skull motifs seen in *vanitas* and *memento mori* paintings (Hauser, 2013). Initially developed as a fully functioning version perceivable with the naked eye for the exhibition *sk-interfaces* at FACT art centre in Liverpool, thousands of pounds and many months were spent developing the piece with a team of Japanese scientists and a supporting lab in Leeds. After discussions with the UK Department for Environment, Food and Rural Affairs (DEFRA), and just a week before the opening, the art centre reconsidered the artwork. Despite being double-contained in a specially built Plexiglas case and displayed in a closed gallery, the potential release of spores into the environment could not be 100 per cent excluded “in the event of a systems failure,” and although given “the chance is slight and that if such an event were to occur it would constitute a category 1 (low) release,” this was a risk they were unwilling to take. (FACT, January 24<sup>th</sup>, 2008) As a result, *sk-interfaces* only included a non-glowing, non-GMO simulacrum – a fact that was indeed disclosed to audiences, in order to stress the difficulty of staging such artwork. A few months later, however, a fully functional version of *Light, only light* [Image 13] made its debut as part of the Article Biennale in Stavanger, Norway. Here, the glowing brain sculpture was shown in the lantern room at a coastal lighthouse, where visitors were invited in to contemplate the stunning effect. This time, the organizers had decided to operate in a legal grey zone by displaying *Light, only light* ‘in transit’. A permit for contained use of genetically modified plants was obtained under the condition that the transgenic moss, after having been sent from Leeds to a laboratory in Uppsala/Sweden and driven over the border by the artist himself, would be autoclaved at a laboratory at the University of Stavanger. And finally, no regulatory issues occurred during the next venue of the *sk-interfaces* exhibition, the Casino Luxembourg. In close coordination with that country's Ministry of the Environment, and taking the issue seriously several months before the opening, the venue deemed Takita's piece as not presenting any danger of unintended release, and organized popular weekly demonstrations of the moss glowing in a specially constructed gallery room to a limited number of visitors. Luxembourg's decision might have been influenced by a precedent: the official authorization obtained for another transgenic art



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- 12 C-Lab, *Living Mirror*, display at the Ars Electronica festival in Linz, Austria, 2019, collection of Wiyu Wahono. Image: Adam Brown.
- 13 Jun Takita preparing his installation *Light, only light* for display in the light room of the Tungenes lighthouse on the Norwegian coast near Stavanger, 2008. Image: Jens Hauser.
- 14 Art Orienté Objet, *Artists' skin cultures*, tattooed tissue cultures of the artists' skin conserved in formaldehyde, 1996. Image: Art Orienté Objet (Marion Laval-Jeantet & Benoît Mangin).
- 15 Art Orienté Objet, *May the Horse Live in Me (Que le Cheval Vive en Moi) - La Visitation*, performance with Kapelica Gallery, 2011. Image: Miha Fras.
- 16 Art Orienté Objet, still images from *Peau Immune (Immune Skin)*, 2011, Video 10' as part of the performance *May the Horse Live in Me*. Images: Art Orienté Objet (Marion Laval-Jeantet & Benoît Mangin).





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piece to be shown at the same exhibition: Eduardo Kac's *Natural History of the Enigma*. This work involves the creation of a transgenic 'plantimal' by combining human and plant DNA to produce a genetically engineered flower. However, Kac's actual GMO plant could not be displayed in the end because of phyto-sanitary reasons regarding the import from the USA to Europe.

### Archiving multi-temporality

Human-animal relationships, transposed into actual wetware practice, are genuinely prone to even more complications. An early art piece involving tissue culture, Art Orienté Objet's *Artists' Skin Cultures* [Image 14], is curious with regard to conservation and transportation issues. Initially grown out of the artists' epidermal cells grafted onto pig dermis and tattooed with motifs of lab model organisms and endangered species, these trans-species totems were supposed to be offered for grafting to collectors but were conserved in formaldehyde and sold in the end. Ironically, although the pieces were made in the United States in 1996, they could not be shipped back from France for the *MATTER(S) matter(s): Bridging Research in the Arts and Sciences* show at the Eli and Edythe Broad Art Museum at Michigan State University, Lansing, in 2018. (MSU Broad, 2022) Since formaldehyde is flammable, no art shipper agreed to take this on, and companies specializing in shipping biological samples refused to transport the work due to its hybrid human-animal nature. This necessitated applying for a special permit from the US Department of Agriculture and involved a months-long process. Previously, when shipping the work to Australia for the *Still, Living* exhibition as part of the Biennale for Electronic Arts Perth (Symbiotica, 2012), a workaround was created whereby the customs declarations contained different descriptions on the way in and out: while 'pig cells' were disguised under more generic 'human and animal cells' on the way to Australia, only cells labelled 'domestic pigs' were sent back to France, since shipping human cells would have caused legal complications.

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With regard to issues of *staging*, *conservation*, and *archiving*, another project by the French duo Art Orienté Objet reveals itself as a telling case study: Their well-known performative biomedical self-experimentation piece, *May the Horse Live in Me* [Image 15], staged in Ljubljana with Kapelica Gallery in 2011, demonstrates the proximity of concerns that biomedicine and performance art share. After several years of preparation, artist Marion Laval-Jeantet was injected with compatibilized horse blood to experience immune otherness in an act of trans-species blood brother (or sister) hood. The artist turned herself into a proverbial 'guinea pig', injecting herself over the course of months with horse immunoglobulins to develop a tolerance to these foreign animal bodies, and to be injected without falling into anaphylactic shock, so that the horse immunoglobulins would by-pass the defensive mechanisms of her own human immune system, enter her blood stream to bond with proteins of her own body and, as a result, impact the body functions of her endocrine system. This risky undertaking alludes to the possibility of healing autoimmune diseases using foreign immunoglobulins as therapeutic 'boosters', but the performance was also conceived as a continuation of the centaur myth, that human-horse hybrid which, as 'animal in human,' symbolizes the antithesis of the rider, who as a human dominates the animal. After the transfusion, Laval-Jeantet, on stilts, performed a communication ritual with a horse before her hybrid blood was extracted and freeze-dried. It is interesting to analyse the different modalities by which the artists decided to stage, document, conserve, re-enact, and even sell this work. Hybrid freeze-dried blood conserved in glass tubes is presented in engraved aluminium boxes, alongside video and high-quality photo documentation. However, there is one hybrid element that conceptually *precedes*, *accompanies*, and *outlasts* the micro-performance: a time-lapse video [Image 16], based on the artist's immunological research that visualizes, in real time, the effects on Marion's body. It functions at the same time as a preliminary *score*, as a *time-based live performance element* and, later, as a *documentary trace*.

Such a conceptual structure can also be observed in Paul Vanouse's gel electrophoresis-based performative works and displays, *Latent Figure Protocol (LFP)* [Image 17] and

*Suspect Inversion Center (SIC)* [Image 18]. Here, the artist inverts the standard logic of making visible the banding patterns created by gel electrophoresis: analytic laboratory methods are used for synthesis, and figurative images are created from a *known* DNA sample instead of the customary abstract patterns from an *unknown* DNA sample. Vanouse generates *iconic* images which are *symbolically* highly charged – such as ID, 01, the copyright symbol, the chicken and the egg, or the skull & crossbones – by treating each lane on the gel as a row of pixels composed of DNA fragments, creating a 2-D grid of bands resembling a low-resolution bitmap image. One can imagine the multiple possible approaches of conserving such an artwork, e.g. as a filmed live lab performance, as a time-lapse video with the emerging motif, as an art book that reproduces the step by step emergence of the motifs via a flipbook section (Hauser, 2011), but also as a collected set of materials, chemicals, biological agencies, and instructions of how even other performers could re-enact the process, containing artistically created DNA sequences, primers, probes, Sybr Safe, agarose etc. In addition, instead of producing aestheticized still images, Vanouse transposes the final gel from the electrophoresis procedure onto photographic film, illuminated from behind. But these light boxes [Image 19] are rather a materialised snapshot of the microperformative processes and contain the recipe for making the moving DNA image itself: the plasmid organism and all enzymes needed to ‘digest’ it, are pedantically listed. As such, the body of work comprises, at the same time, a *score* that matches the preparatory work combining digital simulation and hands-on experimentation with different DNA samples, pH levels, and temperatures, then the time-based live performance during which the artist explains the recipe to an audience, and finally the documentary trace inscribed by the list of enzymes for each row on the photographic film of the light boxes.

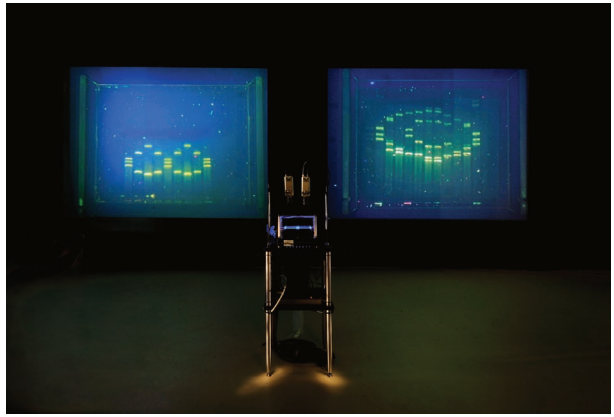
#### **Between post-anthropocentric excitement and the curators’ nightmare: microperformative agencies**

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The worst-case scenario consists of loss or theft during transport resulting from the use of companies not specialized in art shipping, nor offering adequate insurance coverage. Take Tagny Duff’s *Cryobook Archives* as such an example. The *Cryobook Archives* [Image 20] are frozen sculptures made of human skin. It takes weeks to prepare the packages to meet international shipping standards for biological samples, and they can only be shipped from lab to lab as research items. Since no art shipper was willing to transport living biological samples on dry ice, as required for this work, the pieces were shipped via FedEx from Canada to France to be displayed at the *SO3* exhibition at the Espace multimédia Gantner – but disappeared in transit (Hauser, 2015). While the box with the dry ice arrived, all the fleshy sculptures were missing without any explanation; they had last been tracked at the FedEx hub in Memphis. The artist speculated that perhaps “an underpaid chain worker believed this to be a precious organ, worth thousands of dollars on the black market”, or that “customs or state authorities considered the art piece to be suspicious and infectious” (Duff, 2015). The statement can, here again, be seen as an important paratext of the work – a peri-text in this case, which denotes elements initially outside the aesthetic object, but which can be integrated according to the context and the exhibition history, to finally become an integral part of the work’s narrative. Concordia University considered suing FedEx for the loss, but then decided to pay the required amount to enable the artist to reproduce the works, so that they would not only live in memory through photos and videos.

Duff’s case teaches us to anticipate the enormous panoply of not only archivable information and technical media necessary for staging and potential re-enactment (such as a mobile cryo-unit), but also the very specific organic materials and agencies involved – in the case of the *Cryobook Archives*: donated skin tissue, donated human breast tissue samples, pig’s skin, lentiviruses to transfect the skin tissue, and enzyme-conjugated secondary antibodies needed in the immunohistochemical staining processes. These are no longer simple and sourceable materials, even organic, but complex physical-chemical systems, as well as techno-cultural hybrid “epistemic things”

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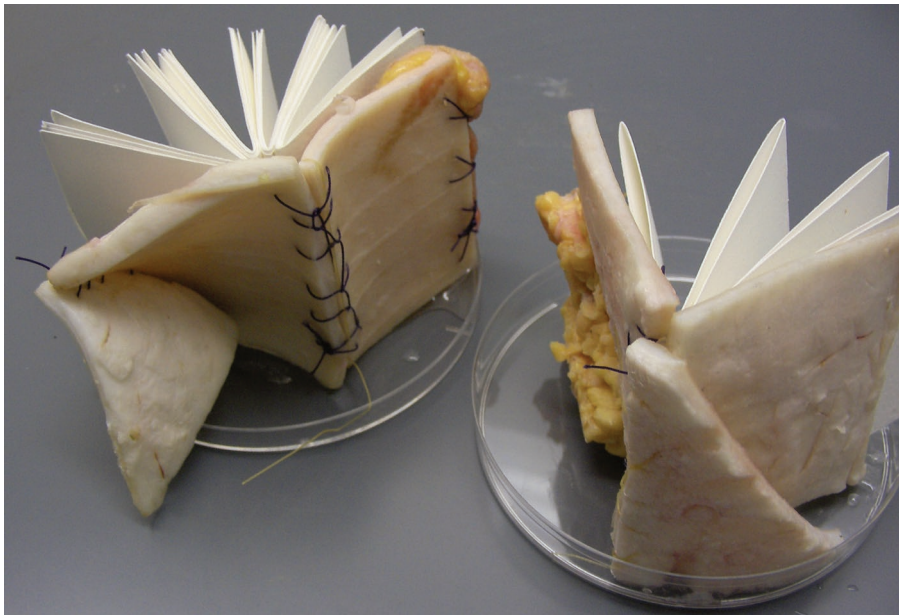
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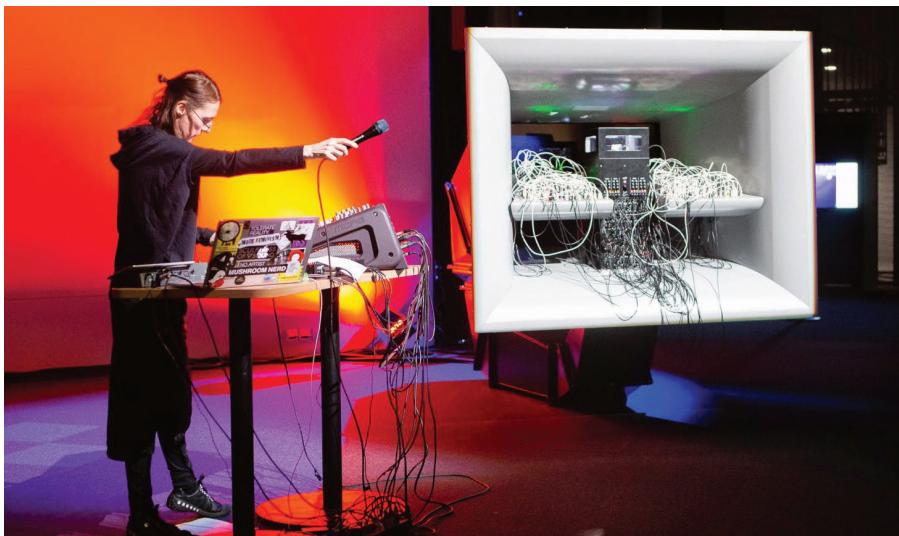
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- 17 Paul Vanouse, *Latent Figure Protocol (LFP)*, installation view from Transmediale 2011 as part of the exhibition *Fingerprints...* at the Ernst Schering Foundation Berlin. Image: Axel Heise.
- 18 Paul Vanouse, *Suspect Inversion Center (SIC)*, installation view from the exhibition *Fingerprints...* at the Ernst Schering Foundation Berlin, 2011. Image: Axel Heise.
- 19 Paul Vanouse, *Latent Figure Protocol (LFP)*, light boxes, installation view from the exhibition *Fingerprints...* at the Ernst Schering Foundation Berlin, 2011. Image: Axel Heise.
- 20 Tagny Duff, *Cryobook Archives*, skin tissue transfected with viruses, cryopreserved between -40 to -80 degrees Celsius, and displayed in the form of anthropomorphic bibliopegy, 2010. Image: Tagny Duff.
- 21 Guy Ben-Ary, *cellF*, here playing with AGF (aka Antye Greie-Ripatti), Science Centre Heureka, Helsinki Finland, 2019. Image: Mari Keski-Korsu.



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(Rheinberger, 1997). Artists today engage in microbial transplantation, bacterial labour, protocell synthesis on stage, as well as in ecological or bird flu related performances and hardly perceivable physiological micro-gestures on different scales. *Performance art* shifts toward a general *performativity in art* that increasingly includes other than human agencies. Such *microperformativity* denotes art practices and theories of performativity to destabilize human scales, and to redefine what art, philosophy, and the technosciences consider to be a 'body' today, consequently displacing the focus from its mesoscopic *actions* to its microscopic *functions*, from physical gestures to physiological processes, and from staged diegetic time to real performative time, even of an experimental setting in a Petri dish. As such, the inclusion of 'aliveness' enlarges the scope of the evolving field of the 'live arts'. Non-human agencies are being staged in relation to techno-scientific or algorithmic systems, thus addressing contemporary dynamics linking the organic and the machinic. The neologism *microperformativity* has progressively emerged from years'-long observation and epistemological scrutiny of how and why art since the 1990s has appropriated a large variety of increasingly available biotechnologies as performative media in order to, literally and materially, stage 'aliveness', including at microscopic scales *in vivo* and *in vitro*. (Hauser, 2020b) Within our special issue with the journal *Performance Research*, the contributing authors have addressed a large variety of instances of microperformativity, biological and technical ones alike:

extra-terrestrial organic matter (ETOM); protocells – precursors of cells formed by innate, complex chemistry, created live on stage; 'psilamine', an artistically created psychotropic molecule; volatile organic compounds (VOC) and aerosols; DNA sequences, manipulated by processes such as electroporation, lipofection or biolistics via genetic guns; protective immunoglobulins; enzymes and pheromones; bio-solar cells, pluripotent stem cells; growth media, amino acids and signalling proteins to culture cells in incubators; spiking neurons grown on micro-electrode arrays; yeast cells; aquatic cyanobacteria; chemolithoautotrophic bacteria (*Acidithiobacillus ferrooxidans*) and human skin bacteria (*Staphylococcus epidermidis*, *Corynebacterium xerosis* and *Propionibacterium avidum*); fungi (*Psilocybe cubensis*); bodily fluids such as mucus, breast milk, blood, sweat and tears; microbiomes sourced from breast milk or Pygmy populations; sweat glands; *Begonia* seeds; jelly fish, xenopus, zebra fish and mealworms; techno-scientific experimental devices such as Winogradsky columns, blunt-tip applicators, or microfluidic machinery with its associated giant unilamellar vesicles (GUVs) and water-in-oil droplets (W/Os); phoneme caption devices and voice spectrograms; machinic graphics processing units (GPUs); Artificial Intelligence based deep learning networks and corporate surveillance systems; high frequency trading algorithms; weaving robots and looms... and also – viruses. (Hauser & Strecker 2020:p.2)

This eclectic list resonates with Chris Salter's bon mot resuming the pervasiveness of the 'performative turn' today: "Bacteria perform processes. Scientists perform experiments. Algorithms perform actions. Humans perform gender and sex. The question is who or what nowadays doesn't perform?" (Salter, 2020a:p.9).

### Performing the archive / Performativity of the archive

The shift from *performance as art* to *performativity in art* is strikingly illustrated by the so-called 'posthuman sound piece' (Salter, 2020b:p.104) *CellIF* [Image 21] by Australian artist Guy Ben-Ary, featuring 'a rock star in a petri dish'. Here, lab-cultured spiking biological neurons are generating sounds, connected to electronic machinery, a kind of neural synthesizer, playing together with a human jazz musician. This piece is of particular interest because it combines in a very explicit sense the notions of 'performance' and 'performativity'. While the notion of a performance puts an emphasis on presenting something to an audience, mostly via a human presence, the notion of 'performativity' highlights the execution of whichever action or process – here, for instance, the spiking

nerve cells in the techno-scientific apparatuses – while the main purpose of nonhuman performativity is *not* the encounter with an audience. German cultural theorist Hans Rudolf Velten sums up the “magic of the performative” as being “processual and transformative [...], anti-hermeneutic” and instead favouring “(corporeal) presence and effects of presence over representation and representing”, being an “antagonist of ontological and essentialist definitions”, while not only focusing “on the discursive features of an art work, but on the processual features [...], able to analyse the hybridity of cultural phenomena and of inter-medial constellations”, expressing “uneasiness about authorial intention” and rather “focusing on the reception and audience of a performance”, meanwhile linking “the material, bodily aspects of culture with its symbolic meaning” (Velten 2012:p.255-256). In this perspective, and with regard to *CellF*, it is tempting to imagine all possible issues related to transport, staging, and conservation – including the need to culture live neurons each time before re-enacting the piece, the technical infrastructure, which goes much beyond the confines of a traditional audio recording, which would otherwise be the most evident form of conservation, etc.

Thinking of collecting and archiving biomedica-based art thus requires one to think not only about those who are and will be *performing the archive*, but also about how far this unstable art is predestined for a *performativity of the archive* itself (Borggreen and Gade 2013), evolving and creating its own ‘life’ over time, rather than only conserving fetishized remnants, documentary traces, recorded narratives, and technical protocols. If for (human centred) performance art “the concept of ‘keeping alive’” is used, in the sense of “transmitting and transcribing them, or interpreting them further” as a “the result of performative procedure and actions” rather than constituting a passive collection (Grau, Müller and Von Büren 2012:pp. 20 & 23), then the microperformative nature of alternative agencies calls for shifting the *metaphoric* level of the ‘living archive’ to the *metabolic*. On the one hand, of course, creating archives includes the active and selective construction of history for which all criteria from the aforementioned categories of object-based contemporary art and digital media art apply. Archivists act as “gatekeepers” who select, filter, and decide upon the allocated place, based on personal preference, professional experience, social influences etc.<sup>3</sup> They also have an impact as “agenda setters”, determining which thematic issues will be considered most important by the archive’s users,<sup>4</sup> with all of the inherent risks of over-representation, omission, exclusion, and erasure. Are these selective processes to be carried out by institutions, curators, by the concerned artists themselves? Are these databases structured predominantly to record artist information, technical and visual documentation, and how much does the exhibition history include, beyond the artist’s intention and interpretation of a piece, as well potentially undesirable narrative elements referring to polemics, reactions, absurdities, anecdotes and other paratexts of ‘all that can go wrong’? How can curatorial expertise be registered and transmitted – expertise, which in this case is also abstract-technical and empirical-material? How can the minimal versus the ideal conditions be defined, to be respected in case of a re-enactment?

Most likely, wetware art archives will differ from previous ones with regard to the constitution of a material ‘database’ for potential re-enactments, which includes hybrid biotechnological systems, cell lines, and organisms, while complete digital storage may prove to be insufficient. An interesting mind game is to compare post-digital, but information technology inspired archives compiling synthetic biology-based artwork with biobricks, on the one hand, and the creation of a specific and individual cell line, on the other. In the first scenario, code- or circuit-based conceptions consider ‘standardized parts’, ‘circuits,’

- 3 The concept of ‘gatekeeping’ was popularized by David Manning in the field of communication studies, examining the factors an editor takes into consideration when deciding which story will enter the news (White, 1950).
- 4 Agenda-setting theory examines the influence of media effects, claiming that while media have a great influence by instilling what audiences *should think about*, but less on *what they actually think* (McCombs & Shaw, 1972).



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22 *Harlequin Coat*, video projection and bioreactor with ORLAN's skin cells, a black woman's cells, and marsupial cells at the *Still, Living* exhibition curated by Jens Hauser, Bakery Artrage, Biennale of Electronic Arts Perth (BEAP), 2007. Image: Tony Nathan. Courtesy of the artist.

23 Magali Daniaux and Cédric Pigot. *Devenir Graine (Becoming Seed)*, video-taped performance in front of the Svalbard Global Seed Vault, 2012. Courtesy of the artists.

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‘modules,’ or ‘chassis’ collected in the Registry of Standard Biological Parts set up by the MIT, and presented at popular events such as the International Genetically Engineered Machine Competition (iGEM), as a functional extrapolation borrowed from computer culture. The jargon is dominated by the concept of *orthogonality*, which implies that – unlike in most living systems – the technical effect produced by one component does not create side effects on other components of the system, “just like in a car,” where “adjusting the rear-view mirror does not affect the steering” (Billerbeck & Panke 2012:p.21). Artworks which rely on such *standardized* information may well be re-enacted through such a procedure. The second scenario concerns the use of primary skin cells obtained via biopsy – but which are technically difficult to be perpetuated: The *Harlequin’s Coat* [Image 22], ORLAN’s first project to involve biotechnology, comprises a custom-made bioreactor in which the artist’s own skin cells are live co-cultured with those of other ethnic origin, as well as with animal cells. The bioreactor is positioned as the head of a coloured, larger-than-life-size figure made of Perspex and bears a mixture of ORLAN’s primary skin cells and those of the WS1 female foetus cell line (Hauser & Hallensleben, 2010). This work is, however, emblematic with regard to both its technical and biological obsolescence and, for this reason, has not yet been re-staged recently after the initial *Still, Living* exhibition in Perth (2007) and *sk-interfaces* in Liverpool and Luxembourg (2008 & 2009). One reason for this is that the prototype of the bioreactor began to leak, and its internal mechanism began to fail. Up to this day, even given the primary high exposure of the artist in the international contemporary art circles, no institution has ever accepted the challenge to engage in a repair or a new conception of the central element of this piece. The other reason is that ORLAN’s primary cells had been conserved and cultured at SymbioticA in Perth, but given the limited ‘life span’ of primary cells, no ‘original ORLAN cells’ are available anymore, which means that in order to restage the piece, the artist would need to undergo another biopsy of her cells, the reproduction rate of which is decreasing with the artist’s own biological age. In this sense, a third option may give an idea of how bio-archiving has inspired artists from the beginning: *The Immortalisation of Billy Apple*® was a collaborative project by pop artist Billy Apple and biologist Craig Hilton, generating an immortalised cell line for further use by the larger artistic community. Billy Apple’s B-lymphocytes, virally transformed to be able to grow indefinitely, were isolated and grown in a tissue culture media, displayed in the gallery in an appropriate setting, including temperature, humidity, nutrition, and contamination-free conditions (Hilton, 2014). The aim of the project was both to protect the *Billy Apple*® brand by immortalising his biological tissue – potentially – for perpetuity, but also to make this cell line largely available by the deposit with the American Type Culture Collection cell bank. But now, after the artist himself passed away in 2021, how will institutions – and also other artists – re-interpret his immortalised cell line? Will cultural practitioners just take advantage of his much welcome ‘raw material’, reference the artist as an homage, or rather draw parallels between this intentionally created cell line of a white male artist on the one hand, and the HeLa cell line, once established without the consent of the black woman disowned of her cells, Henrietta Lacks? In this case, the archive will turn out to be performative as much as the performativity of the archive will engender new forms.

### Seeds and Soils: Creating growth cycles

What if we conceived of a biomedial art related archive as a seed bank? But what constitutes a seed bank, then? What is more important: to exhaustively accumulate grain in sterile and soil-less conditions, or to permanently actualise seeds in an on-going cultivation cycle? What probably comes to mind first is the Svalbard Global Seed Vault located on the Norwegian archipelago of Spitzbergen in the Arctic. It is a kind of trans-generational vessel corresponding to Noah’s Ark in the Anthropocene era, speculating on the seed’s potential to be able to travel both through space and time. In this vast natural cold chamber in the Arctic ice plant, seeds that tell the story of the planet’s biodiversity are put into deep sleep, potentially to be awakened in the event of war or ecological disaster. It is all but certain that the seeds stored in this universal treasury will still be able to germinate in a century or two. It is more of a gene bank for scientists and companies

than a seed bank for farmers, mainly preserving the gene pool rather than crop diversity at a time when multinationals are pushing the ideology of monoculture. Ironically, this sarcophagus against the erosion of biodiversity has itself recently been flooded by the melting permafrost. This absurdity has been picked up by the French artist duo Magali Daniaux and Cédric Pigot. In their video-taped performance *Devenir Graine (Becoming Seed)* [Image 23], they organise a silent protest in front of this underground bunker and imagine that the seeds have already been stolen by global GMO companies. In a complementary move, the Food and Agriculture Organisation of the United Nations promotes community seed banks that encourage the cultivation of local varieties with high genetic diversity and the ability to resist and adapt to environmental change. Here, the focus is on permanent breeding activity, where seeds are exchanged and sold to neighbouring communities, creating varieties that are not accessible through formal seed systems. Which strategy of archiving would we then like to adopt? For sure, MoMA conserves photographic and narrative traces of the 1936 Steichen exhibition – but no seeds to actually regrow this historically important show out of their archives. The seeds themselves took a different route, having been relegated to ‘non art’ for decades, as cheap commercial seed packs, but which have not been available for a long time. It is only thanks to an international network of ‘art breeders’ and ‘biohackers’ that the remaining seeds have been localised and re-cultivated recently. One would be tempted to trust George Gessert’s preference for an ‘art to scatter’ in unexpected places of wilderness, rather than in the jungle of institutional constraints to build archives for that which has already passed.

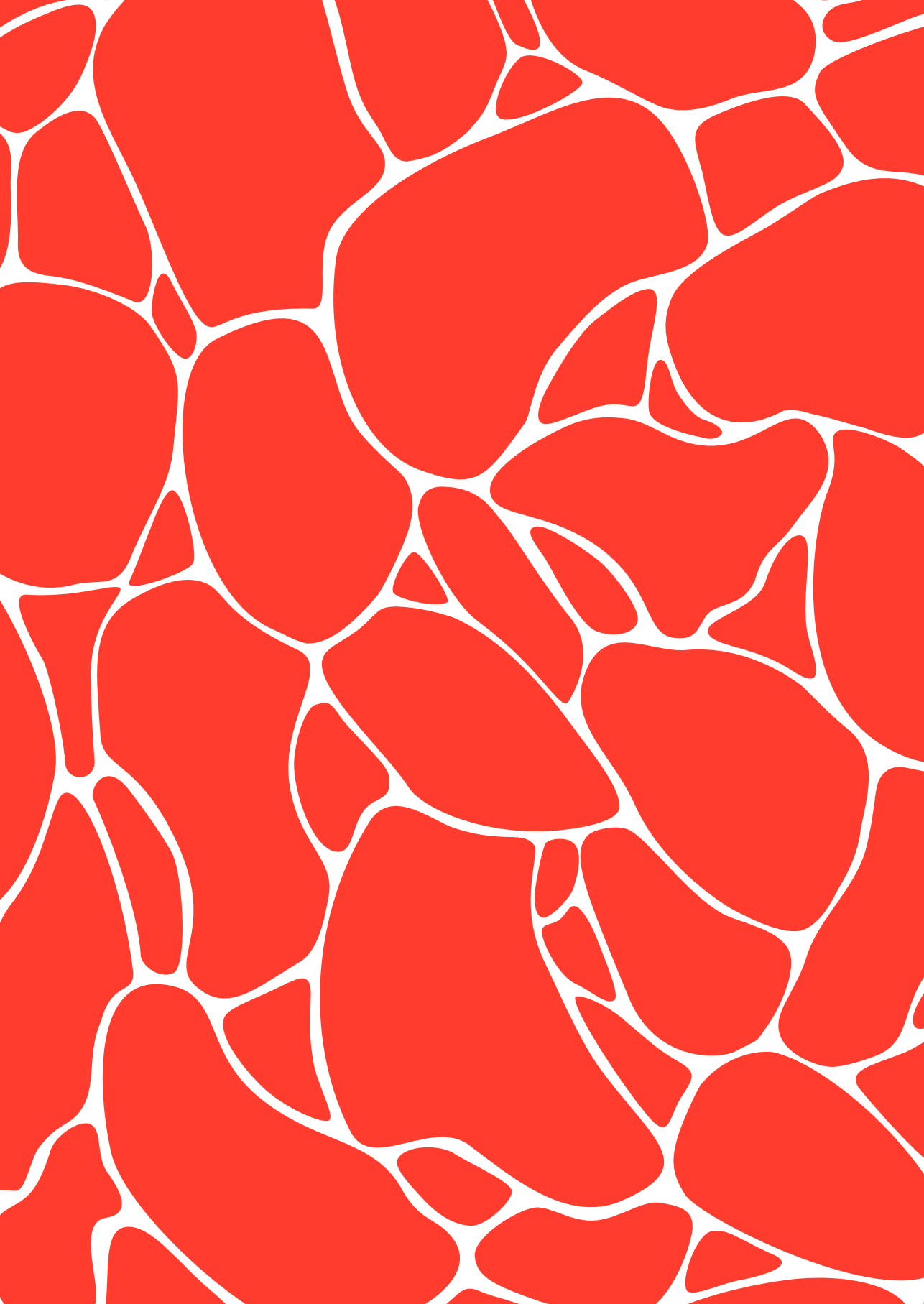
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**Jens Hauser** is a Paris and Copenhagen based media studies scholar and art curator focusing on the interactions between art and technology. He is currently a researcher at the University of Copenhagen's Medical Museion, and a distinguished affiliated faculty member at Michigan State University, where he co-directs the BRIDGE artist in residency program. He is an affiliated faculty member at Danube University Krems, a guest lecturer at the University of Applied Arts Vienna and at the University of Innsbruck, a guest professor at the Department of Arts and Sciences of Art at Université Paris I Panthéon-Sorbonne, and a researcher affiliated with École Polytechnique Paris Saclay. Hauser has been the chair of the European Society for Literature, Science, and the Arts' 2018 conference in Copenhagen. At the intersection of media studies, art history, and epistemology, he has developed an aesthetic and epistemological theory of biomediality as part of his PhD at Ruhr University Bochum, and also holds a degree in science and technology journalism from Université François Rabelais in Tours.



# Outsourcing Care for Life

Ionat Zurr

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“Not a necropolis, but a histopolis, if I may coin a word: not a cemetery, but a place of eternal growth.” (Huxley, J. *The Tissue-Culture King*, 1926)

This paper explores the challenges involved in the care and labour required for exhibiting life as performing objects of art. It will explore the inherent paradox of using living systems for art: On the one hand, the artists are objectifying life by separating living systems from their original context and positioning them on display. On the other hand, through this objectifying act, the artists are hoping to create or enhance the liveliness effect of the artwork, to encourage the aesthetics of care to/for our living environment. Here, I will discuss what is required to present these out-of-context living (or semi-living) artefacts. Then I will look into the maintenance required to perform living artefacts, as well as the type of labour, giving examples of artworks and their artificial support mechanisms.

The discussion will take a more provocative turn, with adopting the “male engineer gaze”<sup>1</sup> in the act of outsourcing care for living artefacts, through automation, drawing on a recent exhibition titled *3SDC: Sunlight, Soil & Shit (De)Cycle*.

The conclusion is an ironic twist, commenting on (performative) death as the most effective means of producing the liveliness affect, borrowing the suggestion put forward by Samuel Butler’s 1872 science fiction; “for art is like a living organism, better dead than dying”.

<sup>1</sup> As in interview with Simon Schaffer, Professor of History of Science at Cambridge University in the BBC podcast “Automata”.

### The first step is separation from context

When living or semi-living systems are being examined in the lab or by the audience in cultural institutions, they are separated from their original context (their natural environment, or the bodies of which they were once part). This mechanism is a violent act of separation, re-contextualization, and redefinition. The living artefact is being prepared/manipulated for human needs of exploration, whether this be through less obstructive view for the human gaze and/or through appropriation of scale to human sensory system and comprehension (i.e. microscope, projection and so on). This is the beginning of the living artefact objectification.

Artists working with living systems, though, are interested in emphasizing the livingness or vitality of their artwork (otherwise, why use such a fragile and temperamental medium?). Although the artists are required to objectify their artefacts, they use different techniques to create a liveliness affect by emphasizing or anthropomorphing the life-like qualities of their artworks. This mostly occurs through visible or implied movement (automata) for example *Futile Labout* (Zurr, 2015) or through sounds (MEART, 1998), smells (Chieza et al, 2019) and interactive elements and rituals. For example, *the ritual of feeding* and *the ritual of killing* as performed in the early works of the author and her collaborator Catts (Senior, 2014). Some artists apply a more durational approach (and less anthropocentric) and let the living artwork change overtime as a signifier of its liveliness (Petrič, 2015).

### Separation of context requires a new, artificial support

When life is separated from the environment it evolved into, if possible, it adapts to the newly introduced human-made environment. However, in many cases, especially if bodies are being fragmented, artificial support must also be constructed for its survival and care.

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Zoos are one of the most common examples of such artificial environments which care for organisms who are isolated from their original environment. These environments, like biological artworks in galleries, are designed to cater both to the de-contextualized organism performing as well as to the human viewer; for example, cages or enclosures with unobstructed view are built, speakers enhance the animals' sounds (or record and replay them) and rituals are performed together with the animals for the amusement of the audience and to demonstrate and enhance the animal "liveliness". The animal becomes the modern automaton-like creature, in the sense that it excites the public imagination in regards to its species, as well as affecting attitudes towards life and the living overall. Like galleries, zoos developed their own archives of precious, rare and culturally significant artefacts. The frozen zoos are an interesting example of such archives, the most notable being San Diego, which has "the largest and most diverse collection of its kind in the world. It contains over 10,000 living cell cultures, oocytes, sperm, and embryos representing nearly 1,000 taxa, including one extinct species, the po'ouli." (San Diego Zoo Wildlife Alliance, 2022) Parts of organisms are isolated, decontextualized and kept in suspended animation inside an artificial support mechanism – the cryogenics. They are literally put on ice in a liminal state, with the *potential* of becoming reanimated if inserted into a new context: "Germplasm stored in the Frozen Zoo® has the potential to produce offspring when used for in vitro oocyte maturation and fertilization, artificial insemination, and embryo transfer... With intracytoplasmic sperm injection, southern white rhino oocytes were fertilized with sperm frozen for 20 years." (San Diego Zoo Wildlife Alliance, 2022).

Beside the question of whether a new context will ever become available for these fragments of lives, another unknown to ponder over is whether these fragments of lives, after being "resurrected" and put into a new context (whether an ovum, womb, body, cage-environment or atmosphere), are an exact copy of what was lost and preserved? Is



their promised *potential* fulfilled? These lessons and questions can be applied to biological artworks and their archives and collections. Should these living and semi-living artworks be preserved in a state of a potential (to be resurrected in time for display) such as being in a cryogenic state, or in the form of written instruction protocols? For example the artwork *Nature* by de Menezes is preserved as written instructions for building a greenhouse, accompanied by a scientific protocol outlining the modification procedure for the butterflies' wings (de Menezes, 2003). Alternatively, will dead relics or photographic representation suffice instead?

Another environment is the biological laboratory which is equipped with different life support mechanisms and tools to provide new artificial care; ranging from rooms with automated temperature control, cages, sterile environments, environments which supply manufactured nutrients, controlled PH levels, artificial lights to simulate circadian rhythms and, very importantly, provisions for propagation and reproduction of the life forms out of context.

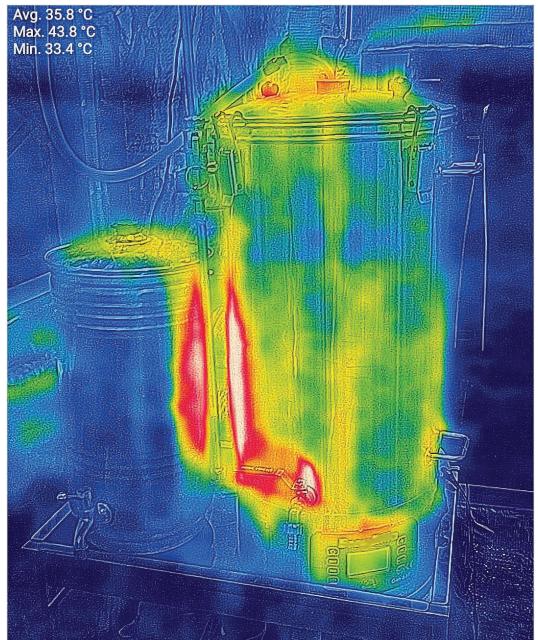
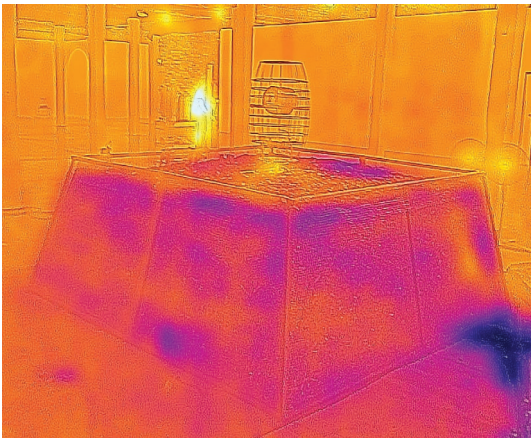
In the early days of presenting living artworks, if presenting life that requires laboratory equipment support and maintenance, such as in the case of the semi-livings<sup>2</sup>, the artists (including the author of this paper) had to create a laboratory in the gallery space in order to present the performing living artefacts.

Ars Electronica *The Next Sex* festival in 2000 is considered a seminal event in the field of Biological Art. Three installations included performing living artefacts; bacteria, tissue constructs, and whole organisms – butterflies (Stocker & Schöpf, 2000). In the piece *Tissue Culture and Art(ificial) Wombs* (AKA *Semi-Living Worry Dolls*), miniature doll-like sculptures (approx. 2 cm x 1 cm x 0.5 cm), hand crafted from biodegradable polymers and seeded with McCoy cell line (Expasy, 2012), were bathed in nutrient solution inside a bioreactor's vessels. This vessel sustained these life forms and shielded them from the harmful external environment. The bioreactor is a techno-scientific "body" which mimics some of the condition of the bodies the cells originated from. However, the nutrients inside the bioreactor vessels had to be replaced daily, in order to discard the cell's waste and provide them, at the same time, with new nutrients. These procedures were not automated, instead, they were conducted by human (the artists) labour in a special environment – the sterile hood. The cells' well-being was monitored by an inverted microscope. The artwork, therefore, was surrounded by a number of layers of isolation; the bioreactor vessel (supplying sterile environment and nutrients), the incubator (supplying the appropriate temperatures) and the see-through walls of the lab (made of clear vinyl sheets) which acted as a physical barrier – an enclosure. This context became the way in which the artwork was "read", to the point that the *mise-en-scène*; or the technological support necessary for the survival and care of the artwork took the forefront, while the humble, small, rotating, anti-spectacle of the *Semi-Living Worry Dolls* took backstage (was overshadowed). Here the technological frame took over the artistic content.

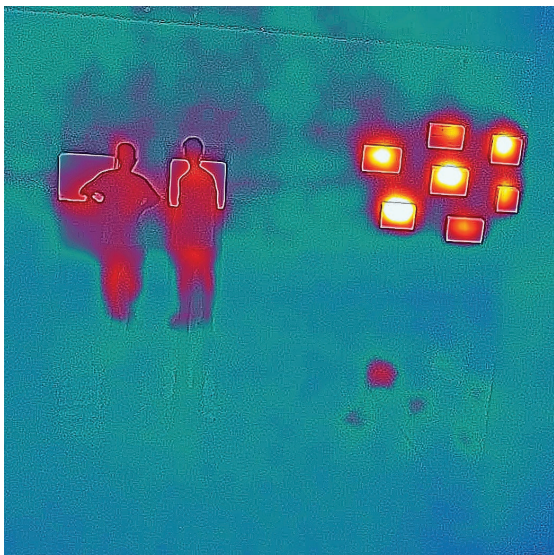
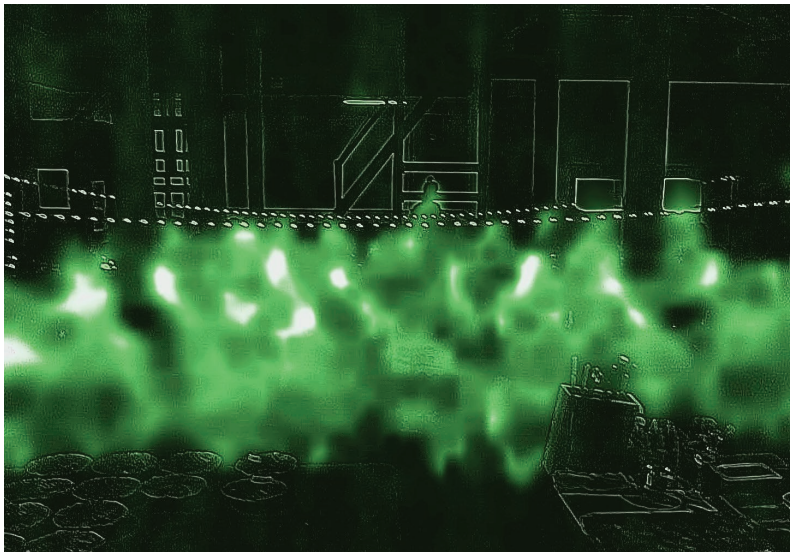
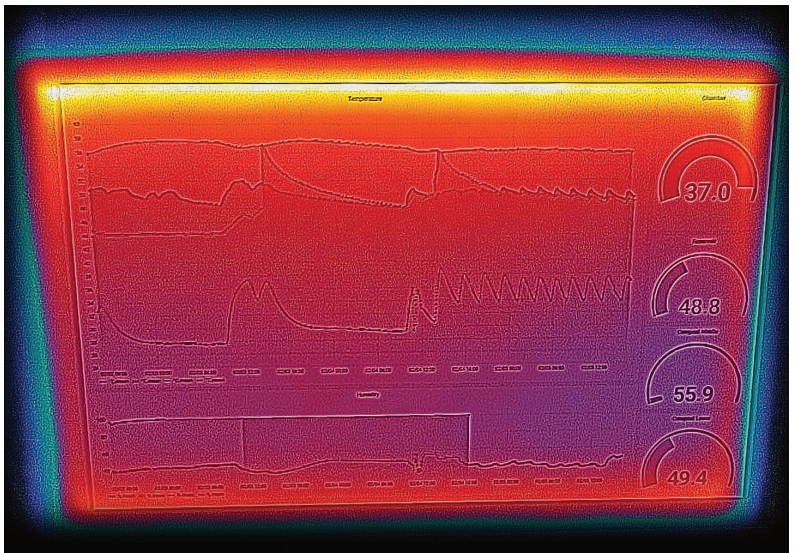
Additionally, the labour required to look after the artwork meant that the artists had to be there not only for the installation of the show, but for its whole duration (unless there was an alternative qualified human staff, trained in tissue culture and antiseptic techniques). This labour meant higher costs for the gallery, as well as causing other unpredictable issues related to working with an artist over a longer period of time.

In the early period of the field, artists (including the author) constructed different laboratories to support their semi-living artworks, adopting different aesthetics to "assist" the audience's gaze towards the artists' conceptual framework. For example, in the *Disembodied Cuisine* Installation (Catts & Zurr, 2013), the laboratory's black walls

2 Tissue sculptures made of tissues from complex organisms which are grown over/into constructed artificial scaffoldings (for more: Catts & Zurr, 2002:p.368).



The Tissue Culture & Art project in collaboration with Steve Berrick, *Sunlight, Soil & Shit (De)Cycle*, Western Australia, 2022. Image: Daniel James Grant. Courtesy of: Oron Catts and Ionat Zurr.



were a reference to Alexis Carrell's infamous laboratories at the Rockefeller Institute<sup>3</sup>. There were also round viewing "portals" positioned in strategic places. The laboratory had a dining section, as the artwork was consumed at the end of the show. However, as discussed, the artists had to visit the gallery every second day for the period of three months in order to feed their artworks in the laboratory. For the author of this paper, this became a more pressing problem once she had her own biological offspring that required her labour and time of care, which then needed to be shared with the care for the semi-living, living and performing artworks. The "solution" for these "problems" was outsourcing the care to machines and automation.

### Automation of Care

Outsourcing care for life through a simulation of an environment is a practice that dates back to at least two thousand years ago, when the ancient Egyptians simulated an environment fit for chicken eggs thermoregulation, by providing heat generated by the biological breakdown of cow or camel dung (Percy, 2006). This invention allowed them to hatch chickens without the need for a hen; "... for they do not use the birds for hatching the eggs, but, in effecting this themselves artificially by their own wit and skill in an astounding manner, they are not surpassed by the operations of nature." (Thayer, 2022). While the hen labour was diverted to the ongoing and undistracted production of eggs, human bodies were required to sense the heat of the egg by attaching it to one's own skin (human thermoception). Additional human labour was also used to turn the eggs around at intervals to allow for even thermal distribution.

Even though humans can subjectively sense changes in temperature through their bodies, it was not until the end of the 16<sup>th</sup> century that an "objective" device, external to the biological body was invented. This first technological instrument for temperature sensing was the thermoscope – an air thermometer which measured expansion of air when heated. Also called "weather glass", it is often credited to Galileo (though, some attributed it to Santorio Santorio (1561-1636), who developed the water buoyancy system in 1593 that indicated relative fluctuations in temperature. It was not until the early 18<sup>th</sup> century that physicist Daniel Gabriel Fahrenheit proposed a standardised scale to measure temperature; with the freezing point of water set at 32 °F, boiling point at 212 °F and human body temperature at around 100 °F.

In 1620 Cornelis Drebbel developed a device that used a feedback system to maintain and regulate constant temperature – the thermostat, which was used for automating the chicken incubator. The incubator was an artificial environment built to support and care for decontextualized life reproduction. Considered to be the first, first order cybernetic device, the thermostat is a feedback loop system that acts as an artificial thermo-regulator that controls the temperature in a specific environment. Following humans' ongoing (and accelerating) ambition to control and instrumentalize life for their own needs and desires, it is not surprising that the thermostat was used to outsource the care for and control of other lifeforms to a technological device. Early examples of chicken incubators and the associated systems that replace the hen for newly hatched chicks were often referred to as *artificial mothers*. The engineering male gaze made the incubator machine "alive" – it made it into an artificial mother (while the female hen was mechanised and "became" a machine that produces eggs and/or becomes herself an object of consumption, as meat). Through the ability to simulate the hen's brooding functions, it secured the supply chain of chickens and eggs as an industrial commodity.

3 "I have sought to strip from the study of this subject its former atmosphere of mystery and complications. The grey walls, black gowns, masks and hoods; the shining twisted glass and pulsating coloured fluids; the gleaming stainless steel, hidden steam jets, enclosed microscopes and huge witches' cauldrons of the 'great' laboratories of 'tissue culture' have led far too many persons to consider cell culture too abstruse, recondite and sacrosanct a field to be invaded by mere hoi polloi" (White, 1954).

Many farmers and scientists working with living systems are dependent on temperature regulating environments – incubators – for their work. While historically these artificial mothers were put at the forefront and on display for the public, this is not the case today. In the early 20<sup>th</sup> century these techno-scientific wonders were celebrated. Two notable examples are as follows: (1) Carrel-Lindbergh’s perfusion pump. Placed in a clear incubator, this elaborated glass pump was used to preserve animal organs outside the body, by pushing “artificial blood” through the pump and into the organ by way of a tube connected to the organ’s artery, which could keep the organ alive for weeks. The design was both practical and a spectacle. (2) The more controversial example is the first human incubators that were presented, by Dr Martin A. Couney, in the Coney Islands Amusement Park’s most popular exhibit:

...[V]isitors to Couney’s exhibit could watch [after purchasing a ticket and walking through the audience designated aisles] nasal feeding through a glass window; doubtless, the spectacle captured their imaginations as a simultaneously advanced and freakish alimentary display. Breast-feeding, a process central to maternity, delivered itself to mechanical production and an aesthetic display. (Gartner & Gartner, 1992)

An expensive device, it was designed to be used either by wealthy private patrons or by the poor, who in lieu of payment allowed their babies to be publicly exhibited. Its design is ideal for exhibition purposes, with the large glass windows placed at eye-level and the tiny infant’s bed suspended in the center. It is precisely these design specifications, relevant not to health care but to health care funding, which shape the path of the Lion incubator. (Proctor, 2004)

However, fast forward to the 21<sup>st</sup> century and beyond, the incubators in the scientific laboratories took the form of an opaque grey “boring” square, blending into the background of the laboratory, and hidden from public view.

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One of the reasons for such a change, this paper suggest, is to do with the objectification of life through the hiding of the artificial systems employed to support it; hiding the labour involved in that support, and, especially today, with the realization of the human induced global warming, hiding the environmental costs these artificial support mechanisms produce. In many cases, the de-contextualization, objectification, and instrumentalization of life is presented as a solution to our environmental problems rather than as part of the cause.

Artists would like to complicate and expose the costs involved in life de-contextualization and re-contextualization, not only to the biological bodies but also to the environment and earth itself. And some are doing so by purposely putting technological support at the forefront of their works.

#### **Maintenance: Feminised labour (Gutiérrez-Rodríguez, 2014)**

Western mythological human stories of decontextualized life engineered to fit a new and, often perceived or advocated as, improved environment follows a patriarchal bio-politics which many times lingers to later times. It is usually the male (engineer) gaze which brings the object in query into life; i.e. the Golem in Jewish folklore, the 19<sup>th</sup> century Frankenstein, the 20<sup>th</sup> century Pygmalion or the more current example of Craig Venter’s Synthia (Catts & Zurr, 2016). While the female gaze turns men into non-living matter or just literally kills, for example in the mythological story of Medusa or in the 2017 film *Blade Runner 2049*.

Let us go back to my earlier description of the laboratory we had to construct for our artwork at the Ars Electronica Festival back in 2000. As explained, setting up a fully functioning laboratory in the gallery to care for the performing living artefact created the

effect of the “theatre of science”. This aesthetically constrained the ability of the artists to position their artwork away from the scientific aesthetics and as a result scientific epistemology. Therefore, artists have begun designing and constructing custom-made automated artificial-support environments, in order to gain more aesthetic freedom, cut the need for a continuous laboratory access as well as reduce human labour. All these automated devices, ironically, further objectified the performing living artefact and made it more of a hybrid flesh-machine automaton.

Jumping 18 years later to 2018 Ars Electronica festival, the automated artificial support mechanism even acted as a stand-in for the living artefact itself. Similarly to the example of the first neo-natal human incubator in the earlier 20<sup>th</sup> century, it was a scientific apparatus (this time developed by Usuda & Kemp) presented and articulated within an artistic/entertainment context. This was done for the purpose of public imagination and cultural articulation. This time, the incubating system, titled after the first woman - *EVE* (Ex-Vivo Uterine Environment) (in addition to providing temperatures and gas exchange) aimed to replicate the female placenta:

...In our Artificial Uterus platform, gas exchange is performed by a sophisticated artificial placenta connected directly to the fetal umbilical cord, with circuit perfusion driven solely by the preterm fetal heart. The present aim of this work is to bring to clinic a functioning life-support platform for infants born at the current border of viability. (Ars Electronica, 2018)

The display of this techno-scientific wonder at the Ars Electronica Festival, however, was bare. No living or semi-living bodies were being sustained by this apparatus. The machine stood for the life itself.

### What about the non-human?

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The Australian bird, the Malleefowl (aboriginal name Nganamara), belongs to the Megapodidae family. Megapode, meaning ‘large-foot’ are also called the incubator bird. The Malleefowl, who are monogamous and spend most of their life together, incubate their eggs in a compost mound which is mostly built and maintained by the male bird. He uses his strong legs to scrape leaf litter and sand into a pile that slowly decomposes and as a result generates heat that keeps the eggs warm. The female’s labour is focused mainly on producing eggs — she lays 20 eggs on average each season and each egg is equivalent to around 10% of her body weight! The male labour includes maintaining the compost mound at 33C by adding, removing and shuffling the organic material to fit within the changing temperatures during the day and night. The male Malleefowl is a biological thermostat. His thermoception device is his beak. Eventually, the chicks hatch and crawl out of the mound unaided with no need for care, guidance or any contact with their parents (a dream of some of the feminists among us?). There is something peculiar in the Malleefowl attachment, devotion and care to the mound-incubator and complete indifference to their offspring.

Following the example of the Malleefowl parents’ outsourcing the care for their offspring to the incubator which is a hybrid of living (microbiota activity) and engineering (intentional construction/architecture), is the piece *Compostcubator* (Catts & Zurr, 2018). The author and collaborators have developed our own vessel of care and control, using a compost pile which creates heat to care for mammalian cells in a tissue culture flask, replacing some of the costs associated with using artificial surrogate machines (i.e. electricity) with the labour of microbiota. For many hours and days the artists and volunteers worked to create the mound of compost, examining and adjusting it just like the male Malleefowl. The cells were kept warm, and thus kept alive, by the heat provided by the compost pile.

In an ironic twist, it seems more and more that biological bodies perform and serve the technoscientific bodies/machines, rather than the other way around. The biological bodies (human and non-humans) must adapt themselves to fit to the technological surrogates human created; anything from human bodies adapting to Artificial Intelligence which drive humans' financial markets and choices of leisure, to non-human animals which perform to the automation procedures and tools that make them into food, medicine and entertainment.

The history of automation is littered with examples of bodies sacrificed for the smooth running of the machine; from the Mechanical Turk (Stephens, 2022) to the Amazon warehouse workers of today (Agnihotri & Bhattacharya, 2022); After all, Ford's assembly line was modelled after the abattoir house (McManus, 2001). This labour is predominantly undervalued (or completely ignored) and underpaid (if at all) – it is the *feminised labour* (or in Haraway's words "The 'homework economy' outside 'the home'") (Haraway, 1992). Feminised regardless of being a man or a woman; to be feminised means to be made vulnerable; precarious, able to be disassembled and reassembled.

In a recent exhibition the authors and collaborators looked at automation of non-human bodies for a fantastical future of automation of food production that is supposedly fully efficient and without costs to the environment. The recent performative durational experiment titled '*Sunlight, Soil & Shit (De)Cycle*' (3SDC), was a contestable food systems project about AgTech. Sunlight, Soil and Shit (the 3 S's) are the three elements our technological utopian future farming is trying to live without. "AgTech" (precision-agriculture intelligence) aims to automate and control food production, while non-standardised elements such as sunlight, soil and shit are removed in favour of artificial light, substrates and fertilisers. We used aesthetics to intervene, sense and gain data of the different processes involved in food manufacturing looking at creating an idealised artificial automated farm in the gallery:

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*Compostcubator* – a compost pile, that generates heat via metabolic activity that is distributed through a water flow to the tissue culture incubator positioned on top. The heated incubator sustains and supports the growth of animal cells in a tissue culture flask – lab-grown meat.

The heated water flow embedded in the compost can be channeled into the custom designed alkaline hydrolysis chamber. The Alkaline hydrolysis process is marketed today as a sustainable alternative to the traditional options of burial or cremation. In 1888, the process was patented by a farmer called Amos Herbert Hanson to produce a fertiliser. "Waste" from the abattoir was collected and put into the chamber to create fertiliser.

To complete the cycle, the flesh-derived fertiliser was sprinkled over the hydroponic garden. The garden was lit by artificial light (with the potential to be produced from solar energy). The plants growing in the artificial system were used to enrich the *Compostcubator* which sustained the lab-grown animal cells.

The cycle became more "intelligent" through the use of an array of sensors such as thermo-imaging, CO<sub>2</sub>, PH, waterflow, and so on. The collected data was displayed in the Control Room area, avoiding the need to look outdoors and actually observe the sun, soil or other shit. This complete "surrender" to automation of both human and non-human bodies was poked at with fun, using the same language as AgTech start-ups:

SymbioticA's 3SDC builds resources to enable the community to accelerate metabolic rifts in agricultural innovation. This project considers whether the precursor to sustainable food systems will be the creation of a metabolic rift – where the means of production will grow ever distant from nature. An ecosystem of technologies that enable and promote transparency, networked experimentation, education, time and climate equity and hyper-local production. We bring together partners from industry, government, and

academia in a research collective that's creating collaborative tools and communities to explore contestable agricultural systems.<sup>4</sup>

This durational experiment involved extensive feminised labour to service the machines that, instead of working smoothly and efficiently, seemed to go head-to-head with the life they were intended to control, i.e. plants died and the alkaline hydrolysis system was clogged and smelled of rotting meat, and the artists' muscles were sore from shuffling the compost.

## Death

It is not usually noted that the first automata, the steam engine, was invented purely as a curiosity or a toy object. It was invented by Hero of Alexandria, the ancient Greek geometer and engineer during the first century AD. The Greeks never used this remarkable device for anything but a novelty. It was only decades later, in the 17<sup>th</sup> century, when Thomas Savery and later on James Watt gave the invention practical uses to the extent that the steam engine can easily be considered the single most important invention of the entire industrial revolution. The aeolipile was an intriguing toy as it created an automaton that could move by itself. Automata signified life and to some extent some sort of agency. As a result, analogies of the body as a mechanical machine flourished during the industrial era.

While machines come alive through automation, we are experiencing the technological transformation of life into object — through the invention of artificial support mechanisms and their automation — starting with the humble incubator. However, life keeps on resisting being automated. A notable example is the art piece *Victimless Leather* that had to be “killed” in 2008 by the Museum of Modern Art (MoMA) in NY (Schwartz, 2008), because its automated surrogate body was eventually clogged by the unpredictable and uncontrolled overgrowth of the embryonic mice cells.

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To borrow Huxley's words quoted in the opening of this chapter, museums are traditionally places of necropolis rather than histopolis, avoiding any changes to the artwork displayed or conserved:

Conservators aim to minimise change to collection material, to protect items from the adverse effects of climate and chemical deterioration, and to safeguard our heritage not only for here and now but for generations to come.” (Australian Institute for the Conservation of Cultural Material)

In short, museums are set up to keep dead things as dead as possible for as long as possible. How can such places care for living and semi-living art?

Artists must struggle with the paradox of objectifying life through its “living performance” presentation (rather than representation) in galleries and museums. In our experience, it is often only when the artwork dies that the audience fully understand and internalise that it was alive to begin with; the plant shrivels; the mammalian cells get infected by bacteria, or they are just taken out of their artificial environment to be killed by the touch and breath of the audiences.

There are costs in de-contextualizing and re-contextualizing life – both for these bodies as well as for the larger living environment. In a similar way to hiding the environmental impact of, for example, cloud computing (Mytton, 2020), our society tends to downplay the role, costs and impact of these technological surrogates as well as the labour involved in our society in the race for automation. What problems will be solved and what new

<sup>4</sup> For more: <https://www.sunlightsoilshit.systems/>



problems will be hatched? Biological Art cannot redeem anything if it ignores the erasure of bodies, biological or otherwise.

In *Better dead than dying* (2014) HeLa cells (a cell line derived and immortalised – without consent – from the now deceased Henrietta Lacks) (Johns Hopkins Medicine, 2022) were grown over a polymer structure shaped after Henrietta’s silhouette from one of her best-known photographs embodying and reanimating her shadow. This Semi-Living shadow was placed in a specially designed closed artificial environment that initially acted to support the growth of the HeLa cells over the polymer structure. However, as the exhibition progressed the cells consumed their nutrients and produced waste which eventually transformed their environment into a death chamber. At an undetermined point in time, the semi-living shadow was no longer living.

If there is something that both humans and cultural institutions cannot stomach, it is “dying”. Therefore, it may be better to once again rethink Samuel Butler’s 1872 provocative suggestion:

I know not why, but all the noblest arts hold in perfection but for a very little moment. They soon reach a height from which they begin to decline, and when they have begun to decline it is a pity that they cannot be knocked on the head; for an art is like a living organism – better dead than dying.”<sup>5</sup>

It may be that in this particular time of human history, with the increase of automation, the living world is being pushed to its limits; it either serves as feminised labour, or is just in the process of dying. Is this what biological art is all about?!

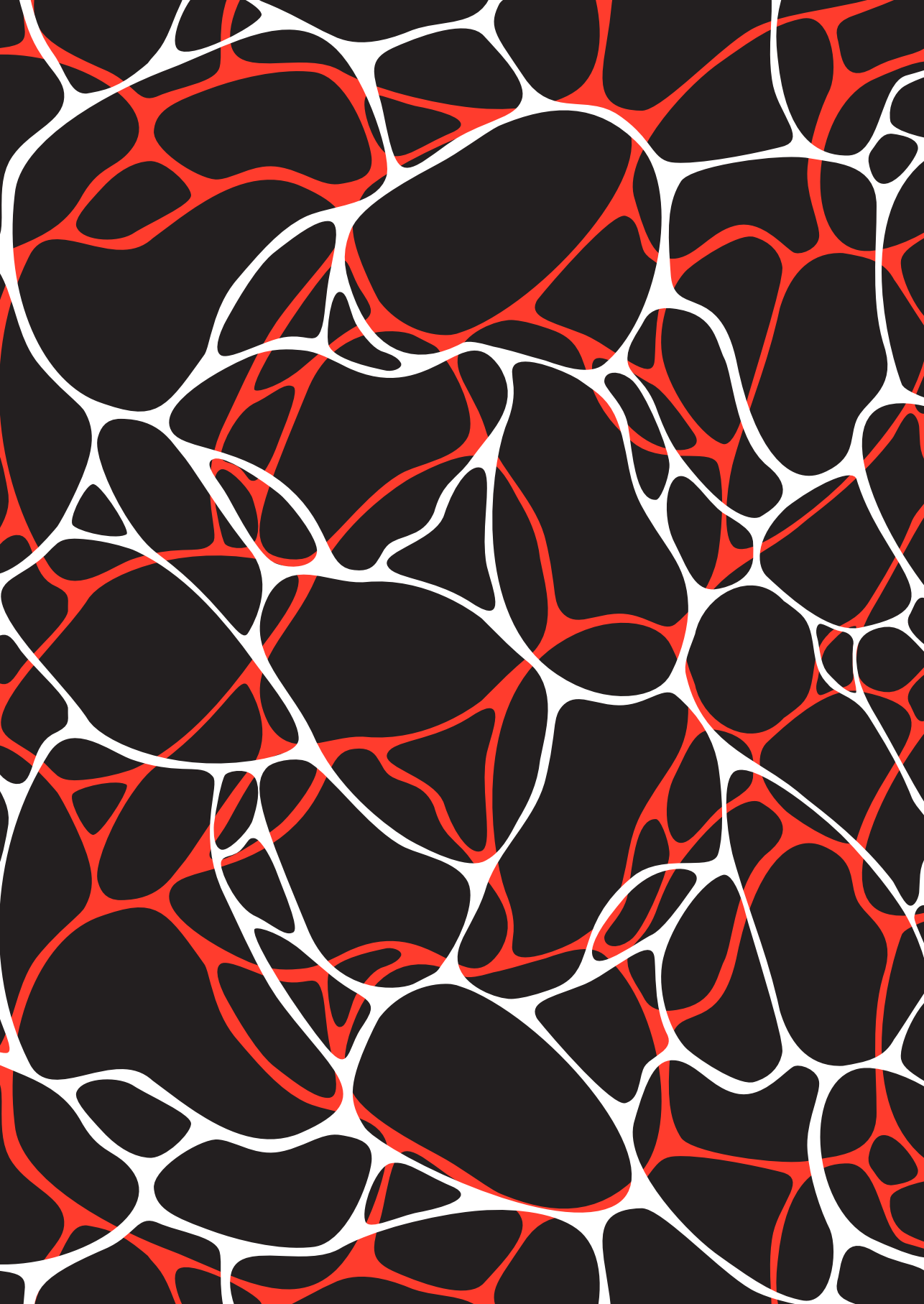
<sup>5</sup> The title of the piece is a quote from Samuel Butler’s 1872 science fiction book titled *Erewhon* in which he poetically explored the risks of technological evolution and the relationships between bodies and technologies.

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**Dr Ionat Zurr** is the Chair of the Fine Arts Discipline at the School of Design UWA, and SymbioticA's academic coordinator. She was a Visiting Professor at Biofilia – Based for Biological Arts, Aalto University, Finland (2015–2020); a visiting scholar at The Centre of Arts and Art History at Stanford University (2007), and a Research Fellow at The Tissue Engineering & Organ Fabrication Laboratory at Harvard Medical School (2000–2001). She is considered a pioneer in the field of Biological Arts, and publishes and exhibits nationally and internationally. Her work was exhibited and collected by museums such as Pompidou Centre in Paris, MoMA NY, Mori art Museum, NGV, GoMA, Yerba Buena Center for the Arts, San Francisco, Ars Electronica, National Art Museum of China, and more. Zurr, together with Catts, has ideas and projects that reach beyond the confines of art; their work is often cited as inspiration to diverse areas such as bio-fabrication, cellular agriculture, new materials, textiles, design, architecture, ethics, fiction, and food.



# Guidelines for the Unstable: Instructions and Recommendations for Exhibiting Life in Artistic Context

Olga Majcen Linn, Sunčica Ostoić

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## Practical difficulties in exhibiting bioart as the basis for creating guidelines

Art containing living or semi-living entities entails manifold challenges and dilemmas for curators and institutions because it encompasses unique issues regarding its exhibiting, which is organised around the physiology of life. Instrumental to showcasing biotechnological art<sup>1</sup> are certain conceptual and practical preconditions for exhibiting fragile living or semi-living entities – animals, plants, bacteria, fungi, cells, tissues or genetically modified living beings. Having living entities in an exhibition venue implies caretaking and responsibility for them during and after the show, and it also implies a lower level of control over the “dispositive,”<sup>2</sup> making the very essence of common exhibition practices dedicated to well conceptualised, controlled, curated experience unstable and impermanent.

- 1 In the paper, for the artworks comprised of living or semi-living entities and systems based on biotechnological techniques and procedures, the generally accepted term “bioart” is used, as well as “biotechnological art” and “biomedia art”, which both appeared as a critical positioning towards the dominant term.
- 2 Michel Foucault’s dispositive refers to the network or system of relations that can be established among these diverse phenomena.

In her research, Amalia Kallergi (2008) points out that “the challenges of living works or technologically elaborate exhibits, often combined in the same piece, significantly increase the practical, organisational and financial requirements of the exhibit” (chap. 4). Partly, this refers to feeding, light, temperature, laboratory conditions and equipment as a necessity of the institution presenting it to provide quite specific conditions for life to survive as well as to adopt “new routines and procedures,” but notes that “bioart exhibit may be more a matter of communication, understanding and collaboration rather than a matter of resources” (chap. 2). She also emphasises temporal, processual characteristics of biotechnological artworks as well interdisciplinary process of their creation as important features impacting the exhibition (chap. 5). Focusing on exhibiting bioart in museums, artists and scholar Ellen K. Levy (2011) expands the perspective towards “sustainable ethics.” For museums, that implies producing objective and critical knowledge about scientific advances, humane treatment of exhibited living entities – specifically ensuring “ethical infrastructure and context for displays that include animals” (p. 450) – and engaging in novel legal situations related to state or international regulations about transporting and handling of biological materials, and intellectual property rights of the artist in regard to the created artwork. Moreover, it entails safeguarding the public from exposure to dangerous substances, protecting artistic integrity by being cautious about funding conflicts like sponsorships diminishing artistic criticism, etc. (pp. 445–446). Artists, researchers and curators Oron Catts and Ionat Zurr (2020) of Tissue Culture & Art Project and SymbioticA artistic research laboratory have been critically reflecting the shifting understanding of bioart when exhibited in art, design, science or natural history museums from the position of their own artistic practice. They indicate that practical difficulties of presenting bioart in institutional milieu are rooted in the conceptual background of the museums’ and curators’ historical and still traditional understanding of their own roles, and art as “never changing and commodified” objects (p. 208). Catts and Zurr point out the twofold phenomena inherent to the presentation of life in museums: “life and living systems are becoming raw materials for human ends, and as such cross over from natural context to technological and cultural objects,” to which museums respond with “the fetishization of technological approaches to life, to the end that it may overshadow the context in which life operates” (pp. 203–204). Speaking from the perspective of curator and scholar in the field of biomedial art, Jens Hauser (2022), having long-lasting first-hand experience with exhibiting biomedial art and mainstream institutional limitations towards it, concludes:

The difficulties with regard to staging, conservation, and transport should not, however, be treated as a straightforward grid of practical problems to solve in order to enable museums to stage new “living images.” The conceptual challenges are philosophically most inspiring and point as much to profound changes in contemporary art practices as to institutions’ incapacity to adapt and evolve accordingly. Phenomena that once took the form of artistic images are being fragmented into a variety of instances of “biomediality” ..., which need to be considered an integral part of the aesthetic idiom – including the challenges, intended or not, prone to exasperate and disrupt museum routine. (p. 81)

This article detects four types of challenges in exhibiting bioart, which could serve as a basis for developing guidelines. The issues are in a very general way connected to potential guidelines that could be beneficial for any art institution<sup>3</sup> exhibiting biomedial art because they would help make displaying life more feasible and acceptable. They would also be valuable to artists, especially emerging ones, who are “intrigued by working with living materials but not ready for the process it requires” (Krpan, 2022). The first issue of exhibiting bioart includes *the particularities* of maintaining and controlling life itself before, during and after the exhibition. *The legality* of artistic work and practice is

<sup>3</sup> In the article, the term “institution” refers to any large or small, established or emerging, private, civic or public art organisation, if not indicated otherwise.

seen as another complex problem, and the third is *the ethical perspective* of exhibiting bioart, while the final topic is the art institution's relation and approach to the *audience*.

### Particularities

In a few selected points, the distinctiveness of biomedial art projects includes instability, changeability, virality and mortality of life which impacts the preparation, set up and maintenance phases of the exhibited artwork; further, the project may instigate an identification process whereby personnel may develop affective or emotional attachment; the projects tend to be controversial; and they require specific termination and disposal models.

Instability, changeability, virality, mortality. Exhibiting biological material and living beings is one of the most challenging aspects for curators in any type of art institution, be it independent or public. Because of the instability, changeability, virality and mortality of life processes, exhibiting life demands different kinds of approaches. The very fact of life that predicates constant change and transformation, growing, changing, and dying is a very foreign concept to art institutions, especially museums which "can be seen as the ultimate necropolis" (Catts & Zurr, 2020:p.208) as they are focused on displaying stable objects. In encountering bioart, institutions manifest "fear of the wet and they have difficulties to cope with the idea of failure, contamination and dying which are integral part of biotechnological artworks" (Catts & Zurr, 2022). Performance art can be instructive to dealing with the uncertainty and transformations of life processes in art: "By referring to exhibiting the biotechnological artwork as performance, either as microperformativity ... or long durational performance, one allows changes inherent to life itself to take place as well as the unplanned and uncontrollable things to unfold and be seen as part of the artwork" (Catts & Zurr, 2022).

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In our own curatorial practice, we encountered numerous situations in which maintaining the artwork alive had set off in unexpected directions. For example, the butterflies for Marta de Menezes' *Nature?* (2000) started transforming too early, during the period of exhibition set up, which caused unexpected organisational actions. The question is what should the guidelines regarding these issues include? Organisers, informed by the artists, should foresee the potential issues with instable artworks and devise solutions; develop a risk management protocol to maximally increase the survival chance of the artwork (in transport, setup, maintenance, etc.) or performer while undertaking risky and dangerous activities; develop standards for terminating the artwork if there occurs an unforeseen need for it. An example of good practice is the project by Art Orienté Objet titled *May the Horse Live in Me* (2011), curated by Jens Hauser and produced and exhibited by Kapelica Gallery in Ljubljana. In this project, the artist was being injected with horse blood plasma containing foreign immunoglobulins, which was potentially dangerous, but all the biotechnical conditions had been predicted so the performance could be produced and presented safely (it included medical professionals and ER on standby during the performance).

Further, in addition to the basic technical rider, a detailed questionnaire for life maintenance of artwork while in institutional care should be prepared, from transport to dismantling, including the questions of what kind of knowledge, sensitivity and responsibility are required for life and share it inside of the institution/organisation; what skills, obligations, space, adequate technical and maintenance conditions are required; the precise timing in handling life; the precautions to be taken and conduct of the production and maintenance team; defining responsibility between the artist and the institution; defining institutional standards with regard to the form of artwork (original state, documentation, representation, etc.).

*Affective and emotional relations.* Dealing with life and art subjects has different affective consequences than other kinds of art objects. Affect and intensity arise because of,

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- 1 Marta de Menezes, *Nature?*, detail from the display at the *Touch Me Festival: Intelligence Abuse* at Badel old factory Zagreb, 2005. Image: Božidar Raos. Courtesy of: KONTEJNER
- 2 Art Orienté Objet, *May the Horse Live in Me*, performance at Kapelica Gallery Ljubljana, 2011. Image: Miha Fras. Courtesy of: Kapelica Gallery
- 3 Siniša Labrović, *Flock.hr*, detail from the display at the *Touch Me Festival: Intelligence Abuse* at Badel old factory Zagreb, 2005. Image: Božidar Raos. Courtesy of: KONTEJNER



as Robert Mitchell (2010) argues, the spectacularization of authentic life in the exhibition space (p. 28). Affective reactions or emotional attachments have been observed to occur with curators, technicians and other exhibition personnel. We personally noticed and experienced the same phenomenon in the works involving vertebrates but also other living and semi-living beings: Špela Petrič's cute rats, Marta de Menezes' lovely butterflies, the adorable sheep of Siniša Labrović and so on. Consequently, in addition to the practical and intellectual labour, emotional labour of the personnel should be acknowledged, and we believe it is important to establish the guidelines for dealing with emotional involvement (of curators and staff) during and after the exhibition, especially if there is an extreme action or event involved.

*Controversy.* Controversy is a very frequent occurrence in art exhibiting life as is, for example, in the reality show *Flock.hr* by Siniša Labrović. It was featured on the front page of one of the biggest Croatian newspapers as scandalous with the bombastic title "Choose Your Lamb for Killing." One of the key points that arise from that experience is that controversy can be optimised so that artists and institutions make the best of it. Because controversy instigates public debate and takes art beyond the standard framework of the institution, it can also have a very negative effect on the professional life of the artist and wellbeing of anyone involved. In that respect, the guidelines should address this issue and make sure the institution is prepared for the controversy. It should provide a broader contextualization of the artwork – define how the curators' and institutions' PR systems deal with controversy and possible dangerous outcomes of controversial biotech art. That includes advocating for and educating the audience about the artwork; establishing rules on how to protect the reputation of the institution from the negative public image or financial difficulties of losing support; having a support and facilitation system (quality media communication, art-public support, developed national and international institutional network); defining the responsibility structure besides the general existing one (statutes, books of regulations, etc.)

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*Termination and disposal.* Life itself holds a paradox. It has universally recognised intrinsic value, but within a certain context it can easily be regarded as worthless (e.g., animals used for food, scientific experiments, soldiers in war...). When life becomes the subject of an artwork, its value increases dramatically and it is suddenly read in a different code.

The manipulation as well as termination of life in science laboratories do not come into question, but in the artistic context they provoke affective reactions and raise ethical issues. In the artistic context, a de-automatisation of ethical codes and social contract about life takes place and every life can become valuable. Because of that, termination and disposal are unavoidably present as topics in curatorial practice that deals with biotechnological art. For example, in Marta de Menezes' artwork *Nature?* (2000), the life of tropical butterflies (*Bicyclus* and *Heliconius*) grown in a lab drove major ethical disputes and numerous misunderstandings with tissue intervention she performed on the caterpillars which was wrongly interpreted as genetic manipulation. Immediately, the butterflies with short life spans were seen as mutilated by the artist. Their life suddenly became recognised and valuable, even though in the scientific environment it was not even noticed.

The disposal of life is one of the situations in which exhibition organisers and curators, both institutional or independent, should base their actions upon ethical criteria of approaching a living artwork after the exhibition closes. There are few options of dealing with life post-exhibition, when life stops being an artwork and becomes a surplus. One is to sustain it by prolonging its life until natural death occurs: it can be returned to the laboratory or another institution it had been borrowed from, or it can be returned to nature; or it can become a pet.

During our curatorial practice, there were numerous occasions of getting unexpected and extraordinary living creatures from various art projects as pets. For example, the

freshwater elephant nose fish native to Africa from Andy Gracie's installation *fish, plant, rack* (2004), plants from Ken Rinaldo's and Amy M. Young's *Farm Fountain* (2008), or a sheep from Siniša Labrović's project *Flock.hr* (*Stado.hr*, 2005). That is also the case with many of our colleagues who work with biotechnological art. The rats of Špela Petrič's *Solar Displacement* (2013), which were cared for by a team from Kapelica Gallery, Ljubljana for more than two years, also ended up as pets. Another possibility in respect to treating living entities following a public presentation is the termination of life. Regardless of the approach, the guidelines ought to define who decides what happens to the artwork after the exhibition: is it the artist, institution or both. In our experience, some artists are concerned with the issue, but not all of them, while the institution has no choice but to take care of the living matter after the show closes. Occasionally, as Hauser (2022) critically points out, art museums euthanise living entities after the show "against the artist's will in order to comply with animal health inspection and quarantine rules – even after organising gallery talks that glorify interspecies empathy" (p. 77). Therefore, there needs to be a protocol for life disposal which details the precise steps to be taken as well as the expected consequences. It should also be conceptually defined what constitutes ethical termination and how to perform it. What to do with Marta de Menezes' butterflies after the exhibition ends? What if the tissue starts to overgrow during the exhibition as in Tissue Culture and Art Project's *Victimless Leather* (2004)? These issues are not only practical, but ethical and philosophical.

### Legality

When exhibiting bioart, multiple legal issues arise, and they can shift focus away from the artwork, but also reinforce the very issues the artist is critical towards. They can cause numerous complications and obstacles in exhibiting as, for example, in the project of Belgrade based artist Zoran Todorović called *Assimilation* (*Asimilacija*, 1997–2010), where a dish made out of human remains from plastic surgeries is offered to the audience for consumption. While exhibiting in some European countries, we witnessed a complete shift of focus to the legality of the artwork. The main concerns were if it is legal to use human tissue, the way it was obtained, if cannibalism was legal, etc., and it was all hotly debated. In cases like this, cultural institutions should establish collaboration with legal advisors versed in specific issues and be familiarize themselves with the permissions or licences needed for exhibiting cells, plants, animals, human remains. Guidelines also need to take into account the laws of a particular country and the international regulations. The survey conducted by Malea et al. (2014) showed that cultural institutions who took part in their questionnaire<sup>4</sup> don't have specific exhibiting standards and that,

[t]he institutional framework varies greatly among countries. Organisations that exhibit BioArt in the United States and in Portugal are not required to obtain a specific licence to hold and exhibit BioArt works. In Slovenia, in some cases, a relevant licence is required by the Ministry of Agriculture and Environment. In Britain, cultural institutions that want to exhibit works made of human cells are required to obtain a specific licence for public display and storage from the Human Tissue Authority (launched in 2004). (p. 5)

The guidelines also ought to define how to handle hazardous materials or materials that can be destroyed or contaminated by the staff, the public, or technical malfunction; state the general position of the institution to any legal risk; define who is responsible if anything happens to the artist, institution personnel or audience directly as a result of the materials used. Further, they ought to define the general position of the institution to censorship, both internal (if it is not legal to display the materials used in the artwork, if

<sup>4</sup> Association for Culture and Education KIBLA, Slovenia; Cultivamos Cultura, Portugal; Ectopia, Portugal; Greene County Council on the Arts, New York; GV Art gallery, London (Malea et al., 2014:pp. 3–4).

- 4 Andy Gracie: *fish, plant, rack*, display at the *Touch Me Festival: Energy Ab/Use* at Pogon Jedinstvo, Zagreb, 2011. Image: Vedran Metelko. Courtesy of: KONTEJNER
- 5 Ken Rinaldo and Amy M. Youngs, *Farm Fountain*, detail from the display at the *Touch Me Festival: Energy Ab/Use* at Pogon Jedinstvo, Zagreb, 2011. Image: Vedran Metelko. Courtesy of: KONTEJNER



the actions the artwork provokes are illegal or in the “grey area”) and external (if animal rights activists or general public demand that the artwork be removed, or if funding from biotech companies interferes with the critical position of the artist (Levy, 2011:p.458)).

### Ethical concerns

The ethics of working with living materials is one of the biggest challenges of bioart in general. The fragile societal balance between control and freedom often gets tested by artworks in that field. The definition of life is in constant flux and change, and currently the most prevailing definition of life belongs to the field of biology. On the other hand, art is by definition the space of free expression. One of the prime ethical questions is the mere right to experiment in the scientific field with artistic goals. The social contract scientists and scientific institutions have is very often criticised by the artists who are working within labs especially regarding the question of the definition of life.

Ethical dilemmas in exhibiting life are manifold. The right to produce an artwork as such can often give the impression of testing unnatural concepts, so the guidelines need to emphasise the existing rules and standards, i.e., that it adheres to the established scientific procedures and that it doesn't pose a safety risk. Further issues imply an ethical approach to living entities before, during and after the exhibition. And lastly, there is an ethics related to the audience protection in the exhibition space who is often facing challenging and sensitive matters.

On the one hand, ethical challenges are the main topic of many artworks in the bioart field, but on the other hand, some of the artworks are so provocative for the audience that they become counterproductive for the ethical issues they are trying to address as well as for the artists and institutions involved. One of the examples is the case of Maja Smrekar and her series of works exploring human and canine relationships. After winning the Golden Nika at Ars Electronica for the work *K-9\_topology* (2017), she became the target of major media attack and public shaming (which would later become the subject of a theatre play). Jurij Krpan, the curator collaborating with Smekar, argues that the guidelines should be founded on developing a theoretical and philosophical framework as a starting point for the ethics of working with bioart. According to him, the ethical imperative should be adhered to unconditionally as the only way to make biotechnological artwork justified (2022).

The artists Catts and Zurr (2004) suggest using a particular ethical model for discussing bioart practice. They are proposing consequential ethics developed by Jeremy Bentham and later Peter Singer, rather than deontological ethics developed by W. D. Ross, A. C. Ewing and H. Prichard. The difference is that consequential ethics is “weighing the moral responsibility by the consequences of the actions; an action is morally right if the consequences of that action are more favourable than unfavourable” (p. 4), while deontological ethics “claims that the rightness or wrongness of an act depends neither upon the motive from which the act was done, nor upon the consequences of the act – but solely upon what kind of an act it is; in other words, a moral behaviour requires following certain principles that are in essence ‘good’ or ‘moral’” (p. 3).

Ethical issues that arise from new technoscientific constructions can be transformative because they bring new knowledge. An important ethical gesture embedded in biomedica art is precisely a reconsideration of the mechanisms, tactics and systems through which knowledge is produced. Critical approach to socially accepted safe zones, i.e., science, is inherent to biotechnological art. The key issue for the artwork is how the institution creates context and communicates to the public the subversive instrumentalization of living matter/entities and manipulating/exhibiting new species for artistic and non-scientific purposes.

The guidelines should further take into account how to reduce risk when supporting subversive and ethically provocative artworks. In case there is a danger for the artwork, artist, personnel or audience, collaboration with medical experts, scientists and scientific institutions is required for ensuring the ethical process, although that is not always possible. The guidelines for caretaking must include various kinds of life entities. For example, discussing animal welfare in the exhibition setting, Levy (2011) points to the guidelines of ICOM, The International Council of Museums, and CAA, The College Art Association of America, but recognises the general deficit of guidelines given the proliferation of bioart practices (p. 450). *ICOM Code of Ethics for Museums* section 2.25 “Welfare of Live Animals” states:

A museum that maintains living animals should assume full responsibility for their health and well being. It should prepare and implement a safety code for the protection of its personnel and visitors, as well as of the animals, that has been approved by an expert in the veterinary field. Genetic modification should be clearly identifiable (ICOM, 2017:p.15).

CAA guidelines for “The Use of Animal Subjects in Art: Statement of Principles and Suggested Considerations” call for ethical standards regarding the freedom of artistic expression as well:

Artists and other professionals in the visual arts must be allowed the full range of expressive possibilities in order for art to maintain a vital role in human society. With that expression, however, comes responsibility when artists and others use animal subjects in art. CAA does not endorse any work of art that results in cruelty toward animal subjects. Further, given that animals do not have the right of refusal, CAA calls on artists and other professionals in the visual arts to examine with the greatest of care any practices that require the use of animals in art (CAA, 2011).

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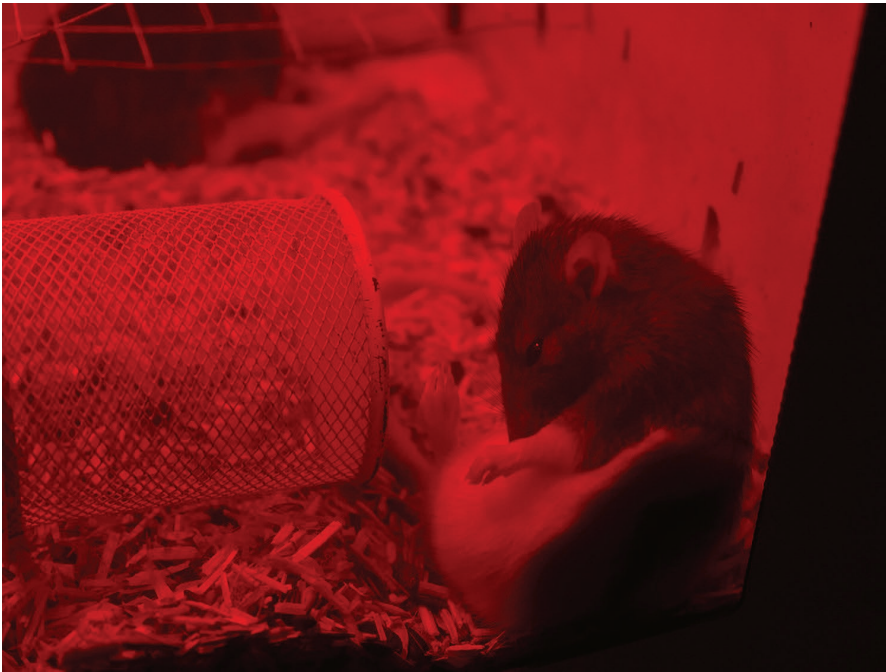
In the case of bioart, animal welfare concerns ought to be expanded to encompass other life forms such as plants, semi-living etc., as well as other aspects of the exhibition practice.

### **Audience and health and safety protocols**

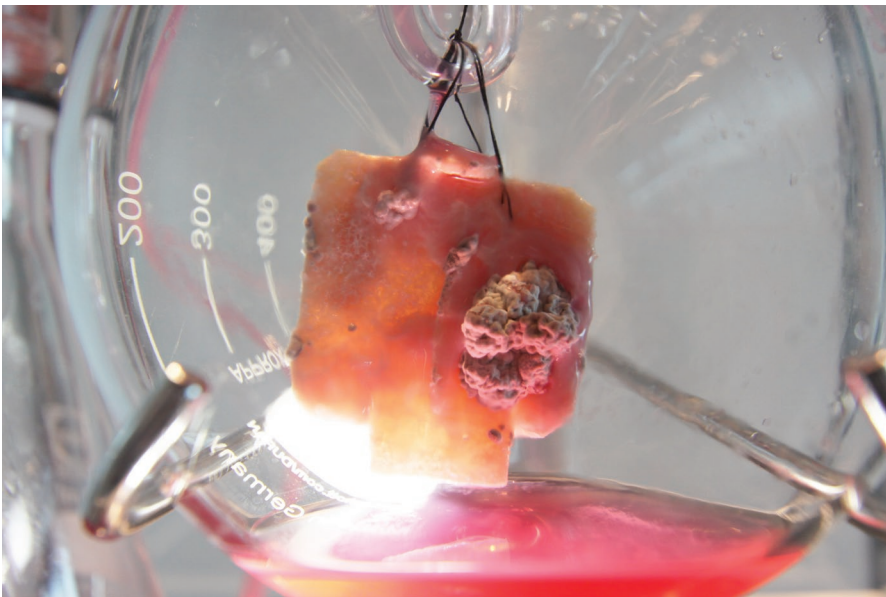
Likewise, the guidelines should include communication procedures that institutions can follow if there is some sensitive matter regarding the artwork, since the audience has a different emotional engagement with respect to living entities. For instance, Catts and Zurr frequently encountered different ethical committees that discussed the exhibiting of life. The *Extra Ear 1/4 Scale* (2003), in collaboration with Stelarc had to be cleared for exhibiting by an ethical committee because the presentation of tissue that is living and growing outside the human body might be seen as unethical by the audience.

The angle that we chose to take with the Human Ethics Research Committee was to argue for an “ethical right” for the audience to be exposed to an artwork which raises bioethical concerns. ... With regard to humanity generally, our point was that the project was “part of a larger scale endeavour by artists internationally to deal with new concepts of self and life that our society is being confronted with, in the light of developments in the biomedical field.” We argued that “art can play an important role in generating a cultural discussion in regard to these issues: by presenting tangible examples of contestable scenarios, art can act as a starting point for a broader philosophical and ethical discussion.” The installation was finally given ethics approval, although perilously close (two weeks prior) to the show’s opening (Zurr & Catts, 2014:p.209).

The communication strategy of the institution should be working towards provoking an open-minded approach and preparing the audience for the encounter with new and unexpected forms of artwork. Additionally, the use of articulated language, precise



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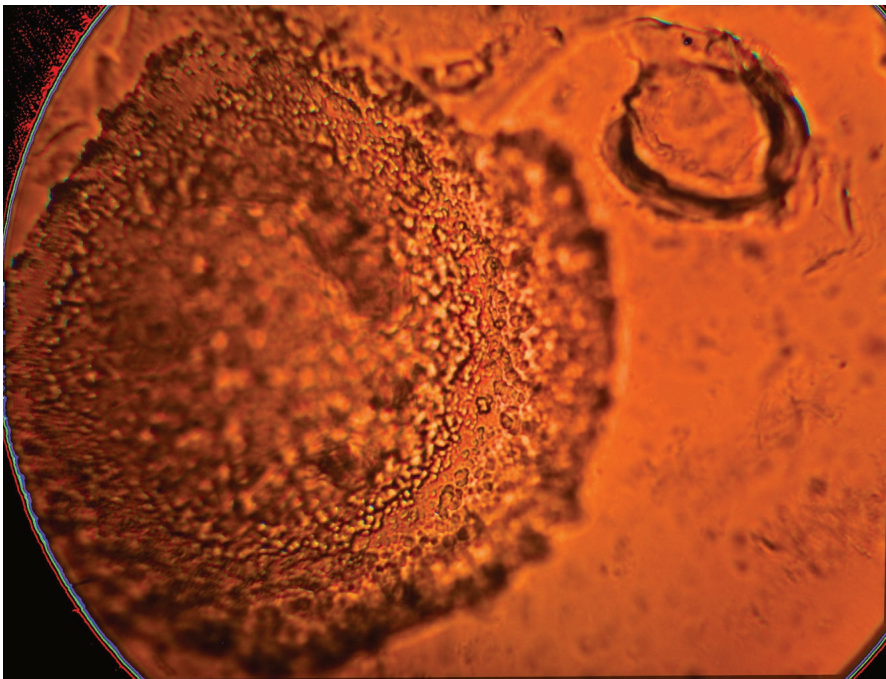


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- 6 Špela Petrič, *Solar Displacement*, detail from the display at the *Touch Me Festival: It's about time!* at Klovićevi dvori Gallery, Zagreb, 2014. Image: Miran Kramar. Courtesy of: KONTEJNER
- 7 Tissue Culture and Art Project, *Victimless Leather*, detail from the display at the Mori Art Museum, Tokyo, 2010. Image: Tissue Culture and Art Project. Courtesy of: Tissue Culture & Art Project (Oron Catts & Ionat Zurr)



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- 8 Zoran Todorović, *Assimilation*, detail from the display at the 4<sup>th</sup> Science Festival at SC Gallery, Zagreb, 2006. Image: KONTEJNER team. Courtesy of: KONTEJNER
- 9 Maja Smrekar: *K-9\_topology: ARTE\_mis*, hybrid cell microscope view, 2017. Image: Gjino Šutić and Maja Smrekar. Courtesy of the artist

terminology and expressions explaining the processes and conditions is highly desirable. Levy (2011) argues that “the acquisition of knowledge has arguably always been the most valuable product of museums ... [that] must find ways to make bioart and nanoart accessible to a diverse public” (p. 446), and “have to ensure that they impart accurate information in signage and publications since the public may rely on these means for knowledge about nanotechnology and biotechnology” (p. 445). In this regard, communication guidelines should refer to a variety of audiences and specify the responsibility to have understandable and informative exhibition labels. Notifying the visitors about the presence of biological materials would be required,<sup>5</sup> and the approaches defined for addressing negative public reactions or actions on site. The processes and conditions in bioart are not completely controllable, so the audience often finds itself in a liminal position with a transformable potential. The liminality of the audience calls for the creation of conditions for informed and protected audiences as an important part of the mission of art institutions; therefore, high standards for audience relations and health and safety are to be considered.

The question of danger is complex because it’s not always transparent if an artwork is unsafe for the audience or vice versa. Thus, the guidelines should address not only the dangers of the artwork to the audience, in the sense of physical danger or challenging artworks that deal with sensitive and polarising concepts which are ethically “dangerous,” but also the effect that they audience has on the artwork itself, where the artwork can be endangered by bacteria, changes in temperature or humidity or other factors due to the presence of the audience. One such example is the art project *Immortality for Two* (2014) by Luis Graça and Marta de Menezes in which the authors used a viral vector to introduce oncogenes (cancer inducing genes) into their own cells, thus generating two immortal cell lines containing the complete genomic information of two people. During one of the exhibitions, the petri dishes that were supposed to ensure a sterile environment were unintentionally contaminated, causing the death of the “immortal” cells – in other words, destroying the artwork.

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The protocols concerning the health and safety of the audience differ depending on the country and institution. Predefined protocols can sometimes affect the artwork in the sense that it cannot be experienced and perceived. There are projects that test the health and safety limits, for example, Adam Zaretsky’s potion made from cocoa butter & DNA of salmon sperm massaged into the skin of volunteers (*iGMO\_B/D THGP CBGC CRISPR SAG, The Orgy of Transgenic ReproTech CRISPR Baby Design as Medical Fetish*, 2019); a cosmetic line by Isabel Burr Raty for which she and other women on the female “farm” harvest their bodily juices to produce beauty care products, thus raising the issue of exploitation and sexuality; *Perfume* (2006) by Silvio Vujičić made from the fluids and excrements produced by the human body: urine, saliva, vomit, blood, sperm. These artworks were successfully exhibited due to a lack of protocol, and this absence of formalisation was beneficial for ensuring that experimental artworks of this kind be presented. That means that the guidelines need to comprise the investigative nature of the field and be flexible enough to embrace the most important quality of bioart artworks – creative, unexpected and often inverted experimentation.

The guidelines should deal with the question of how to protect the audience, but also how to enable the showcasing of such artworks. These artworks are not meant to be a safe zone, but there is a fine balance that has to do with giving enough information and getting an informed consent. Institutions should inform the audience about the potential (side-)effects or risks posed by the artwork; they should enable the audience to decide for themselves and sign the permission, and ensure that the protocols don’t prevent exhibiting the artwork.

<sup>5</sup> Malea et al. (2014) survey found that most institutions do inform visitors if biomaterial is present, whether in the exhibition space or indirectly through leaflets (p. 5).



## For and counter to standardisation

There are many arguments against having standards and protocols for exhibiting bioart, the most common one being the claim that standards can disrupt or prevent the realisation of the exhibition rather than make it easier. Also, the diversity of artworks in the field disables standardisation or affects the artworks in an undesired fashion. Research, which is a crucial component of biomedial art, often results in something new, and the essence of standardisation is relying on conventional practices. Even though the research process can follow certain rules and conventions, art research has completely different intentions and goals than scientific research, and in that respect creativity and thinking outside the box are antithetical to standardised exhibition practices.

Just as the law doesn't always serve justice, so a disproportionate number of rules can make exhibiting complicated and troublesome. Standardisation could cause artists and curators to work arduously on never-ending administration. Requiring the artists to do (often extensive) paperwork and handle permits related to biomedial art most frequently come from larger art institutions and festivals around Europe. There are also many examples of bureaucratic burden, from obtaining a permit for exhibiting biomaterial from scientific institutions (the most notorious example being Eduardo Kac's protest art project *Free Alba* (2001–2022) which resulted from not being able to get the rabbit with fluorescent jellyfish gene out of the lab), to different medical check-ups that artists who deal with their own body have to pass in order to keep the audience safe. Artist Margherita Pevere addresses the issue of reliance on scientific institutions:

I trust that transdisciplinary collaborations are mutually enriching and mind-opening for all parts involved, and will continue to be so. However, this makes arts “depending” on the dynamics of institutionalised labs — their generosity, or interest, time and so on — an aspect that has to do with the costs of running a lab and the standards that labs must comply to. This makes a peculiar credibility of artists and curators crucial, because they should “demonstrate” to be able to comply with these standards: they are required to be “credible” in the eyes of non-artists. I appreciate this in general as one does not want their work or credibility endangered by poor practice of collaborators. However, this relationship is highly unbalanced for art practitioners. There are many standards in biolabs, such as the famous security levels (S1, S2, S3, S4). ... Or the general rule that “what enters in the lab, stays in the lab.” That means that the idea of having cells or bacteria exhibited in the public is easily welcome. The possibility of exhibiting, thus, depends on a convergence of personal and institutional factors, including the time, resources, or determination of curators, the openness of scientific collaborators to involve in time-consuming paperwork, or the response of institutions. There is a greatly variable framework depending on the country, which adds a layer of unpredictability. (Pevere, 2022)

From the artists' viewpoint, there is a large problem already on the production level of the artwork that could be addressed by institutional guidelines, and that is the imbalance between valorising scientific work in a lab and artistic work in a lab — the problem of merely approaching scientific labs with artistic projects. The artists that already work in labs (Joe Davis at MIT labs, Marta de Menezes at Ectopia, Oron Catts and Ionat Zurr with SymbioticA) have entirely different experiences in getting exhibiting permits for their artworks than those who are not personally engaged with or employed by the lab.

Standards and protocols can be too rigid and serve as mere justification for not taking any risk by supporting a valuable artwork. On the other hand, if there are no guidelines from art institutions, then the standards from other fields are going to be applied. As Levy (2011) states, museums must convey to state, federal and international regulations and health and safety issues, they must provide assurance that no hazardous materials are involved (p. 452) and the regulations regarding biomaterials are different for licensed

- 10 Tissue Culture & Art Project in collaboration with Stelarc, *The Extra Ear 1/4 Scale*, 2003. Image: Tissue Culture & Art Project. Courtesy of: Tissue Culture & Art Project (Oron Catts & Ionat Zurr)
- 11 Adam Zaretsky, *iGMO\_B/D THGP CBGC CRISPR SAG, The Orgy of Transgenic ReproTech CRISPR Baby Design as Medical Fetish*, performance at the *Extravagant Bodies: Extravagant Love* at HALA V of The Nikola Tesla Technical Museum, Zagreb, 2019. Image: Sanjin Kaštelan. Courtesy of: KONTEJNER
- 12 Silvio Vujičić, *Perfume*, detail from the display at the *Device\_art 2.006* festival at Miroslav Kraljević Gallery, Zagreb, 2006. Image: Božidar Raos. Courtesy of: KONTEJNER
- 13 Luis Graça and Marta de Menezes, *Immortality for Two*, detail from the display at the *Touch Me Festival: It's About Time* at Klovićevi dvori Gallery, Zagreb, 2014. Image: Miran Kramar. Courtesy of: KONTEJNER.



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scientific labs. If art museums function as “safe places for unsafe ideas” (see Cameron 2008; see Catts & Zurr, 2020), grasping public imagination with the potentialities of new technologies dealing with living matter, then they should be open to developing their own standards and protocols for exhibiting biomedica, but these should not be too limiting or restrictive.

In that regard, the guidelines would formalise interdisciplinary collaboration between art and science institutions in order to help not only with administrative issues regarding exhibiting life and biomaterials, but also aiding artists in the production process.

### The purpose of guidelines

The artists and institutions who continuously focus on bioart have still not arrived at the stage of making large-scale knowledge systematisation and distribution. One of the rare examples of a project researching the showcasing and collection of bioart was *BioArt: Borders and definitions. Research project for the development of a widely accepted deontological framework of its production and management*, running from 2012 to 2015. The project was led by the Technological Educational Institute of Athens (TEI) and coordinated by the Department of Conservation of Antiquities and Works of Art in collaboration with researchers from the Panteion University of Athens and Columbia University, USA. The project *BioArt* was expertly envisioned and had relevant objectives.<sup>6</sup> It made a valuable introduction to pertinent issues pertaining to collecting and exhibiting bioart, although it resulted in scarce proceedings. The project’s official website provides only a short general statement of the project and information about the e-workshop titled “Collecting and Display BioArt: Ethics and Guidelines” containing a questionnaire for experts, it lists two published papers,<sup>7</sup> and includes the programme of the closing symposium with prominent international experts held in Athens in 2015.

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The non-existent knowledge systematisation and distribution on a broader scale makes bioart detached and isolated and prevents the field from becoming interconnected with the already established international exhibiting guidelines and standards and positioning itself even more globally.<sup>8</sup> If bioart is to be exhibited in various types of art institutions that do not necessarily specialize in working with living materials, the basis for reaching them should be documents provided by the professional bioart community – theorists, curators and artists as well as scientists collaborating on the project. Although there are some organisations and institutions that uphold the highest professional standards with regard to exhibiting, it is not possible to adopt a standard without some sort of knowledge formalisation within the field and without collaboration with international museum professional associations and contemporary mainstream art institutions. A more proactive position should be considered from the professionals’ point of view. Drafting the guidelines could set ground rules for exhibiting life in art in order to make it more accessible to diverse institutional art frameworks.

For a considerable time, a recurring argument prevailed which claimed that because of the uniqueness of each biotechnological artwork, they should be approached individually and that general guidelines would not be beneficial for the bioart field. That kind of reasoning obstructs a broader reach, transfer of know-how and networking outside the field. Prominent artist and curator of bioart Marta de Menezes likewise acknowledges that adjustment or modification is necessary and vital for the field.

<sup>6</sup> See *BioArt* project objectives at: <http://www.bioartproject.net/project.html>.

<sup>7</sup> Avaritsiotis et al. 2013; Malea et al. 2014.

<sup>8</sup> For discussions about the relationship between new media art and mainstream contemporary art see Bishop, 2012; Quaranta, 2013; Shanken, 2016.

Every artwork has its own characteristics, and there is no way to create guidelines that look like a typical technical rider or a template for one. But after twenty years we have matured enough to be able to say that we know enough of the diversity of expressions in bioart to allow for something as a flow chart, where you have questions leading to more questions but that eventually help to create a series of instructions – a map of directions. That would make it easy for anyone displaying bioart to feel comfortable that working with living materials and live organisms in exhibition conditions can be sorted and addressed. (de Menezes, 2022)

Creating a pragmatic map of directions for exhibiting biomedial art de Menezes is describing can be developed further. It can become an online database of instructions with a basic outline of questions and answers along with specific examples of existing artworks and those in the production phase. Expanding over time, the platform for collecting instructions for exhibiting would become an invaluable open resource for artists and institutions. Eventually, it would turn into an archive of guidelines. This database could be integrated in the project *Arch-ive* since the platform intends to “serve as a catalyzation tool for the activities of artwork and museum specimen digitization, archiving and distribution; remote event participation, planning and realization; augmented publishing; staff and student education training; and topic contextualization and interconnection” (arc-hive.zone, n.d.).

### Guidelines criteria

The development of guidelines for exhibiting biomedial art should be based on a few general but fundamental criteria, valid for a variety of art institutions worldwide. The initial criteria should be *shared biocare in the approach to life and death* (the living and semi-living) in line with the artist’s concept and ethical treatment of life. That presents itself as a concern of all the involved parties with the aim of maintaining a caring and ethical approach. Subsequently, if needed, ending the existence of a biological entity should be done in a humane and contextually most appropriate way. The aim of biocare is to enable dignified liveliness and termination. The following criterion is *responsible risk-taking* of the institution which should not limit or censor the artistic concept regardless of how challenging the preparation of the exhibition and its maintenance or public communication may be.<sup>9</sup> This might present a difficulty for public institutions since risk management is one of their prime objectives, but life must be an exception. The guidelines should also reduce the risk, if there is any, for the artwork, public, artist, curator, exhibition space, or at least provide security for the institution so that the risks are diminished and under control as much as possible. This would provide greater manageability and safety of such projects. *The production of authentic knowledge and experience* is the next criterion. The guidelines should endorse the showcasing of critical, investigative and authentic art projects. Lastly, *exhibiting artwork in its original state* should be an imperative for institutions rather than presenting it in the form of documentation. By staging the “aliveness” of biomedial art, meaning its performative nature – consisting of a microperformative aspect (Hauser, 2020b:p.12)<sup>10</sup> and, to use performance art terminology, a durational aspect (Catts & Zurr, 2022),<sup>11</sup> the aim would be to ensure the authenticity of the artwork. Undoubtedly, more work would be needed to further develop the criteria based on interdisciplinary collaboration between artists, curators, theorists, art institution directors and scientists.

9 This is not to say that curators are to be considered brave because they “dare” to exhibit demanding bioartworks, but that there is a risk in exhibiting life itself for it changes, grows, decays and dies.

10 See Hauser, 2020a.

11 See Hauser, 2020b.

## Conclusion

At this time, there are no generally established and internationally accepted guidelines on how to deal with the challenges of exhibiting biological materials and living beings. Therefore, each encounter with exhibiting and showcasing bioart is practically a pioneering work wherein a particular institution tries to provide optimal exhibiting conditions and tackles ethical and legal challenges anew for each individual artwork.

Biomedica art often demands more direct and constant human care and monitoring than non-living media, and guidelines could make that process more manageable. The conceptual framework, particularities, legality, ethics and relation to the audience are all aspects to be included in these guidelines for exhibiting biotechnological art. As a form of online database of guidelines within the Arch-ive project, it would be particularly effective for improving organisational processes and providing measures for avoiding unexpected occurrences while dealing with life or accepting them as intrinsic to biomedica art. Although such guidelines might generate certain challenges in organising exhibitions involving biological processes, they would be useful and valuable to both art institutions with experience and the ones with no or little experience in presenting bioart as they would serve as a basic set of pragmatic recommendations and instructions ministering to systematic preparation and maintenance procedures. In addition, the guidelines would be a helpful tool for artists in that they would provide them with necessary control over the processes of research, transportation or showcasing of artworks. They could be constructive in dealing with pragmatic and conceptual issues, but their scope should not in any way endanger artistic integrity and authenticity.

Furthermore, the guidelines would foster high exhibiting standards, professional growth and adequate presentation and recognition of biomedica art in any interested institution. They would also contribute to biotechnological art's becoming equally recognised as part of the mainstream contemporary art world and illustrate that it is not outside the norms of exhibiting, and they would also communicate the gravity of its affirmation and public displaying. It remains to be researched how the guidelines can become an integral part of the international art institutions' practices and what exact form (an online manual with flow charts, "white book," etc.) they ought to take.

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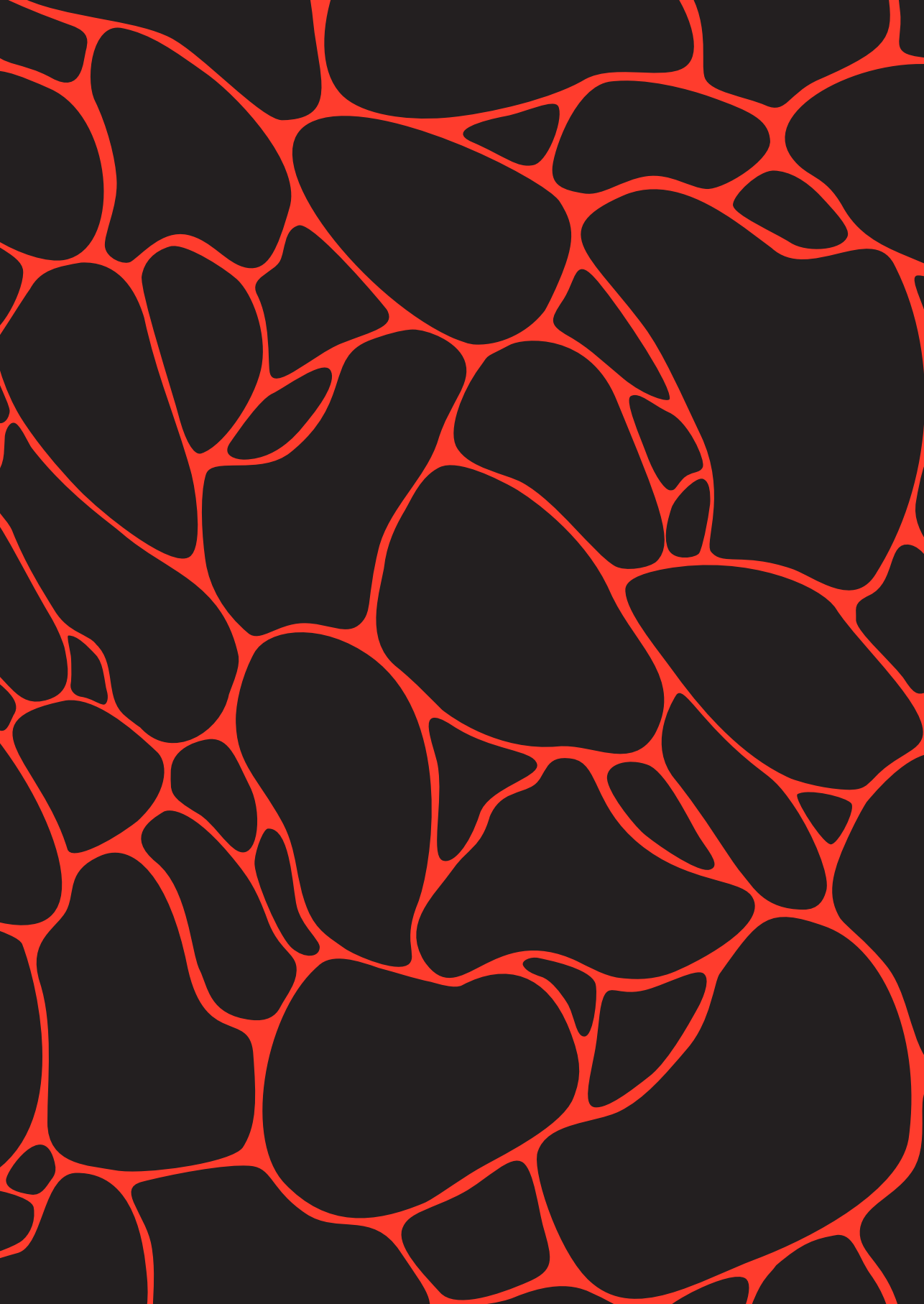
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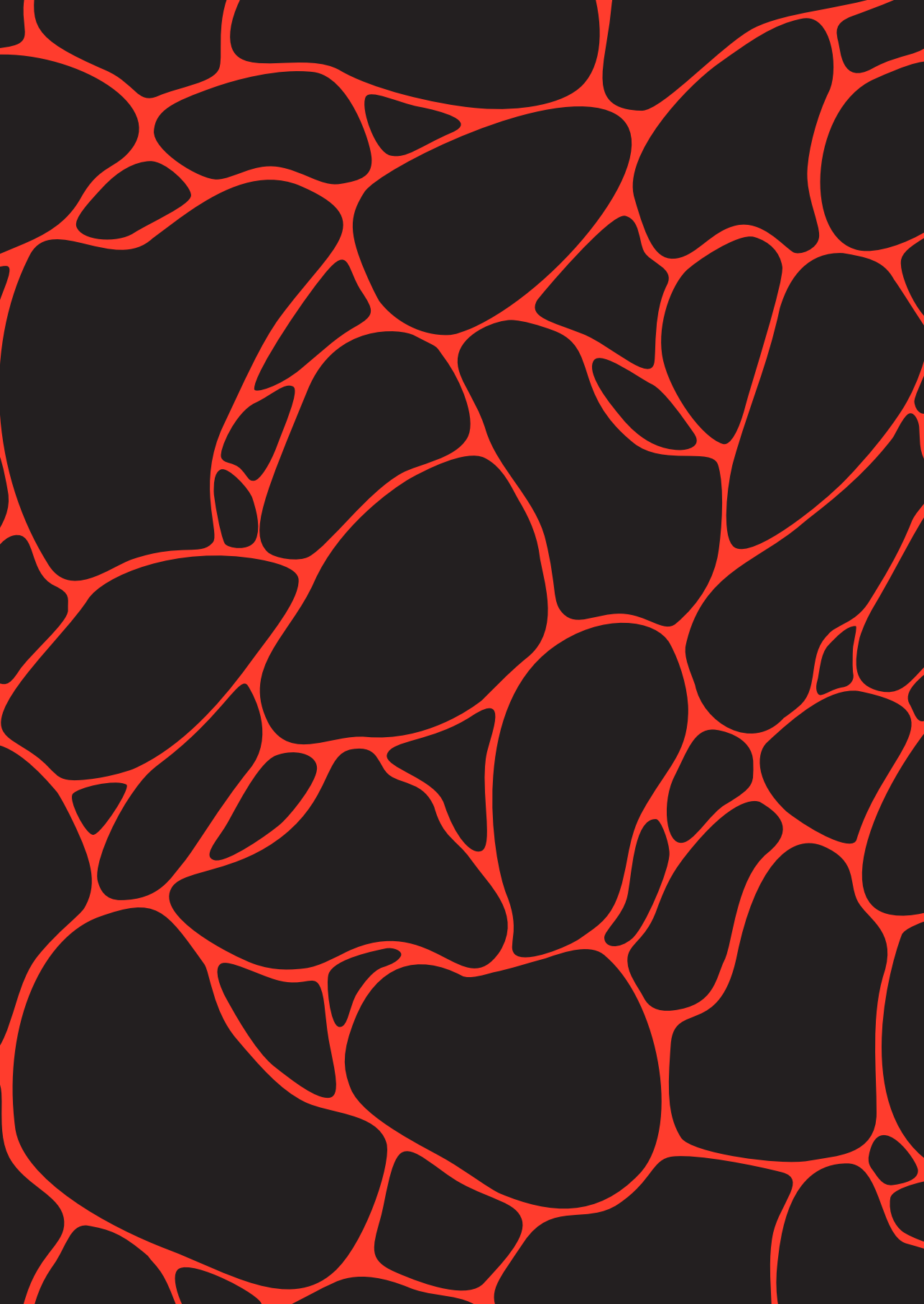
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**Olga Majcen Linn** is a curator based in Zagreb. She holds a PhD in arts and media from the Faculty of Media and Communications, Belgrade. In 2002 she founded the nonprofit organization KONTEJNER, which presents contemporary, intermedia, and interdisciplinary art operating in the fields of art and technology, art and science, and live art. Among its most significant projects are the Touch Me Festival, the Device\_art Festival, the Extravagant Bodies Festival, and DIY\_ARTLAB. Since 2003, she has been working at the Gallery VN in Zagreb, where she presents young and emerging Croatian artists. In the course of her curatorial work, Majcen Linn has authored and/or published more than a dozen books, catalogues, and readers. She is a guest lecturer at the Academy of Fine Arts in Zagreb.

**Sunčica Ostoić** is a cultural worker from Zagreb, where she graduated Art History and Philosophy at the Faculty of Humanities and Social Sciences. She is currently a PhD student of Studies in Contemporary Transdisciplinary Arts and Media at the Faculty of Media and Communications in Belgrade, under the supervision of PhD Miodrag Šuvaković. She is a guest lecturer at the Academy of Fine Arts in Zagreb (Art at the Intersection of Science and Technology). In 2002, she co-founded NGO KONTEJNER. As the author of the projects Extravagant Bodies, Touch Me, and Device\_art, and initiator of the DIY\_ARTLAB platform, since 2000 she has worked on more than 100 exhibitions, festivals, lectures, and publications in Croatia and internationally: in Zagreb, Rijeka, Dubrovnik, Ljubljana, Belgrade, Skopje, London, Glasgow, Perth, Sydney, San Francisco, Beijing, Tokyo, etc.







# Testimonial and Material Evidence

Ida Hiršenfelder

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I examine the archive in two mutually affected trajectories, the administrative and cultural, both influenced by the challenges posed by contemporary art practices of the past few decades. These past experiences, successes, and failures may serve as a starting orientation point for those who consider including radically different materials such as biological matter or processes in the archive of contemporary art, which initially was not structured to facilitate such interdisciplinary evidence. The administrative paper archive has undergone a digital turn, which declared the possibility of multiple temporal and contextual layers within memory technologies. However, the administrative digital archives are still rigorously rooted in their techno-mathematical structure, which does enable a multitemporal retrieval but is still based on arborescent hierarchical architecture. In the cultural turn of the last decades, collective memory production has shifted its focus on the one hand to the analysis of techno-cultural temporal dynamics of social, administrative and technological systems, and on the other to the extraordinary conceptual shifts posed by decolonial, queer, post-humanist cultural critique. The solution proposed so far is to enable transparency of processual, material, affective, and contextual aspects of lived experience as opposed to the opaque institutional selective activity and centralisation. The archive thus becomes a testimonial rather than merely material evidence. To support this approach, I will offer a presentation of case studies of performative practices to think about structural conditions in interdisciplinary collaboration through which the cultural turn may influence the administrative structure.

First, I would like to make a brief distinction between the two trajectories. Whenever I address the notion of administrative archives, I will use archives in the plural as there are many approaches and disciplinary differences between particular administrative archives. Whenever I address an archive as a dispositif, for thinking about structures of memory production, I will use the archive in the singular form.

For more than two decades, archivists, especially those who are informed by critical analysis of archive as an enlightenment tool to validate political or national power, have been trying to propose a rhizomatic approach to archival structure. But to apply this approach in a concrete administrative sense, we risk the structure to sustain a discursive bias. Wolfgang Ernst (2016), in his proposition to radically de-historicise the archive, points out that the administrative archives are in a strict sense a memory that promises an objective and non-discursive representation of a singular time or event, and that we cannot simply take out archival records because they are politically incorrect and that it is precisely “the non-discursive and non-narrative structure of the archives which makes it such a uniquely powerful institution.” (p.10)

There are at least three concerns or doubts that I would like to point out when thinking about a non-hierarchical and rhizomatic archive. The first has to do with some level of mistrust in technology, the second with an understanding of the time it takes to archive, and the third with the sense that there is a lack of political will to enable such archives or memory production.

Although digital archives are subject to General Data Protection Regulation and copyright laws, we must anticipate that images will escape control and the documents will be remixed, not following the original intention of their production. The digital archive not only stores documents and their meaning but also affects their meaning with the structural environment in which they are situated. The digital archive has a certain autonomy which enables a montage of comparable perspectives, yet performs certain violence over the event and the body, which is based on the system (Hiršfenfelder, 2020:p.79). An infesting problem that we are facing in the administrative archives is a double lock between long-term sustainability and accessibility of digital archives. It turns out that big data repositories are, oddly, in some way more vulnerable to time decay than physical objects, meaning that the programming languages and protocols that they are based on are deemed obsolete in a span of about 15 to 20 years. Many are hopeful that HTML-5 will prevent such obsolescence, but I am personally less optimistic. It takes an enormous effort and lots of funding to facilitate updating and upgrading the digital archives. Also, with the artistic production, virtually with any ground-breaking art production we find that it doesn't fit into our firm and often rigid taxonomical structure. There are always artworks that are somehow outside of the archive or incorrectly indexed, which produces untraceability in existing retrieval queries.

I would like to give a short example. Since recently, in Slovenia, academic credentials are collected by the National University Library. Whenever an academic needs to retrieve these credentials for promotion in an academic position, they simply make a printout from the COBISS repository of the library. And this works perfectly and instantaneously for printed matter such as monographs, magazines, and musical albums. However, it gets a little more complicated for an artist/professor who works in traditional formats such as paintings, sculpture, graphics, and illustration. For those who work with new forms of art such as performances, sound installations, biomedica installations and durational projects indexing becomes much more complicated. The repository's taxonomy was created before the widespread emergence of digital media in the arts and has not been updated to facilitate such production. When Slovenian artists applied for academic credentials, what they were left with was to give false information about their work to the archive.

If digital systems and taxonomies become obsolete, this is even more true for the accessibility platforms, the frontend webpage design of archives through which the users (researchers, students, artists, curators) are accessing these materials. In the case of my

last archival position, the Web Museum<sup>1</sup>, I am unfortunately realising that a design update and the tools to access the materials are crudely outdated after just 8 years since it was first conceived and just 5 years since it was launched. Until Summer 2021, I worked at the Museum of Contemporary Art Metelkova on projects related to digital archives. The larger part of my work for the museum was the so-called Web Museum project, a repository for the storage of digital audiovisual cultural heritage that also has some online access to audiovisual materials when legally permitted. The project deals with inventorisation of artistic practices based on media technologies from early video production to contemporary digital content and intangible productions. But most of the documents are connected to performances and discursive programmes, artistic events, exhibitions and referential publications, which significantly contribute to the understanding of the art materials.

Through semantic connections, we drew attention to important segments of heritage that were formerly not included in the systematic reviews of artistic production in Slovenia. An added value of the repository was the creation of a common open-source backend web-based interface for multiple users in an attempt to decentralise the archival process. Whereby, as a museum archivist I am not the sole gatekeeper of the archive. Nevertheless, the storage is not completely open, so the archive maintains some credibility of administrative archives. Organisations or individuals became so-called users of the Web Museum, while the museum provided technical and content support to digitise, systematise and publish the materials online when this was legally possible. So, this archive is ideally neither entirely open nor entirely closed but rather a structure negotiated by its users, who together have a better understanding of the needs that the art production creates.

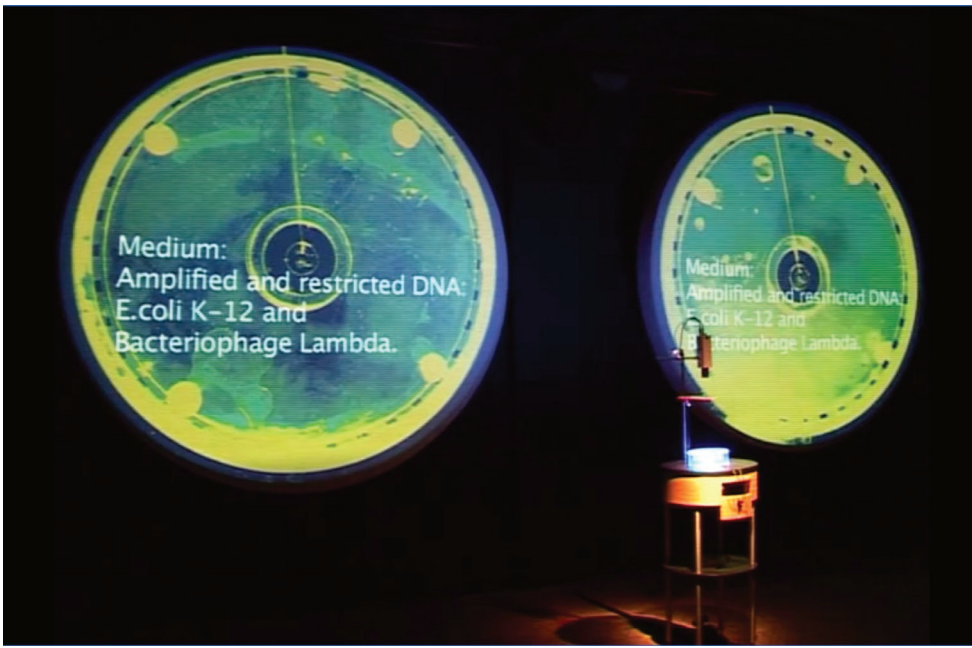
One of the bigger and more significant archives in the Web Museum is the Kapelica Gallery archive and so far we have digitised approximately 450 tapes containing around 700 audiovisual items, of which metadata inventory is made for about 200 documents from Kapelica's production between 1996 and 2013.<sup>2</sup> The majority of these video documents have unclear copyright contracts in regard to publishing online, but they are available online on request by a researcher for free. It means that the third party in this open archival platform besides the museum archivists and editors are the users such as researchers, artists, university professors, curators, and others. There is still a lot of work to do but we've made the first major effort to make these materials more accessible and available to curators and researchers.

There are at least three concerns or doubts that I would like to point out when thinking about a non-hierarchical and rhizomatic archive. The first has to do with some level of mistrust in technology, the second with an understanding of the time it takes to archive, and the third with the sense that there is a lack of political will to enable such archives or memory production.

Following my first consideration about the mistrust of technology, the second concern has to do with the manual work and the time it takes to create an archive. It turned out that the promised big data analysis and cross-referencing research is only possible for corporate giants. Most artistic and academic data analysis is somewhat an intellectual fantasy limited by the time and labour it takes to create big data. It depends on very pragmatic labour conditions and the workloads of the archivists. In our case, the museum had only myself employed for the project, while the NGOs that are the constituencies and the users/co-creators of this archive find themselves in even more stressed, underpaid, overworked situations.

1 You may access the Web Museum on the following online address <http://mrezni-muzej.mg-lj.si/>.

2 Images published in this article are from Kapelica Gallery archive. Some were also made in co-production with the City of Women Festival that is also a part of the Web Museum.



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- 1 Paul Vanouse, *Ocular Revision & Latent Figure Protocol*, still from video documentation of the installation at Kapelica Gallery, Ljubljana, 2011. 21' 14". Courtesy of: Kapelica Gallery
- 2 Marta de Menezes, *Nature?*, still from video documentation of installation with live organisms at Kapelica Gallery, Ljubljana, 2005. 40' 54". Courtesy of: Kapelica Gallery

Care as a contested notion was already unpacked in this publication by Ionat Zurr. Care is a matrix of power relations with many social and economic aspects. Care is never an innocent practice but a conflictual relation linking living beings, spaces and technologies. In our case, trapped by the precarity of cultural producers defined by a politics that keeps culture in check. For example, to properly digitise, index and archive just one short audiovisual document of performance art it can take one archivist several hours, if not days, from start to finish. And if one attempts to dig deeper and broaden the documentation, this process can stretch over months, if not years.

The third pitfall for the archives that I would like to point out here is political will. I have been quite blindly self-assured that working for a national institution is a guarantee for sustainable and long-term storage, preservation, and caring for the archives. Before that, I was working with Barbara Borčić in the DIVA Station Video Archive in the context of a nongovernmental organisation and have experienced the uncertainty, and at the same time resilience of working in precarious conditions. I have come to realise that the conditions in public and national institutions are regrettably much more volatile than I had imagined. The opportunity to take proper care of heritage is often too strongly dependent on personal (dis)engagement and private (dis)interest. In politics, the inclination to truly care is often lacking, which results in neglect. Or even worse, the conditions set by the populist political currents impose a short-sighted and intellectually-challenged understanding of archival processes. At the same time, such currents are often inclined to revisionism and biased utilisation of the archives. These revisionisms are not to be cynically mistaken for the cultural turn that created the extraordinary conceptual shifts posed by decolonial and queer cultural critique. This critical calling is not a biased reading of events but rather precisely the opposite; it is a call to recognise the biases in a presumably “non-discursive” archive. They call for testimonial witnessing of minorities and incorporation of validity of indigenous knowledge into the archival production as opposed to the hegemonic and Eurocentric reading of what is legitimate knowledge. Gayatri Chakravorty Spivak (1999) says: “Perhaps it is no more than to ask that the subtext of the palimpsestic narrative of imperialism be recognised as ‘subjugated knowledge’, a whole set of knowledges that have been disqualified as inadequate to their task or insufficiently elaborated...” (p. 267).

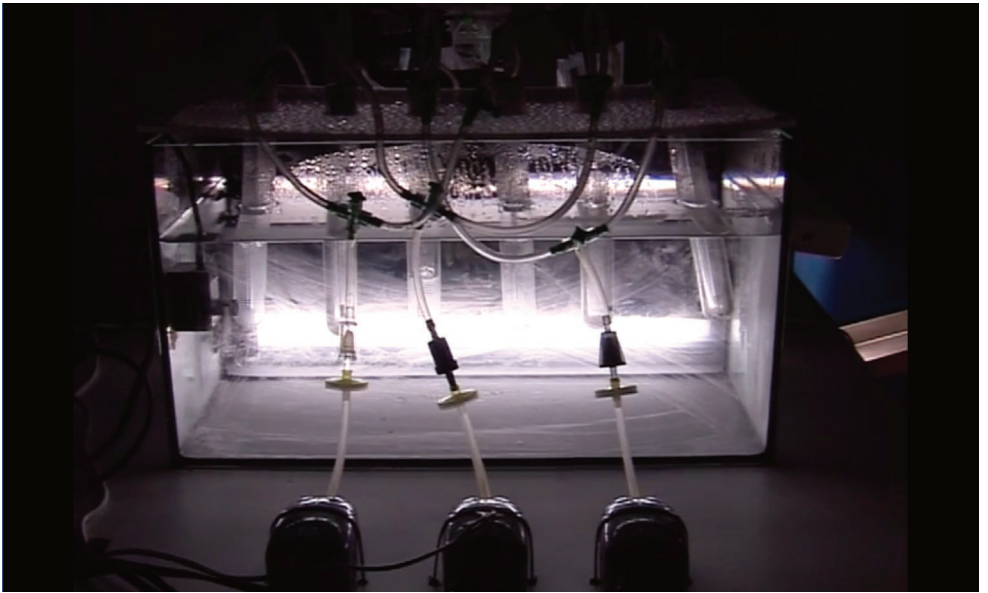
In this turn, indigenous scientists propose that their knowledge belongs to a “high-context” and relational worldview that includes all connections in interdependent dynamic balance in its considerations and activity. In contrast, Western science perceives from a “low-context” view, reducing context to a minimum with a focus on material objectivity, reproducibility and productivity. This comparison is also an effective illustration of the tension and structural difference between a rhizomatic archival structure with many cohabitating nodes and clusters, and the arborescent hierarchical categorical apparatus of the enlightenment. In a testimonial archive, witnessing and storytelling are not collected and archived in an ethnographical sense from a lived experience into the categorical apparatus of the existing Western archive. I would like to give an example of the importance of self-mediated practices of the Zapatista movement, which has, for over 20 years, made a conscious effort to create and archive their experience. Los Tercios Compás, the Zapatista media agency, promotes the mastering of technological tools and using them by as many members of the movement as possible. Not just as their media strategy of validating their political struggle for self-government, but also as a tool for the production of their archival traces. In this way, the archivist is not a passive observer who collects documents that were produced outside of them, but someone who actively engages in the production of the archival material. The unfixed, non-categorical activities (of performance art, indigenous experience, or living materials) are therefore not something that needs to be done or incorporated into the existing archives but rather a lived experience that is performed throughout its production.

I have had the privilege to work with archives that were conscious of these processes of archiving simultaneously with the lived experience. Often, they produced artistic statements, witnessing and testimony as a part of their strategy of production. A common reproach of the testimonial archive is that a personal account is less reliable than material evidence. However, I will show in the following example that sometimes the opposite might be true and that it is pointless to assert value in the question of evidence collection. The example is a little tribute to Olga Majcen Linn and Sunčica Ostoić, who curated the Break21 Festival, entitled *Dead or Alive* in 2002 at the Kapelica Gallery. This piece of the archive was a little detective story. The kind that makes the job of archivists intriguing. In the audiovisual materials, there were mini DVs with the inscription Break21. In the materials, I recognised performance works; some from hearsay, some from personal memory. The detective story started to unfold when Sandra Sajovic from Kapelica sent me a scan of the programme that did not contain artwork by the late Marijan Crtalić. I was absolutely certain that this performance was shown on Break21. It took some time to affirm that the programme notes were printed before the last changes in the actual programme were made. So, the material archive proved less reliable than Sajovic's testimony. It cannot be emphasised enough that it is utterly important to create documents as long as witnesses are alive.

An archive is a time machine that actively creates ways of accessing individual or collective experiences. Digital archives in particular, such as the Web Museum, anticipate open and free access to memories. They are not just representations of events, but a field in which we can surpass the informativity of events to strengthen our experience of the past and also the future possible worlds (Hiršfenfelder, 2020:p.77). Every idea of history is inextricably linked to a certain implicit experience of time conditioning our knowledge. The implicit category of time varies from culture to culture. The image of time conditions all experiences, and no cultural shift is possible without changing this experience. The primary task of social change is therefore not to change the world, but to change time. An archive is a tool for monitoring our experience and comprehension of time (Hiršfenfelder, 2020:p.79). It is a place where documents are given their story-making value as the consequence of them being put in the apparatus of time. And the apparatus of time in the Western experience is infected by the idea of linear historical progression and linear advancement that is ever better and faster. In this dromology, as Virilio (1977) calls it, our vision narrows, the context becomes blurred and we are only able to perceive what lies ahead and not what contextual framework informs it. And the solution to that is not to go back to the pre-information slow time, but to be open to the experiences of non-linear times.

If we want to fixate the schism in chronological time, it turns out that we cannot contain it. The “now” is always evading us. The question of *nowness* is doubly essential for the documents of performance and living processes. First, there is the question of the “*nowness*” of the moment of staging a living system. Second, the document itself is subject to its own temporality, not as iteration, but as a new point of *nowness*. The incapability of *nowness* in archives, libraries and museums that accumulate time creates heterochrony or time as a social and political category, not as an abstract physical dimension (Hiršfenfelder, 2020:p.81). Wolfgang Ernst (2016) even considers an attempt to delineate the archive from historiographic production and calls for a media-archaeological approach that is “not just an auxiliary discipline to history, but an alternative model of processing data from the material archives of the past. While historical discourse strives for narrative coherence, the archaeological aesthetics deals with discrete, serial strings of information.” (p.12). The historical administrative archive is rooted in coherence and does not allow for negotiation. It is considered an authority on producing knowledge. But the solution to this rigour is not the inclusion of testimonial archives into the dominant knowledge, as I believe that the inclusion of, for example, oral history in the institutional archive without the latter's authority being overcome leads to a form of colonisation or appropriation of the former. I can find a way out of the binary position by beginning to think of documents in the archives with unease. This puts me in an uncomfortable state of checking





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- 3 Andy Gracie, *Autoinducer\_Ph-1*, still from a hybrid ecosystem installation at Kapelica Gallery, Ljubljana, 2008. 15' 12".  
Courtesy of: Kapelica Gallery
- 4 Marijan Crtalič, *Diving*, still from video documentation of performance at *Break21 Festival, Dead or Alive* at Slovenska kinoteka, Ljubljana, 2002. 28' 35".  
Courtesy of: Kapelica Gallery



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- 5 Cassils, *Tiresias*, still from a durational performance at Kapelica Gallery, Ljubljana, 2005. 2011, 37' 51". Courtesy of: Kapelica Gallery
- 6 Silvia Federici, *The Return of Primitive Accumulation and the Ongoing War Against Women*, City of Women, Ljubljana, 2014. 99' 32". Image: Nada Žgank.
- 7 Ana Čigon, *Dear Ladies, Thank You*, still from video documentation of multimedia performance, at Kapelica Gallery, Ljubljana, 2011. 28' 17". Courtesy of: Kapelica Gallery

for meaning while the two simultaneously work for and against each other. I think this way of using the archive was already performed by Foucault and the post-structuralists. Such discrete moments are revealed in the incapability of an impeccable iteration in a re-enactment. The archive is not simply fixed, but an invitation to map new spaces and relations, revealing different forms of the same thing in a qualitative sense. From this perspective, the task of creating archives is not in mimicking a certain archival form but in expanding the concept of what an archive can become. The archive is not a representation of events, but a possibility that strengthens our experience of the (lived or unlived) past and perhaps develops a bodily experience different to that of the event but in kinship to it. In this sense, the ephemeral art event such as the beautiful 40-minute recording of Marta de Menezes hatching butterflies continues its existence and participates in the production not just of meaning but also of the life-lived. The archive is not a place where documents end, but a place where they begin. When thinking of performance archives and perhaps also archives of art that use living materials, it is thus not the aim to reproduce the event or the life in re-enactments or in collection displays, but rather that we make use and creation of new experiences by reliving the archival material. In my understanding of the performativity of the archive, I pay attention to how the archive is open outward and is capable of reflecting inward at the same time, which allows for some measure of permeability.

The aim, however, is not to archive everything. I propose that the archive be guided by the logic of distribution, not the logic of accumulation. About ten years ago, I thought a lot about the question of the inflation of digital materials that are stored as a consequence of the unpaid perpetual online labour of billions of creators of digital content on various social media platforms. At the time it almost seemed as though I was asking the wrong question because the majority of my professional labour was about preserving, digitising and categorising archival data. I asked how not to preserve the digital life in its entirety and forever, and enable dying, instead of prolonging our digital zombie life to eternity.<sup>3</sup> I was addressing the digital accumulation that happens not because of the conscious decision to archive but due to the automation of saving. Accumulation without purpose is preventing us from finding any reliable data at all. It is like a smokescreen of the ever-flowing data stream. The fundamental shift in the demise of forgetting and the prevalence of remembering too much of this data can have terrible consequences. Not just in terms of privacy, but also in a cultural sense. In psychology, the capacity to suppress traumatic memories is a psychodynamic automatism that enables the traumatised person to remain at least somewhat functional. Likewise, the capacity of society to forget can prove to be beneficial. Observation of the very few living individuals with an unusual disorder that causes them to remember everything proved that they are unable to make decisions due to a surplus of uncategorised memories, and that they are generally not able to enjoy the present moment (Mayer Schönberger, 2009:p.50). If we look at this statement from today's schizoid post-truth reality, we may get some sense as to where society's paranoid frenzy and radical political polarisation stems from. From the perspective of the human brain, a computer that remembers everything is actually utterly mad and extremely discontent. Contrary, the brain has a system of ordering information before committing it to long-term memory. Mayer Schönberger (2009: Chapter 6), who researched data accumulation, suggests that we would have to assign an expiration date for the information. This means that the producer of digital information decides on its lifespan. Keeping this in mind, the archive has an even greater social and political obligation not to be an accumulation of things but always keep in mind the distribution. Who and for what purpose is it going to be used? As Allan Sekula (1992) pointed out, for example, the history of forensic photography and the criminalist archive is connected to the development of eugenics, racial theories and class discrimination based on evidence

<sup>3</sup> One of the outcomes of this thread of thought was a short lecture *Digital Death. The Net Never Forgets* at Aksioma – Institute for Contemporary Art in Ljubljana as a part of Igor Štromajer's exhibition *Make Love, Not Art* in 2012.

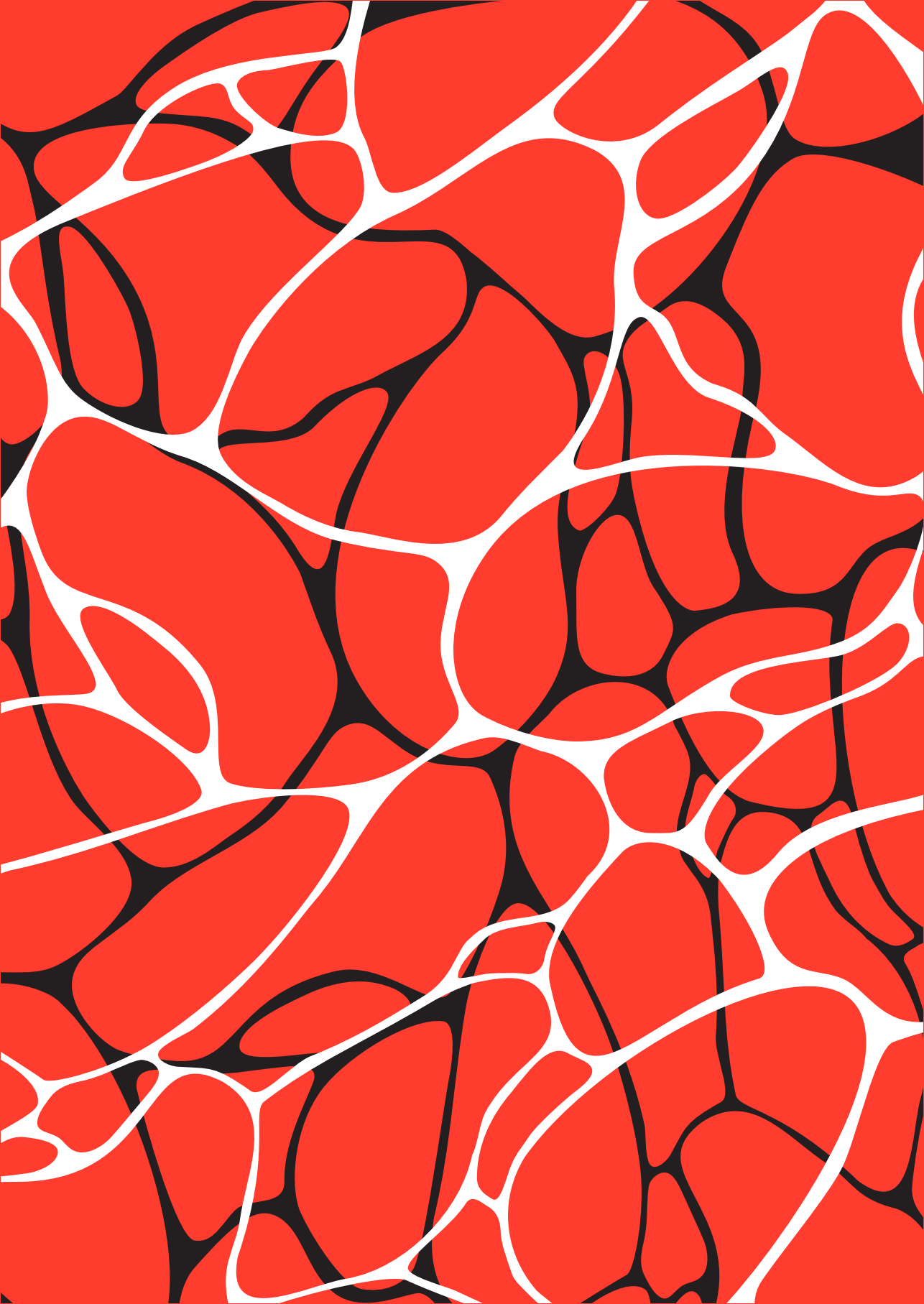
suggested by the physical characteristics of individuals (344–379). This is a clear example of the danger of accumulative principles, whether we speak of criminal archives, big data harvesting or piles of unsorted false information.

In the conclusion, I wish to briefly come back to the idea of the archivist as a gatekeeper who determines the procedures of historicising, such as the logistics of archive interpretation, valuation, verification as well as exclusion, erasure, and separation. Archiving is always a selective process. Reading the evidence is the only thing we can do as the evidence cannot speak for itself; the same goes for seemingly unambiguous evidence. Reading is always subject to culturally loaded clarification. The only thing separating us from a completely arbitrary interpretation is then ethical or personal responsibility that is limited by social and political interests. We might want to ask ourselves what are the important selective decisions or criteria that we make or are subsequently continuously making, to keep the archive alive? What are the reasons for framing the archive in terms of a specific art field, a particular genre or a certain point in time? What sort of carriers are we handling (documents, photographs, AV materials, protocols)? How much of the archive is digital and how much analogue, and what is presented online? If the archive is digital but not online, how do we facilitate access?

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**Ida Hiršenfelder** is a sound artist and archivist. Her sound projects exploring bioacoustics, experimental music and sound spatialisation are released under the onomatopoeic acronym beepblip. She was employed at the +MSUM Museum of Contemporary Art Metelkova (2014-2021) on projects related to digital archives: editor of Web Museum, a repository for contemporary audio-visual art, editor of Moderna galerija's home page. To this day, she is a member of L'internationale Online editorial board and a co-curator of the Glossary of Common Knowledge. She is currently an advisor for the Nomad Dance Academy archives. Previously, she was an archivist assistant of DIVA Station, Digital Video Art Archive at SCCA, Centre for Contemporary Arts-Ljubljana (2007-2013). She co-created Art-area bi-weekly edition on contemporary art and was an editor of feminist monthly Sektor Ž at an alternative radio station, Radio Študent (2006-2014). She worked as a correspondent and critic at Dnevnik Daily. Amongst other media, she published texts in *Maska: The Performing Arts Journal* (Ljubljana), *Digicult.it* online magazine (Milano), *FurtherField* online magazine (London), *Dialogi Magazine for Culture and Society* (Maribor) and in readers and exhibition catalogues.



# Fragments of an Archivist

Rok Vevar

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## The Genealogy of the Temporary Slovenian Dance Archive

I declared the establishment of the Temporary Slovenian Dance Archive (TSDA) in my apartment in Šiška, Ljubljana, shortly after having moved into it in 2012. During that period, I began to systematize the materials which had been piling up for years from various donations, due to my interest in the research of historical and theoretical work in the field of contemporary dance and contemporary performance practices, produced outside of public cultural institutions. As interested users of the materials began to turn to me, I realized that the collections were being turned into an archive.

In 2011, I systematized the materials in the library of the Public Fund for Cultural Activities (JSKD; Javni sklad za kulturne dejavnosti at Cankarjeva 5)<sup>1</sup>, which Neja Kos, a retired consultant in the field of contemporary dance at the Association of Cultural

<sup>1</sup> The Public Fund for (Amateur) Cultural Activities is a state cultural institution that has been producing artistic and cultural activities of non-professional artists in the Republic of Slovenia since 2000. Between 1977 and 2000, the name of the institution was The Association of Cultural Organizations of Slovenia. It is an institution that emerged after the Second World War as the Union of Cultural and Educational Societies, and is related to the role that culture, art, and education played in the anti-fascist struggle during the Second World War. After the war, these societies renewed the network of municipal cultural centers and continued to develop programs similar to those during the war. The government of the Socialist Republic of Slovenia had planned the development of a workers' socialist art from this union, which never came to its proper conceptualization. At different periods in history, the institution took care of its cultural programs, through which they cultivated the possibilities for talented young people to choose artistic professions, with varying intensity. In the other republics of Socialist Yugoslavia, despite individual attempts, such institutions did not operate as effectively as in Slovenia where amateur culture abounded.

Organizations of Slovenia (later named The Public Fund for Amateur Cultural Activities, and finally renamed The Public Fund for Cultural Activities), had been collecting since she began working there in 1977. This is the institution which, during a certain period, most constructively made up for the institutional deficit in the field of contemporary dance. When the employees of this institution began to throw away systematized materials, Nina Meško, Neja Kos, and I decided to move them to my apartment. Even before that I had brought home the materials that the Maska Publishing House wanted to get rid of when relocating from their joint offices with the Exodos festival. In 2012, I received materials from Tanja Sciamia's sister, Ksenija Hribar, the choreographer and founder of the Ljubljana Dance Theater<sup>2</sup>. After several work visits to London, where Hribar worked between 1960 and 1978, I used the acquired and donated materials to create an extensive collection of Ksenija Hribar's materials, based on which the book "Ksenija, Xenia: the London Dance Years of Ksenija Hribar" (Maska, JSKD, Nomad Dance Academy Slovenia, 2020) was written.

Between 2012 and 2017, I organized individual and group guided tours of the archive in my apartment, as well as short lectures on the history of dance. Ida Hiršenfelder, a contemporary sound artist and archivist who came to one of these lectures at the suggestion of Zdenka Badovinac, the director of the Museum of Modern Art and the Museum of Contemporary Art Metelkova<sup>3</sup>, took care of the digital Web Museum (Mrežni muzej). They invited me to move the Temporary Slovenian Dance Archive to the Museum of Contemporary Art Metelkova, which happened in the spring of 2018. In this institution, the TSDA opened in April of 2018.

### An Archive Without a Plan

The Temporary Slovenian Dance Archive was created without a plan. It emerged as a systematization of my own research interest before I had even realized that this could be an archive. In the beginning, it was not a project, but at some point, it turned into one. If I did become a dance archivist, or more precisely, an archivist of the performing arts, this was not my conscious decision, but rather a determination that makes me happy. At the beginning, I received the materials that I keep in the archive because artists and cultural workers, my friends, wanted to get rid of stuff before moving house. They deposited it in a place of anticipated or perceived interest, so as not to throw it away in the trash. My apartment, in which I had declared the establishment of the Temporary Slovenian Dance Archive in 2012, became a repository of various materials. The TSDA, thus, tells the story of the currency of certain artistic practices in the Republic of Slovenia, or in the City of Ljubljana, and is not my private achievement, but rather the achievement of the local community of artists. Because of all of this, I was never able to own the material I keep, and at the same time, when various public cultural institutions in the field of performing arts began to show interest in it, I did not allow them the possibility of selective ownership.

The archive, which is always evolving and in a constant process of transformation, houses and maintains printed matter, typescripts, manuscripts, and correspondence related to local and foreign artists who have worked and performed in Slovenia in the field of contemporary dance and contemporary performing arts. It also comprises festival folders,

- 2 *Plesni teater Ljubljana* is referencing the name London Contemporary Dance Theater, where dancer and choreographer Ksenija Hribar (1938-1999) also performed between 1967 and 1974. After returning to Ljubljana in the late 1970s, she began working with young dancers and, together with them in 1985, she founded the first professional dance theater in Slovenia. Between 1985 and 1993, Plesni teater Ljubljana operated as a contemporary dance group, and in 1994, by moving to the premises at Prijateljjeva 3 in Ljubljana, it became a production house without a dance ensemble.
- 3 The Museum of Contemporary Art Metelkova is a unit of the Museum of Modern Art, a public cultural institution established by the Republic of Slovenia.



documentation of the Contemporary Dance Association Slovenija from its founding in 1994, folders of educational programs in the field of contemporary dance, folders of letters of recommendation, which are a rich source of biographical data, folders of photographic materials (mostly photographic prints), an extensive audio-visual archive, as well as two extensive collections: a collection of the critic, journalist, and dance pedagogue, Marija Vogelnik, and a collection of dancer and choreographer, Ksenija Hribar.

### **An Archive Without Cultural Production**

One of the first decisions I made as an archivist was to start creating without producing; without providing the archive with a formal production foundation at the outset, which would demand time and feed into the time of the creation of the TSDA. At the same time, this meant that the entire endeavour was not my job (in terms of production), but my hobby, a leisure activity. This is still 80% true today. The decision I made did not mean that the TSDA would not come out of the process as a phase product, but by deciding to create an archive, I avoided the ideological form of contemporary cultural production where work and production eliminate or reduce creation to a minimum at the expense of production (especially the organizational elements of production, such as communication, organization, fundraising, promotion, etc.), which results in a weak product, and where funders (sources of public financing, their networks) formally and realistically subordinate the work.

### **Creating Archives**

The creation of an archive does not mean the appropriation of archival documents, but a form of fidelity to documents in a way that considers them as manifestations of time. The loss of documents in most institutionalized archives is the result of the focus on production at the expense of creation: ignoring their time by fetishizing materiality, quantity, and preservation, whereby archives become more important than their documents. This is the appropriation of time, and with it, of all potential histories told by the documents: the wet dream of authoritarian approaches to time, which can lead to historical revisionism. I understand this as the territorialisation of time, and the cultural and political context I come from is always deep in the revisionist falsifications of time, or at their fringes. Time cannot be taken possession of, and certain documents simultaneously point to a time that has never been documented. For me, histories are forms of documentary and speculative time. Because they are the product of that which can be understood in a given present, they are always fundamentally uncertain, incomplete. Speculative time is a list of things we do not know. It is very important to me that even that which we do not (yet) know, is transparent.

Toni Morrison's suggestion that certain cultural, as well as artistic forms, are, in certain cases, forms of oblivion, is very appealing to me. The storage of a time that, at a certain moment, had to be forgotten. The poesis of forgetting. In the novel *Song of Solomon*, Morrison sends her hero, Milkman (Macon Dead), to explore a family story in the southern United States. He tries to find traces of his vanished great-grandfather Solomon, about whom it was rumored – and which coincides with the mythical folklore tradition that certain enslaved African Americans had learned to fly – that he had flown back to Africa. Milkman finds no trace of his great-grandfather for a long time, until he figures out that the song and dance performed by the children on a playground in the heart of the city, witnessed regularly by the young researcher, is exactly this document - the story he is looking for. The documents we deal with in archives are not only traces of memory, but also forms of forgetting. Not so much the affirmation of memory, but the necessity of oblivion. The task of curatorial projects, historiography, or an artistic handling is to transform forgetting into forms of memories, to create redistributions from the stocks of time, and various forms of that from which the past can ultimately transform into some new future.

Temporary Slovenian  
Dance Archive. Images:  
Dejan Habich, MG+MSUM





## An Archive as Working With Time

Working with time is twofold in the TSDA, as time is settled within the materials that the archive stores. Simultaneously, it is also ensuring the creative time needed in order for the practice of archiving arrives to its product. In both cases, the TSDA is a rebellion against the erosion of time, against the ideology of contemporary cultural production, which seeks to provide art and culture with a mere sequence of present time(s), producing the illusion that, in the field of art and culture, we live in year zero all the time. Some cultural contexts are more, and others less inclined to such practices.

In recent years, the deficit of the public sphere in public spaces has been articulated with regard to the forms and manifestations of the public, but what is usually lacking in the public sphere in such cases is mainly time. Individual texts without their contexts present time(s) without their genealogies, as well as without visions and plans, spaces without their time, territories enclosed with hedges, technical barriers, and police guards. Guardians against the invasion of anything or anyone *different*.

Of course, the time contained within documents cannot be repeated. Creating with archival documents cannot be any kind of repetition of time, but I find its possible transformations very exciting. It can be understood by developing something with it, by turning it into one of its possible historiographical, theoretical, or artistic forms. By creating differences from it or with it (complex repetitions), rather than identities (simple repetitions). This is the only way to make time available to us and to secure access to texts, only by actualizing or transforming their potential contexts with which time is shown to us in its undocumented places, in its absences or in that which was once necessary to forget. For me, these transformations are processes of deterritorialisation and reterritorialisation, as the future, the past, and the present can transform, change, complement, and correspond with each other, thus discouraging a territorial treatment.

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### The Shape of the Archive

The Temporary Slovenian Dance Archive is not a replica of the existing archival institutions in the Republic of Slovenia. Even if it would wish to become one, it does not have the necessary financial, legal, staff, and other material conditions. The concept of an installation in time protects it from institutionalized legal frameworks that turn archival activity into defensive shelters of materials over time. This means that it is a process of authorial archival work, and that I can keep some documents in individual collections that would cause public institutions procedural problems in regulating their ownership and custody rights. At the moment, the TSDA still curates mainly my own individual research and curatorial interests.

The history of artistic practices in the territory of the country which is today called The Republic of Slovenia is connected with two organizational forms: (1) public artistic and cultural institutions, and (2) forms of self-organization, which in Slovenia today we call the “non-governmental sector,” and which had very different names in the past, such as independent culture, alternative culture, subculture, experimental artistic practices, various avant-garde (e.g. constructivism), neo-avant-garde (e.g. reism), and particular avant-garde (e.g. retro-garde) labels with their aesthetic specifications. In certain periods of time, forms of self-organization did not have specific names.

The art which was created in forms of self-organizations, related to various historical forms of precariousness, represents at least two thirds of the total artistic production in the history of art in Slovenia. The institutions that had a state-building and nation-building function in various state and political systems of today's territory of The Republic of Slovenia were mostly a structural copy of the institutions that existed in the monarchies that colonized the area before 1918. For me, the artistic practices that emerged from self-organized structures of societies, associations and often in not officially registered

communities, are certainly the key protagonists of the history of artistic practices in The Republic of Slovenia. These include contemporary dance, which since its beginnings has been an emancipated artistic ground for creative realization, especially for female artists. The self-organized forms of artistic production, with their respective precariat, are, with their exceptional heritage, what I recognize in the field of contemporary dance and contemporary performing arts as forms of uninhibited artistic audacity. With the TSDA, I strive to provide space and time for this aspect of artistic production.

### Archiving Dance

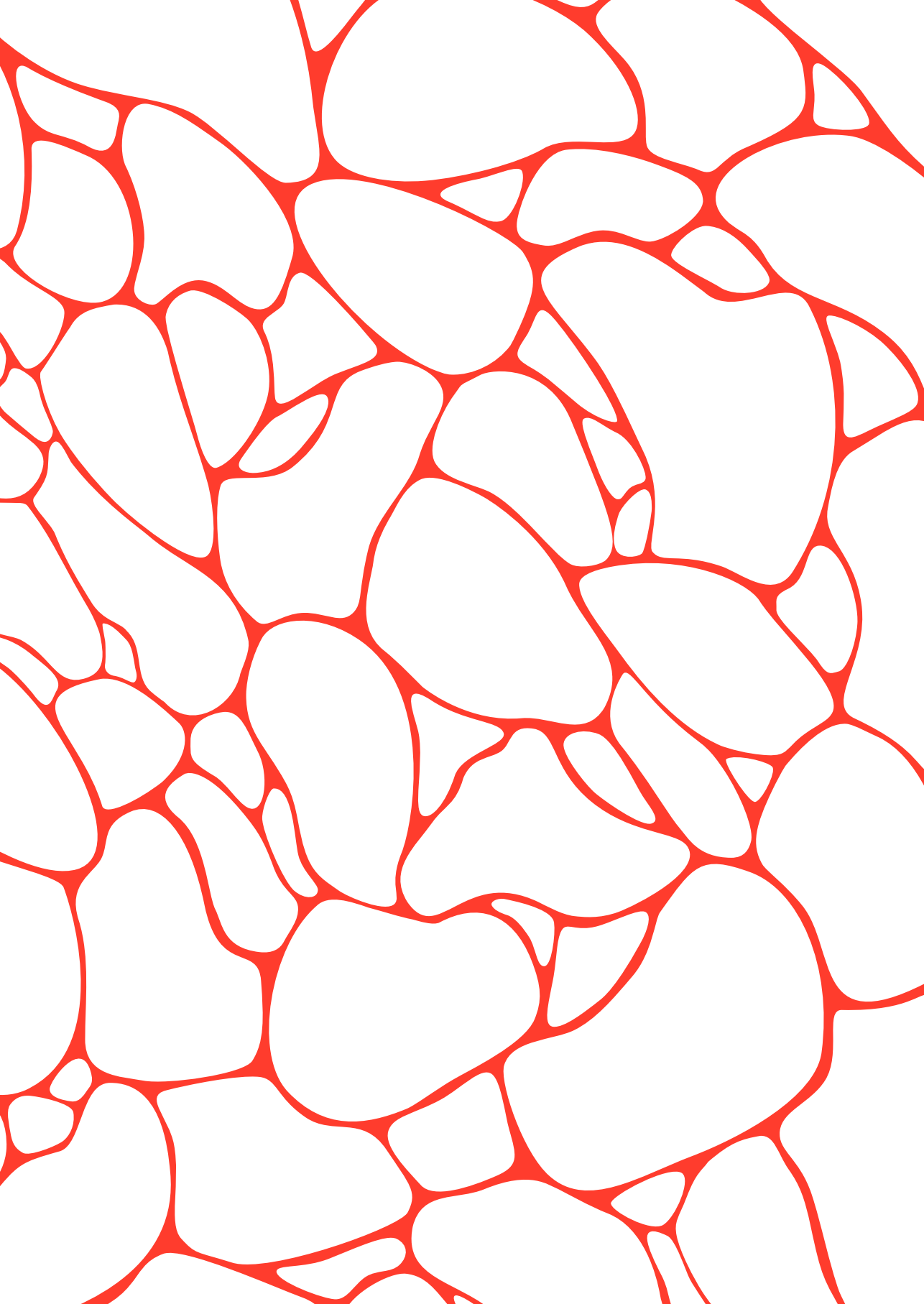
The archiving of dance is constantly confronted with its absent object, which is primarily choreographic. This is where the proverbial melancholy of dance history comes from. The artwork, which unfolded over time, danced its disappearance. I do not understand the history, theory, or curation of dance as reconstructions, conservations, or consolidations of its fundamental disappearance. When it comes to dance, the most exciting thing for me is that each individual embodiment carries with it a whole series of eliminated traces. The uses of bodies that seek to unify a particular body, for example in identity, choose aspects of the body or perform a selection of bodies, without entirely removing their remnants. That is why I find the archiving of dance, or the converting of archival documents into various possible forms, perhaps more exciting when it deals with the unpredictable remnants, than with that which wants to be visible or most obvious. Dance always contains more bodies than are obvious or available in the missing object, or that are contained in its traces in the available documents. Dance's time past emerges in the interspaces of its documents. The information that appears in these interspaces, even if it has only an indirect connection with the missing object, can be much more interesting than the object itself. It remains there mainly because, so far, no representation has managed to annihilate it: uncertain, unencoded, and potent presences. Exactly because it refers to an uncertain body, dance seems to me such a potent archive, a great supply of what is always stored in it. A deposit of things that no one remembered to remove, because the remains and traces are always poorly visible. For me, dance is the creation of something other than what bodies have always been: not the production of identities, but of differences.

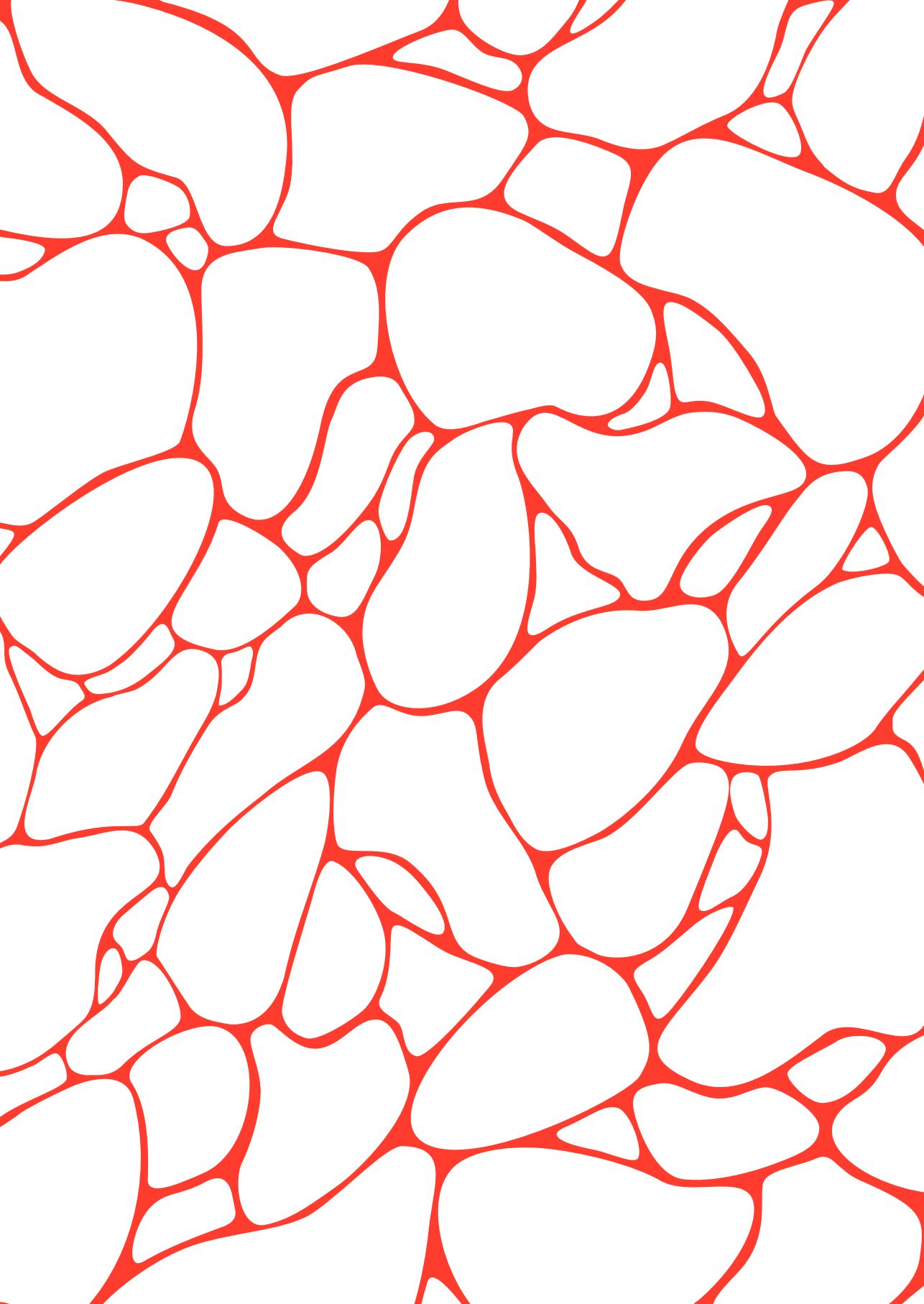
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### The Archive and the History of Dance Are Two Different Things

Choreography in contemporary dance (as an expanded practice, as publicists at some point described it through analogy with sculpture), can be an artistic, cultural, or usable function, methodology or practice dealing with the conditions, creation, or the production of composing, constructing, performing, or perceiving of various presences, absences, or representations of human bodies, as well as with traces or indications contained within those bodies. The archive of dance consists of documents. In some of its parts, of course, there is also the documentation of testimonies, reflections, conclusions, interpretations of events and experiences. The history of dance is not exclusively the history of works of art and artistic processes, but the configuration of different (interpersonal) relationships, the history of social ways of composing life, community, and art, decisions and agreements related to an indifference to human bodies. It seems to me that what is vital is that dance is a practice in which the (human) body does something, builds, shapes something with itself, and at the same time it must invent again and again the tools, methods, and technologies with which make these things possible.

**Rok Vevar** is a writer on the theory and history of contemporary performing arts, and a historian and archivist of contemporary dance. He graduated in Comparative Literature and Literary Theory at the Faculty of Arts in Ljubljana, studied theatre directing at AGRFT, and attended GILŠ Kodum in Ljubljana. As a journalist, he has published in a number of local daily newspapers, and in some national and foreign professional periodicals in the field of performing arts and literature. He is the author of the book *Deadline for the Show - Selected Criticism and Articles* (Litera, 2011). He has directed three performances with Simona Semenič: *Full Fist of Empty Hands* (Muzeum, 2001), *Solo without Talon* (Glej, Maska, 2005), and *Cartography of Full-Length Pictures* (Maska, 2005). He has co-directed three performances with dancer, choreographer, and director, Jana Menger, and performed in the last two. He is the author of the performance-lecture *How My Life Turned into a Festival* (2011-13). In 2013-2015, he was habilitated as an assistant professor at the AGRFT Department of Dramaturgy, where he taught a seminar on Theatre Criticism and Theories of Contemporary Dance, and at the Academy of Dance in Ljubljana he taught *History of Dance II* (20<sup>th</sup> century), *Dramaturgy of Contemporary Dance and Analysis of Contemporary Dance*. He is an active member of the Balkan dance network *Nomad Dance Academy*, where he initiated a project of regional archiving of choreographic practices in the *Nomad Dance Institute* program.







# From Videodokument and Videospotting to the DIVA Station

Barbara Borčić

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The DIVA Station is a compendium of projects whose aim is to research, document, and archive, as well as analyze, interpret, present, disseminate, and promote (primarily) Slovenian video art and, to a lesser degree, new-media artworks and short films. This is the reason why the text will mostly focus on video art. (Image 1) It includes documentation and archival material, along with research and curated programs, which are accessible online and are open for cooperation: comprehensive documentation (*Videodokument*), research and educational projects (*Archival Practices*, *Video Turn*), curated programs/exhibitions/screenings (*Videospotting*), and physical & online archives (DIVA). (See the SCCA projects links at the end of the text.)

The Digital Video Archive (DIVA) is being developed by SCCA-Ljubljana, Center for Contemporary Arts<sup>1</sup>. Its development started in 2005, and its goal is to conduct both the production of the archive and its use and promotion. Materials from the physical archive are available for public viewing at Project Room SCCA, where projects and discussions with artists, curators, and theorists, who are directly involved with researching and archiving contemporary art, are also organized. A database compiled on a search engine and combined with open access to artworks is available free of charge at DIVA online.

<sup>1</sup> Established in 2000 and situated along Autonomous Cultural Centre Metelkova City in Ljubljana, SCCA-Ljubljana, Center for Contemporary Arts (a successor to the Soros Centre for Contemporary Arts - Ljubljana, 1993-1999) is a generator of innovative programs and projects that facilitate artistic and interpretative practices. Its diverse activities address artists, curators, theorists, and critics in the fields of visual and new media arts. They trigger artistic, discursive, and social practices, and are rooted in an interdisciplinary approach and intense international cooperation. SCCA-Ljubljana divides its program into three complementary areas: artistic and curatorial projects, video/film/new-media art archive, and education/school.

The reflection of DIVA Station, its context, structure, and role, is based on the positioning of the archive as a strategy for writing narratives of video art development in Slovenia from the beginning of the 1970s until today. This text is concerned with the (hi)story of its development from a personal and professional view. Its aim is to present the archive as a grassroots endeavor and expose some of my personal entries into the world of video art, art history, and archival work as the head of the DIVA Station and the Director of SCCA-Ljubljana. The text also presents the archive's particular segments and manifestations, as well as presentations and collaborations. Special emphasis is placed on the various usages of the archive developed by either the producers or the invited professionals and artists. It seems that an archive is by definition always incomplete and fragmentary, it has to do with the process problem of selection and exclusion, so it is also a reduction or counter-archive at the same time. Today, DIVA Station, which is developed together with many colleagues and artists, is a vital program led by Peter Cerovšek, with Vesna Bukovec and myself as collaborators. We are constantly adding newly acquired works to the archive and promoting an overall understanding of artistic oeuvres and practices by organizing workshops, discussions, screenings, and exhibitions, as well as international presentations<sup>2</sup>.

## I. The development process

Let me introduce the development process of the DIVA Station Video Archive – its context and conceptualization as a grassroots endeavor that met the needs and plans of the local community of artists, the video scene in Slovenia. It had actually begun as a combination of my personal and professional involvement in video production in my formative years as an art historian and media theorist.

In the 1980s, I was deeply involved in the “Ljubljana alternative scene” as a curator, organizer, and artist, and this engagement marked the starting point of my further professional development. As the artistic director of the Škuc Gallery, besides organizing video screenings and events, I was also simultaneously co-authoring art and documentary video projects. Additionally, as a student of art history I was involved in writing about video, performance, and alternative art. In the first half of the 1980s, video had an important role as an artistic means of expression, being not only a tool for documentation, but also for the programming of events. Video was both a constitutive part thereof, and its effect, developing specific related dimensions. Moreover, it had a strong social function as a means to interpellate the community and to form the alternative scene (Škuc – Forum Video Production, a mass production introducing “new codes of meaning”).

In the 1990s, I worked at the Soros Center for Contemporary Arts in Ljubljana, first as an assistant director and later as the director. This proved to be decisive in providing me with the possibility of professional research and documentation of video art concerning not only the financial part, but also the institutional support and international networking. Circumstances in the scope of documenting and archiving media art, particularly video art, were quite similar in most countries of Central and Eastern Europe, as shown at the *V2 East Meeting on Documentation and Archives of Media Art in Central, Eastern and South-Eastern Europe* held in Rotterdam in 1996. In the countries where video art had

<sup>2</sup> The DIVA Station has been presented in research and curated programs of video and new media art in the form of exhibitions, screenings, seminars, and lectures worldwide: from Basel, Moscow, Los Angeles, Sarajevo, St. Petersburg, Vienna, Oslo, and Beijing to Luxembourg, London, Berlin, Bergen, and Belgrade – e.g. with the program *Feedback Loop on Media Façade*, Museum of Contemporary Art Zagreb, and an exhibition with a lecture by B. Borčić in Udine; moreover, it also participated at international video/media events, festivals, exhibitions, and symposia, ranging from *Transmediale* in Berlin, *Home Made Marmelade* in Prishtine, *Venice Biennial*, *Youth Salon* in Zagreb, *Intersanding* in Tallinn, *Communication* in Almaty to *Ars Electronica* in Linz, *Problematizing Experimental and Archival Practices in Video and Film* in Manila (The Philippines), *Museums of Film – Film in the Museum* in Zagreb, and *Emergence of Video Art in Europe* in Paris and Lausanne.



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- 1 DIVA at Škuc Gallery, detail from the exhibition at Škuc Gallery (context), Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana
- 2 DIVA at Škuc Gallery, opening event of the exhibition at Škuc Gallery, Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana
- 3 DIVA at Škuc Gallery, detail from the exhibition at Škuc Gallery, Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana

already established a tradition of its own, the documenting and archiving of this segment of artistic creation only began to develop in the second half of the 1990s, and in most cases the process was initiated by Soros Centres for Contemporary Arts. There were two SCCA-Network programs that particularly met the needs of the community and that offered some solutions: *Comprehensive Documentation* and *Sweat Media Sweat* focused on media art. Despite the considerable number, high quality, and long history of video art in Slovenia, none of the existing art institutions had systematically dealt with, followed, documented, presented, or reflected on video production. For this reason, the decision to embark on the documentation and archiving of video art was not a difficult one. Additionally, a happy coincidence (serendipity) happened which proved the needs of the protagonists and organizations (such as the initiative for saving the already mentioned ŠKUC-Forum Video Production from deterioration and oblivion; or for publishing a catalogue of particular video works or exhibitions), as well as the growing interest for the presentation of video art in the international arena, which coincided with the planned documentation program of SCCA-Ljubljana. We complemented both and produced Videodokument, which helped in setting the basic narrative of media development in Slovenia and listing main video art protagonists. Therefore, through the process of contextualization, video art has become an important part of Slovenian contemporary art history.

In 2000, the Soros Foundation finished its mandate in Slovenia, and the Open Society Institute – Slovenia was closed, along with the Soros Center for Contemporary Arts as its part. However, the Center's program continued within the framework of a newly established NGO, Center for Contemporary Arts SCCA-Ljubljana. The first activity of the Center was to investigate the state of audiovisual archives in Slovenia – artists' personal archives, as well as the archives of organizations and institutions. These were registered and presented at the exhibition held at the Kapelica Gallery in 2005. At the same time, there was a constant effort to present models of good practices – artists and institutions from abroad. Based on our research, documentation projects, and international collaboration, the DIVA Station Video Archive was finally created. Soon after, we became partners in the EU project "GAMA – Gateway to Archives of Media Art", which gave us the opportunity to collaborate with highly skilled organizations concerned with media art and its preservation and archiving. That was the framework within which we also established the online DIVA archive. In 2019, we were happy to join another EU project, "Not Yet Written Stories – Women Artists' Archives Online", which has created archives in a common online repository.

## II. A practical functionality

The topic of the DIVA Station, its logic and meaning, its accessibility and usage, can be introduced/demonstrated with two types of visits, i.e. a visit from the archive and a visit to the archive.<sup>3</sup>

### DIVA Archive on a visit

The most complex presentation of the DIVA Station – a model of a possible permanent installation of the archive – was the study exhibition DIVA at Škuc Gallery in Ljubljana (2009)<sup>4</sup>. It was envisioned in the form of a "live and open archive" offered for free viewing to the public. It displayed the historical context of understanding and using AV

<sup>3</sup> My presentation at the Kapelica Gallery in Ljubljana was accompanied by a number of video material to show two of the most outstanding cases: *DIVA at Škuc Gallery*, a video essay by Nika Grabar presenting the exhibition through the topic of archiving as "the preservation of memory", and the performance Ana at the Station by Ana Čigon, based on the artistic exploration of the DIVA archive. Both are available at DIVA online.

<sup>4</sup> The exhibition was conceived and realized by B. Borčič in collaboration with the DIVA Project Group.

technology, as well as including representative video works and curated selections. At the same time, it was conceived as an educational platform with practical demonstrations and theoretical contributions.<sup>5</sup> (Image 2) Video works from the DIVA Station were shown on several screens, while in the viewing room visitors could make their own selection for screening. To make the selection easier to the public, several programs were prepared that represented the DIVA Station in all its thematic and structural diversity. In one of the front windows of the gallery that overlooks the main pedestrian street in the old city, there were three screens installed, displaying video works based on animation, which attracted random strollers during the day and night. The exhibition also allowed visitors to see various processes of preservation, the development of video equipment, and shifts in the usage of technology. (Image 3) The classification of archival material was presented in the form of language-based graphs on the walls divided into several topics.<sup>6</sup> (Image 4).

Another feature of the exhibition was a Black Room displaying the development of video equipment, carriers, and protocols to present shifts in the use of analogue and digital technology. The diagrams/infographics on the wall exposed the transfer of light energy into electrical and video signals, and back into light energy again.<sup>7</sup> (Image 5) During the exhibition, there were several guided tours, while video artist Neven Korda held a workshop on video signals. The exhibition closed with screenings of an international selection of video works, and an experimental hybrid event that combined analogue and digital video practices and produced images transferred and projected through the entire gallery space. (Image 6)

The next project in the Škuc Gallery was developed in 2020 under the title VideoGarden, a program of screenings and talks on video art and film in the open air, the gallery's inner courtyard. In collaboration with the Photon Gallery, we have been organizing Video Evenings with the DIVA Station (2016-2022), screenings and conversations, with the aim to present and promote video artists participating in the archive. In addition to this, we continuously organize lectures, screenings, and discussions at and with the Slovenian Cinematheque. One of our regular discussion topics is the distinguishment between the forms of (short) film and video, whose aim is to rethink the delimiting features and specific characteristics that used to be pertinent for each form of expression, and which are now questionable. Moreover, since 2020, curated screening programs of international video/media archives are regularly being organized and a video art/film retrospective by a selected Slovenian author is being co-produced.

### A Visit to the DIVA Archive

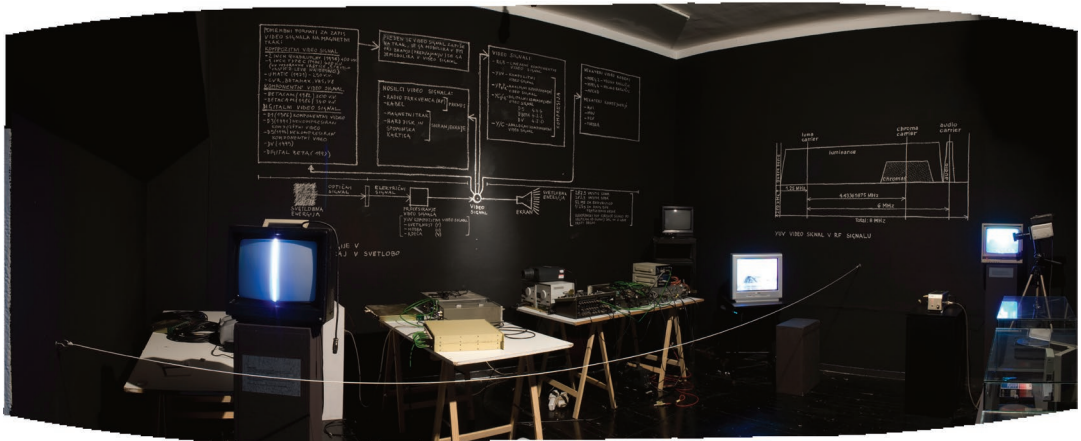
*Ana at the Station* was conceived as an experimental project based on the research of DIVArchive and its creative reuse (SCCA Project Room, 2015). Ana Čigon has researched her position as an artist within the history of video and performative practices registered by DIVA, which led her to the performative action of intertwining her artistic practice with the creation of other artists. Through the eclectic knitting of written, spoken, and performative quotes from her videos, and videos of other related artists, her performance

- 5 In his lecture *Geography of the Media*, Andreas Spiegl (media theorist, curator, and critic), e.g., focused on the increasing availability of information and its implicit translation into codes of compatibility offering new maps of contexts and references.
- 6 The carrier is unstable, The paradox in the conservation is copying, Disturbance of the signal: crystal clear sound and image, Classification into categories and what cannot be grasped, The structure of input and description, Accessibility - invited to view, Random keywords.
- 7 The graphs presented: 1) important formats for recording video signals on magnetic tapes according to the composite and component digital or analogue video signal; 2) promoters of the video signal, allowing the storage and transmission (radio frequency, magnetic tape, hard disk, and memory card), and some of the video codecs; 3) light and color values of the audio-video signal within the radio frequency fields.

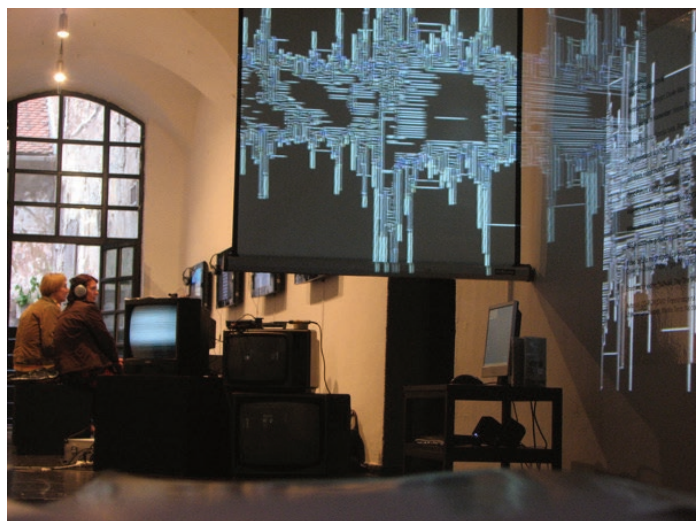


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- 4 DIVA at Škuc Gallery, detail from the exhibition at Škuc Gallery, Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana
- 5 DIVA at Škuc Gallery, detail from the exhibition at Škuc Gallery (black room), Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana
- 6 DIVA at Škuc Gallery, closing event of the exhibition at Škuc Gallery, Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana



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strived for the contextualization of her work with the aim of formulating a critical position towards her own creativity. (Image 7)

In 2021, we introduced *Back2Back* as a new type of event parallel to classical curatorial approaches by inviting local and international authors to present their own production and establish a dialogue with works from the DIVA Archive through screening and conversation. Over the years, numerous international curators, students, artists, critics, organizers, theorists, video, and filmmakers have visited the DIVA Archive to get acquainted with Slovenian video production, sometimes conducting their study practice or focused research. A number of them have included some artists into their exhibitions and festivals or made a curated video program (*Videospotting*), e.g. Christopher Krause, Lawinia Rate, Jake Yuzna, Sixtine Rose Boyer, Anita Budimir, Laura Spolaore, and Alice Militello.<sup>8</sup>

### III. Experimental artistic practices

Based on the DIVA Archive, we conceived the research and art project *Video Turn* (2011-2013) that tackled experimental video, multi-disciplinary, and new-media practices from a theoretical and artistic perspective, combining an educational and interpretative level with an experimental exhibition format and performative, media, and installation practices. The project focused on a specific media language and artistic expression to investigate the experimental and structural practice within a certain medium and particular means of expression. We developed the project in collaboration with three artists based on their longstanding work and activities in the field of experimental video/new media practices: Neven Korda, Marko Košnik, and Miha Vipotnik<sup>9</sup>. In addition to research, interviews, panels, and texts, the project included a series of performances and exhibitions, as well as public lectures and screenings under the title *Aspects of Experimental Practices* staging Sandro Droschl (Medienturm, Graz) and Sanja Kojić Mladenov (Museum of Contemporary Art, Novi Sad) in the Project Room SCCA and Vžigalica Gallery in Ljubljana. The Active involvement of SCCA researchers through writing and publishing texts and notes in the project's blog concluded the two-year research and art project as a gesture to establish an equivalent responsibility for the formulation of statements; that researchers formulate in words and artists in the audiovisual field. (Image 8a + Image 8b) (Image 9).

In 2021, the V-F-X Ljubljana Festival was established to open a new space for experimental audiovisual practices. The idea was formed because of numerous exceptional filmmakers, video artists, and visual artists that create moving images and are committed to media experimentation. Apart from screening and discussing experimental AV works, the festival

<sup>8</sup> Sixtine Rose Boyer from Paris, e.g., prepared a video program entitled *The Dark Alter* (2012) about the alternative art scene, Metelkova and its forerunners predominantly, the role of groups like FV, Borghesia and Laibach. Laura Spolaore (*Man and Environment*, 2010) and Alice Militello (*Video in Public Art*, 2012), students of Università degli Studi di Udine, conducted their study specializations on *Methods of archiving audiovisual contemporary arts*. Anita Budimir, a media artist and member of the Klubvizija film laboratory in Zagreb, prepared several programs and events in Ljubljana and Zagreb on the basis of a one-year research of the DIVA Station Archive (2017-2018). Christopher Krause, a performer, dramaturge, and theorist from Germany, was interested in the constitution of meaning through the interplay of language and objects (*Faces and Structures*, 2018). Lawinia Rate, a Berlin-based art historian, critic, author, and curator, conducted her research, entitled *Materialities of Divergence. Filmic Experiments and Feminist Movements in Europe* since the 90s (*In Praise of Dreams*, 2019). Jake Yuzna, an artist, filmmaker, and curator from Minneapolis, USA, was interested in Slovenian alternative culture and made a selection of works that loosely trace a trajectory of alternatives found within the DIVA Archive (*The Alternative Is Hard to See*, 2021).

<sup>9</sup> The artists are also concerned with the preservation of their own work, and would quite often include fragments of past works in their recent projects in order to comment on their attitude towards new technologies, methodologies of work, and communication with the public. In their work, they have often collaborated with other artists and have acted as initiators and organizers of group initiatives and projects.



also presents existing platforms, festivals, and programs devoted to experiments that transcend the borders of the established, and search for new possibilities of expression and ways of using the medium.

## IV. Documenting and presenting

### Videodokument

Collecting archival materials for DIVA was based on the documentation and research project on video art in Slovenia entitled *Videodokument: Video Art in Slovenia 1969-1998*, a comprehensive overview of thirty years of video art in Slovenia published in 1999. (Image 10) *Videodokument* was the first systematic research project of video art in Slovenia, whose importance lies in establishing a terminology and setting a theoretical basis for further research. It comprises a Catalogue, a Book of Essays, a CD-ROM, and a Web Site with comprehensive documentation, presenting 21 artists, more than 400 video works in text and picture, a chronology of events, commentaries, and a list of video works accompanied by a name index. The Book of Essays includes twelve essays concerned with the context of the production and reception of video art in Slovenia and Yugoslavia from different perspectives.<sup>10</sup> One of the earliest CD-ROMs in Slovenia was produced in collaboration with Ljudmila (Ljubljana Digital Media Laboratory), which even received a prize at the International Computer Festival (Maribor, 2001). It is an interactive presentation on electronic support with contents from the catalogue and the book of essays presented in a more representational form, with abundant visual material, cross-references, and AVI movies. The Web Site was an interactive presentation of the project, with some representative parts of the contents on the Internet, complemented by a timetable that shows the density of video works produced by artists in specific years. In the 1990s, the conditions for the beginning of documentation work were ideal: on the one hand, there was the institutional and social distance needed for the systematic description and lexicographic classification according to names and categories, and on the other, there was the presence of all, even pioneer actors, who provided information and complemented the materials of public institutions with personal records and collections.

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### Videospotting

The material gathered at SCCA led to a series of curated video programs of relevant Slovene video production and their presentations worldwide in the form of exhibitions, screenings, and lectures.<sup>11</sup> (Image 11a) A survey and thematic programs of video art in Slovenia are curated by the SCCA-Ljubljana collaborators and invited curators based on their own thematic or curatorial standpoints. In time, 59 programs by 30 local and international curators were produced, focusing on various topics and video genres. (Image 11b)

Some of the Videospotting programs evolved into exhibitions or workshops. For example, Videospotting and Videodokument, curated by Zemira Alajbegović and B. Borčič (Bunker in the Square of May 1, Udine 2004), Race with Time. Performance in a Rear-view Mirror

- 10 On the one hand, the essays describe video production itself, often with an unavoidable personal note, from its beginnings in the 1970s up to the end of the 1990s. On the other hand, they observe it in relation to television or other art practices, such as film, visual arts, dance, music, and theatre. In this way, we tried to fill the gap in interpretation that would detect media specific elements and place the new medium in a social and production framework.
- 11 OP Alternative Film/Video Festival (Belgrade, 2019), Blickle Kino, Museum für zeitgenössische Kunst (Wien, 2017), Lace Gallery (Los Angeles, 2016), Union Docs (New York, 2016); Blackbox (Manila, 2015), Museum of Contemporary Art (Zagreb, 2014), Künstlerhaus. Halle für Kunst & Medien (Graz, 2013), TransDance Festival (Cairo, 2013), Sofia Film Festival (2012), LUX (London, 2011), K2 Contemporary Art Center (Izmir, 2011), Townhouse Gallery (Cairo, 2010), Arsenal Municipal Gallery (Poznan, 2010), Ars Electronica (Linz, 2009), trans-mediale (Berlin, 2007), CalArts, Los Angeles (2004).

Vuk Čosić



Nuša & Srečo Dragan



Ana Nuša Dragan



Srečo Dragan



Jasna Hribernik



Marko Košnik



Marko A Kovačič



Ema Kugler



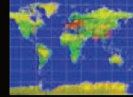
Andrej Lupinc



Marjan Osole - Max



Marko Peljhan



Sašo Podgoršek



Nataša Prosenc



Rok Sieberer - Kuri



Apolonija Šuštaršič



Mirko Simič



Peter Vežjak



Miha Vipotnik



Sašo Vrabič



ZANK



Andrej Zdravič



## VIDEOSPOTTING

Series of survey and thematic programs of video art in Slovenia and presentations (exhibitions, screenings, lectures) in Slovenia and worldwide

Home About Texts Artists Curators Exhibitions Screenings Slovenako

### programs

Race with Time, Performance in a Rear-view Mirror (2014)

Feedback Loop (2013)

Constants and Continuities (2013)

The Dark Aker (2012)

Video in Public Art (2012)

Industrial Landscape (2011)

Intimising Dance (2011)

Keyword: Food [11] (2011)

DIVA Station Presents II (2010)

Man and Environment (2010)

Random Tape Destruction (2010)

DIVA Station Presents (2009)

The Meaning of Time (2009)

Concrete\_Recollected\_Constructed (2008)

One Minute\_2006-2007 (2008)

Videoance\_6 (2008)

One Minute\_Šao Paolo (2007)

Trace (2007)

Transient Bodies (2007)

EveIdentify Yourself (2006)

Videookument\_Presents (2006)

Private-Public (2005)

New New Video (2004)

Creatures\_2 (2003)

Recent Video Works (2000)

Videookument Presents\_1 (2000)

Videookument Presents\_2 (2000)

Bodyspotting (1997)

Creatures (1997)

Dancemania (1997)

Docuart (1997)

Intolerance (1997)

Memories (1997)

From Alternative Scene to Art Video (1994)

### The Meaning of Time (2009)

Curated by: Mateja Rot

Production: SCCA-Ljubljana 2009

Duration: 20' 37"

A selection of three works by Slovenian women artists that re-examine and contemplate the issue of movement in time and the idea of time passing that is reflected in dreams as well as in everyday realities. Time is interlacing with a moving female figure, her body and spirit. Time is moving fast and sometimes slowly while we carry on living our existences, facing choices and making decisions. We are floating in an endless journey, making up our minds in bridging the past and the future, youth and maturity, courage and fear of being alive. Subsequently, the viewers are carried into more abstract mood which constantly transforms, inviting us to experience the passing of time, dissolution of figure(s) and metamorphosis of the image. Finally, the image settles spontaneously in the water. And inside the water there is life.

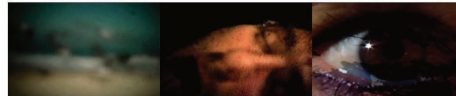
Zemira Abtjebegović, Quick/Slow, 11' 47"

ZANK, 2004



Nataša Prosenc, Crossing, 4' 59"

Los Angeles, 2005



Nataša Skušek, Floating,, 4' 31"

Ljubljana, 2004





11b

- 10 Videodokument: Video Art in Slovenia 1969-1998, screenshot of the web site. Image: SCCA-Ljubljana. Courtesy of: SCCA-Ljubljana
- 11a Videospotting, screenshot of the web site. Image: SCCA-Ljubljana. Courtesy of: SCCA-Ljubljana
- 11b DIVA at Škuc Gallery, detail from the exhibition at Škuc Gallery (Videospotting programs), Ljubljana, 2009. Image: Dejan Habicht. Courtesy of: SCCA-Ljubljana
- 12 *Race with Time. Performance and Video in a Rear-view Mirror*, exhibition at National Theatre Museum/Institute, Ljubljana, 2014. Image: Vesna Bukovec. Courtesy of: SCCA-Ljubljana



curated by B. Borčič (National Theatre Institute, Ljubljana, 2014 & grey) (area space for contemporary and media art, Korčula, 2015) (Image 12), demonstrated the relationship between performance art and video art. Projected Visions. From art in the urban context to fiction and dystopia (Apollonia, échanges artistiques européens, Strasbourg, 2018), curated by B. Borčič, presented video works focused on topics such as a city, urbanity, public space, and participative art. (Image 13a) *Cheers to Women! 25 Years of Film and Video* (Alkatraz Gallery, AKC Metelkova City, Ljubljana, 2019) was curated by Ana Čigon and Vesna Bukovec within the 25<sup>th</sup> International Festival of Contemporary Arts – City of Women in 2019, and presented selected video works by women artists. (Image 13b) *Transgression?*, curated by Vesna Bukovec and Peter Cerovšek, was based on urbanity, sound, and rebellion (Kino Šiška, Ljubljana, 2020). Following Videospotting thematic programs (*Dancemania*, *Videodance. 6* and *Intimising Dance*), the SCCA organized two international workshops entitled *Open Studio*, led by Neven Korda and Borut Savski in Cairo (2010) and Izmir (2011). These workshops explored the relationship between dance, interactive performance/live act, sound and video through a theoretical introduction and practical work, with the objective of introducing workshop participants to the interdisciplinary potential of video and sound as a technological tool and artistic means of expression, and its capacity of manipulation in real-time. (Image 14)

## V. Collecting and Archiving

### DIVA – Digital archive of video and new media art

DIVA is a study and research archive with Mediateque situated in the SCCA Project Room that contains over 1.100 units of video artworks, documents of events (actions, performances, lectures, installations, interviews ...), and sources (TV shows, books, catalogues, magazines) by local and international artists. The material is collected according to certain criteria from artists and organizations on different carriers and formats (VHS, S-VHS, Beta SP, mini DV, CD-ROM, DVD, CD, mini disk, audio cassettes, and digital files). Apart from having a rich archive of local video and media art, the Mediateque also keeps video works by international artists (e.g. Dalibor Martinis and Renata Poljak, Chto Delat, Voina, Mare Trala, Borga Kantürk, Eléonore de Montesquiou etc.), as well as archival projects by various international media organizations: e.g. the ZKM's 40 Years of Video Art in Germany with 10 DVD compilations with referential works from different decades; Video Edition Austria – Release 01 – a compilation of Austrian video art; Lux compilation *Rewind + Play. An Anthology of Early British Video Art*; and works from The One Minute Festival. We are also proud to have a compilation of the alternative Paper Tiger TV and video compilation by SCCA-Sarajevo.<sup>12</sup> The archive is complemented by a library, a collection of specialized literature, books, catalogues, and periodicals on contemporary video and new media art and its theory. Various materials and sources became an important reference point and additional incentive for ours and our visitors' professional work. (Image 15)

The DIVA Archive focuses on collecting video documentation within a wider national context, and primarily presents local video art production (video art, video documentation of art events, video documentation of theoretical lectures and discussions) in order to provide representational and research materials for curators, artists, theorists, students, and a wider interested public. Apart from collecting Slovenian video art from the early 1970s until today, it also has a number of new-media projects and, as of lately, experimental short films. The possibilities of exhibiting the artworks are decided in agreement with individual artists.

<sup>12</sup> The international video works and archival projects are not presented on-line, therefore it is only possible to preview a research copy of the work in the Mediateque, and it is primarily used for research and study.

The archive has been developed through the research and attentive observation of video production, followed by its analysis and interpretation. It has been created by the DIVA Project Group with the help of numerous consultations with artists, curators, and other professionals and international collaborators, who were experienced in issues of storing video art and establishing video archives. The group has included numerous members who focused on different archive-related tasks, from managing, editing, and advising to web programming and design. Members begin research projects on the basis of concrete examples and current tasks, while they also engage in discussions on conceptual issues related to digitization, content description, terminology, and other general decisions. The project group works closely with artists and other Slovenian and international experts (critics, curators, theoreticians, etc.), prepares closed debates and open public events (seminars, exhibitions, lectures, discussions, workshops).<sup>13</sup> (Image 16)

The process of documenting and archiving begins with collecting the material and ends with the procedure of archiving. The DIVA video archive is based on facsimiles – precise copies of the highest possible quality of video works. In this regard, we should therefore first consider what the process of digitization actually means. Digital archiving does not mean that information is copied and compressed in DVD format or kept on a hard disk. These two methods are only supportive side effects that serve to satisfy the need for an archive to be available to the professional and wider public. The primary purpose of an archive is the storage of artistic content as an important segment of tangible and intangible mobile heritage and historic memory. Considering the technology that is available to us, facsimiles of a video work can be stored in the most reliable way on MiniDV, DigiBeta, and D5 format. We have opted for the most accessible – MiniDV, which requires a recording on hard disk in a DV PAL codec.

However, there is a contradiction between digitization and the notion of an archive, as an archive is primarily supposed to store originals and not copies; an assignment impossible to accomplish in the present day abundance of media carriers, some of which are obsolete, as there are very few devices remaining that can play original files, and only the most experienced experts know how to operate them. Moreover, the most worrying factor is that the devices are becoming unusable or even defunct. Since their emergence in the 1960s, there have been many technical improvements of the carriers and recording standards, often not due to the quest for higher quality, but because of the market logic. In the last forty years, there have been over 30 formats, the most well-known including U-matic, BetaSP, Video8, VHS, DVD, Digital Beta, and MiniDV. The composition of the carrier, reliability and stability of their parts vary greatly – but, contrary to general belief, the magnetic tapes do not disintegrate sooner than thirty years if stored properly. Unreliability has reached a critical point with digital carriers like DVD format, that is not only unstable, but due to compression, provides relatively low quality information. Since the carriers are unstable, we are faced with a paradox – the information can only be preserved by being copied. Therefore, the core object of a video archive is the artistic content, not so much the original “master” in its physical form as an object. Some archives have at their disposal appropriate air-conditioned spaces and sufficient funding, so they are able to also focus on storing master copies. Therefore, our only option was collaboration. Our first desired partner with whom we formed a good connection was the Film Archive at the Slovenian Film Archives – the central institution for the storage and

<sup>13</sup> Head of the DIVA Station: Peter Cerovšek (2020-), Barbara Borčič (2005-2019), DIVA on-line manager: Ida Hiršenfelder (2008-2014); Members: Vesna Bukovec (2015-), Peter Cerovšek (2017- ); Barbara Borčič (2005- ), Dušan Dovč (2006-2019), Ida Hiršenfelder (2007-2014), Neža Grum (2016-2017), Luka Polutnik (2016), Miha Kelemina (2014-2015), Andrej Pezelj (2010-2012), Ana Grobler (2009-10), Miha Colner (2006-2012), Mateja Rot (2006-09), Hana S. Vodeb (2006-07); Consultants: Zemira Alajbegović, Damijan Kracina, Neven Korda. Some parts of the texts are based on descriptions and explanations evolved during the process of conceptualizing and developing the DIVA Station in collaboration with the members, particularly Ida Hiršenfelder.

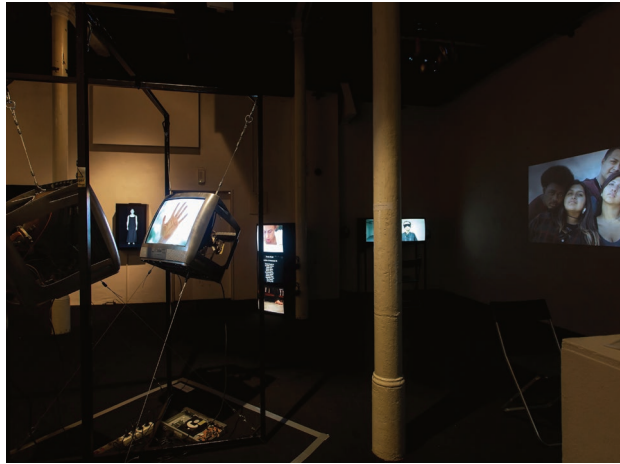


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13a *Projected Visions. From art in the urban context to fiction and dystopia*, detail from the exhibition at Apollonia, *échanges artistiques européens*, Strasbourg, 2018. Image: Barbara Borčić. Courtesy of: SCCA-Ljubljana

13b *Cheers to Women! 25 Years of Film and Video*, detail from the exhibition at Alkatraz Gallery, AKC Metelkova City, Ljubljana, 2019. Image: Nada Žgank. Courtesy of: SCCA-Ljubljana

14 Neven Korda and Borut Savski, *Open Studio*, workshop at K2 Contemporary Art Center, Izmir, 2011. Image: SCCA-Ljubljana. Courtesy of: SCCA-Ljubljana



13b



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- 15 DIVA – Mediateque at SCCA Project Room. Image: Damijan Kracina. Courtesy of: SCCA-Ljubljana
- 16 DIVA Project Group, discussion with artists and professionals at Project Room SCCA, 2005. Image: Damijan Kracina. Courtesy of: SCCA-Ljubljana

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protection of the Slovenian national film heritage, and a part of the main state archival institution, the Archives of the Republic of Slovenia. Unfortunately, we could not come to an agreement in the end. We were more successful later in establishing a long-term collaboration with the Slovenian Cinematheque. Namely, we have managed to secure the professional archival conditions for video art opuses of selected artists in 2020, and master tapes/best quality copies are stored (and also transferred to LTO tapes) in their premises/archive. The collaboration is very productive: SCCA-Ljubljana prepares the data and video material of individual artists, and the artist signs the contract with SC. Together, we also organize the video/film retrospectives of individual artists at the Slovenian Cinematheque.<sup>14</sup>

### DIVA – online archive. Database and access to video works

The DIVA – Digital Video Archive is also accessible on the Web with a hypertextual database and search engine combined with open access to video/film/new media artworks.<sup>15</sup> (Image 17) It is based on collecting video documentation within a wider national context, and includes artists who work in Slovenia and/or Slovenian artists abroad. Here, it needs to be noted once more that any attempt to build an overall archive is based on the criteria of discrimination and interpretation, which are the result of criticality, which inevitably leads to the incompleteness of the archives. Archives significantly contribute to historical cultural consciousness; however, they are in all respects conditioned by ideological assumptions and laws of (affirmative) discrimination. They fail to present historical events or objects in their entirety, but are based on “cultural” relations, which can be clearly identified through an analysis. Despite this incompleteness and the need for continuous upgrading and improvement of the archives, the procedures for the treatment of materials need to be clearly defined by a typology of terminology, which creates a cartography of conceptual frameworks within which a video artwork (in our case), or some other audiovisual material (short film, new media work) is discussed. This system provides straightforward tools for mitigating the contradictions which are inevitable when the system of an archive encounters various artistic approaches. This typology for discussing video materials has been defined in collaboration with the partners of the GAMA platform by classifying entries into three categories: artwork, events, and sources. The artwork category is divided into different types: art video, documentary video, art film, experimental video, one-minute video, music video, video installation, interactive art, television art, fiction, animation, video performance, dance video, travel video, computer graphics, sound, and hybrid art. The category of events is divided into workshops, discussions, festivals, concerts, performances (unedited documentation footage of performances), lectures, presentations, exhibitions, screenings, and seminars. Documents, articles, catalogues, interviews, essays, and books are classified as sources. Apart from the Video Works section, there are other sections available for search: the Artists, the Genres (Works, Events, and Sources), and the Context. In view of the latter, we would like to highlight a selection of longer and more complex texts that offer an overview of the research of video art in Slovenia, and the context in which video works originated, and which the video works helped to create. This section is here to show how, from the very beginning, video production has been strongly governed by the social, political, technological, economic, theoretical, and artistic context. Furthermore, users can search by years and the abundance of keywords.

<sup>14</sup> Produced and planned so far: Miha Vipotnik (2020) and Ema Kugler (2021), and Marko A. Kovačič (2022) and Neven A. Korda (2023).

<sup>15</sup> The conception of DIVA on-line: Barbara Borčič and Damijan Kracina; Web programming: Borut Savski; Design: Ajdin Bašić; Copyright: all copyright works and sections of copyright works available on this Web page are subject to copyright and other forms of intellectual work protection according to the Copyright and Related Rights Act (ZASP). Artworks and sections from artworks published on this Web site cannot be used without the consent of the authors/owners of the works.



In addition to a detailed description of the artwork, which includes information about the author, production year, producer, setting, co-workers (music, editing, programming, camera...), and the technical description of any possible damage or other characteristics of the primary material, special attention is given to the style of writing a short description of an art video. The description on the Internet interface of DIVA Station forms an index of key words that enable a more precise search for artworks, and connects them according to the content. Therefore, the hierarchy of description is set first and foremost by the visual art parameters and media characteristics, while the description of the narration of the work is adjusted to the demands of a particular work or artist.

## VI. International collaboration and exchange

International collaboration and exchange have been created through different segments of the DIVA Station, from SCCA international seminars and participation in European archival programs to presentations of DIVA and the already mentioned exhibitions and screenings of Videospotting curated programs worldwide.

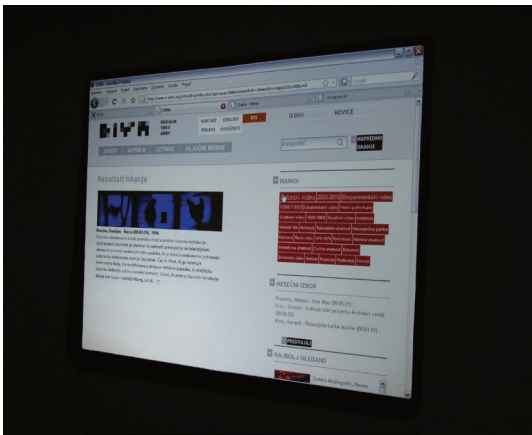
### Archiving practices

The DIVA Station encompasses a number of international seminars which thematize the importance of audiovisual archives, their creation, integration, accessibility, and collaboration. The seminars deal with issues of production, usage, meaning, and dissemination of AV archives on a practical and theoretical level (exhibitions, workshops, lectures, panel discussions). Since 2005, twelve seminars have been held on various topics, e.g. What is to be done with AV archives?, What is going on concerning AV archives?, Archiving of multimedia art. Three Case Studies, How to connect contents of AV archives?, What is the meaning of AV archives?, Self-archiving and archiving of artistic networks, etc. Within the seminars, we hosted numerous lectures, exhibitions, workshops, presentations, and screenings of international artists, critics, and institutions/archives.<sup>16</sup> (Image 18)

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From 2016, the seminars are being organized on the 27<sup>th</sup> of October every year, to join in the celebration of The World Day for Audiovisual Heritage that UNESCO declared in 2005 to raise awareness of the significance and preservation risks of recorded sound and audiovisual documents. We work on the premises that present-day documentation and archiving are necessary for the understanding of contemporary visual and media art practices. Establishing archives, promoting their use, accessibility, and dissemination, and defining their ownership are important questions that have still not been sufficiently highlighted in the Slovenian cultural milieu. We have set ourselves a task to present significant archival models — experimental, systematic, or partial — that are already in use, to address and promote their functionalities and mutual interconnections. Furthermore, we wish to support and promote the practice of open and constructive exchange and emancipated work by artists in the system of contemporary art. We believe that important parts of this system are also post-production processes (documentation, archiving, dissemination) and independent production of individual archives, which include the availability and visibility of their presentation materials. From the very beginning of our

16 NIMk – Montevideo (Amsterdam), Lux (London), Transitland (Sofia, Berlin), transmediale (Berlin), ZKM (Karlsruhe), Ludwig Boltzmann Institute (Linz), imediathek (Bremen), and AV-arkki (Helsinki), Argos (Brussels), Ursula Blicke Video Archiv (Vienna), n.b.k. Video-Forum (Berlin), Academic Film Center (Belgrade), Austrian Film Museum; lectures by Stephen Kovats, Rotraut Pape, Gaby Wijers, Mona Schieren, Heike Helfert, Andrej Pezelj, Darko Fritz, Slavko Kačunko, Kathrin Becker and Nadja Šičarov; exhibitions and performances by Dalibor Martinis, Dan Oki; workshops by Gerard Couty, Christian Vanderborgh, Neven Korda, Damijan Kracina, Wiel Seuskens, accompanied with panel discussions and exhibitions: Dalibor Martinis: Data Recovery (Zagreb); video archive jukebox Transitland (Berlin); Darko Fritz: Archives in Progress, [New] Tendencies (Zagreb); AV-arkki, The Distribution Centre for Finnish Media Art (Helsinki).



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SCCA - LJUBLJANA  
Zavod za sodobno umetnost

# KAKO POVEZOVATI VSEBINE AV ARHIVOV?

## HOW TO CONNECT CONTENTS OF AV ARCHIVES?

Razstava, predavanja, projekcije, delavnica  
*Exhibition, Lectures, Screenings, Workshop*

vidalica  
Odprijo / Opening Hours  
torjek - nedelja / Tuesday - Sunday, 10:00 - 18:00

12.-15. 10. 2010

18



19



20

- 17 DIVA online archive, screenshot of the web site. Image: SCCA-Ljubljana. Courtesy of: SCCA-Ljubljana
- 18 *How to connect contents of AV archives?*, exhibition and seminar at Vžigalica Gallery, Ljubljana, 2010. Image: Vesna Bukovec. Courtesy of: SCCA-Ljubljana
- 19 Miha Vipotnik, *Videogram 4*, detail from the exhibition *Archiving of multimedia art. Three Case Studies at Project Room SCCA*, 2010. Image: SCCA-Ljubljana. Courtesy of: SCCA-Ljubljana
- 20 Not Yet Written Stories – Women Artists' Archives Online, artists' posters, 2021. Image: Jane Štravs, Kasia Listwan. Courtesy of: SCCA-Ljubljana
- 21a *3 + 3 = 6. Three women artists, three art practices, six decades (NYWS)*, detail from the exhibition at Project Room SCCA, 2021. Image: Janez Zalaznik. Courtesy of: SCCA-Ljubljana
- 21b *3 + 3 = 6. Three women artists, three art practices, six decades (NYWS)*, detail from the exhibition at Project Room SCCA (curators), 2021. Image: Janez Zalaznik. Courtesy of: SCCA-Ljubljana



21a



21b

theoretical and practical engagement with archives, we have striven (and have not yet fully achieved):

- To establish a platform for the preservation, presentation, and dissemination of audiovisual contents in Slovenia (contextual level).
- To trigger institutional change, i.e. to make possible the inclusion of audiovisual/video archives under the sector of intangible national cultural heritage (political level).
- To present models and means of preservation, presentational strategies, and possibilities of dissemination (theoretical level).
- To educate artists and NGOs in the production of digital archives, and to inform them about the models of archiving for the purposes of storage or presentation and dissemination (practical level). (Image 19)
- In this way, SCCA-Ljubljana tried to introduce and emphasize the meaning of audiovisual archives and their accessibility and present the local circumstances, compare them to successful international practices, and establish long-term collaborations. It has to be noted that we have not yet come to any agreement with state cultural policy/Ministry of Culture, neither concerning a comprehensive understanding of the meaning of AV archives, nor the state support of this unstable media archiving. We are among the vast majority of organizations worldwide dealing with AV archives of contemporary art that are faced with a lack of support by the authorities, which could/should ensure the sustainability and professionalism of this field. The archives are endangered not just because of the fragile and vulnerable archiving material that is subject to fast chemical decay and technological out-datedness, but mostly due to the lack of recognition of their importance by the (national) authorities. Nevertheless, we are stubbornly certain of the positive and constructive outcome that the future will bring, especially through an exchange of experiences and collaboration.

#### GAMA – Gateway to archives of media art

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The DIVA Station/SCCA-Ljubljana was a partner in a project that has been developed as a European Internet platform that connected similar European media art archives and enabled us to achieve better visibility and wider accessibility. The GAMA portal ([www.gama-gateway.eu](http://www.gama-gateway.eu)) was launched at Ars Electronica in 2009 by a consortium of 19 partners, ranging from IT experts, academic and cultural institutions, to distributors and archives, such as: Argos centre for art and media (Bruxelles), Heure Exquise ! International center for video arts (Lille), Les Instants Video Numeriques et Poetiques (Marseille), LI-MA – Former Montevideo/Time Based Arts (Amsterdam), C3 Center for Culture and Communication (Budapest), Filmform Foundation (Stockholm), Ars Electronica (Linz). We learned a lot from these eloquent and professional organizations and their personnel. Unfortunately, the GAMA portal had to close in 2015 due to several unsuccessful attempts of candidacy for EU funds or other sources, which is too frequently the case with on-going projects that get seed money and are later left to uncertain fate and are, eventually, abolished.

#### Not yet written stories – Women artists' archives online

The DIVA Station/SCCA-Ljubljana was a partner in another European project focused on archives with three partners: Arton Foundation (Warsaw), Office for Photography (Zagreb) and the Latvian Centre for Contemporary Art (Riga). In two years (2020–2022), the project focused on female artists who had often been overlooked in the history of contemporary art. The SCCA selection of women artists was aimed at different generations of the key artists who were/are active in the field of action/performance, film, and video art in Slovenia: Ana Nuša Dragan, Zemira Alajbegović, and Ema Kugler. The most important activities of the project were related to field research, an international conference, and the publication and archiving in the common repository ([www.forgottenheritage.eu](http://www.forgottenheritage.eu)). SCCA also prepared seven workshops, a poster action (Image 20), and two exhibitions.  $3 + 3 = 6$ . Three women artists, three art practices, six

decades presented video works, films, objects, and documents from artists' archives and the archives of SCCA and MGLC (SCCA Project Room, 2021). (Image 21a + 21b)

## VII. Accessibility

For a short time, at the beginnings of video art and its subsequent admittance to the television media, there seemed a very optimistic prospect that the accessibility of video would enable the complete democracy of the media. These idealistic expectations were not realized, but they did foretell the emergence of a new media — the Internet, where the illusion of democracy was almost convincing. This brings us back to the notion of “accessibility”, which has sparked passionate debates and a sort of “archive fever” about the preservation of media art in the last two decades. The issue of accessibility and knowledge dissemination (in this case, knowledge about video art in Slovenia) is questionable not only due to technical demands; it is also problematic from the perspective of the user and the artist. At the very beginning (*Videodokument*), it was necessary to clarify certain dilemmas: whether to make a selection of documents, or (at least try) to include all available and accessible information on the art field. To store the information and leave the possibility of selection to the user, or to employ a more selective method and assume responsibility for unavoidable manipulation with information. Is the mass of information that needs to be thought through still useful for the potential user? Can he or she plough their way through such a mass of data? Or precisely the opposite — is it the very mass of data that gives the documentation project archival value? To all those more seriously engaged in video art, particularly the avid researcher, who watch artworks analytically, patiently read information, and search for links, the systematization and categorization of material in *Videodokument* or DIVA could certainly be welcome and enjoyable. And, hopefully, beneficial.

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Needless to say, numerous obstacles and difficulties have been encountered in the process of collecting and classifying the material. In most cases, authors did not have updated and well-arranged artworks and documentation; many items had been lost or misplaced. This applies in particular to earlier works. Consequently, our project had them rummaging for lost and forgotten tapes and documents to which artists attribute less significance, in contrast to current production. For editors playing the role of documentarists and archivists, this only strengthened our belief in the usefulness of our activities, and immersed us in the long-lasting task of reconciling and updating information, as well as encouraged us to accept an all-encompassing systematization that is more friendly to the user than the artist. This was also an opportunity to meet with personal stories and partial recollections that repeatedly, in the focus of attention, began to regain sharpness. These often tell us much more about the production and reception of video, and the distinctive lines between various views of video, than external, objective history, which is based on generalizations and, thus, conceals the differences and shifts, discontinuity and creativity. That is our advantage (also considering the small country and population size). However, special attention has to be put on the artist's right to be acquainted with, and to have influence on, the context, interpretation, and ways in which their work is presented. Therefore, the task of the archival organization is not only to systematize the documentation in databases, but also to preserve the art works and disseminate knowledge. It also needs to establish effective communication channels between artists, other creators of audiovisual archives, and audiences. For this reason, openness and all-inclusiveness are relative. A hidden or even unconscious mechanism is at work here, forcing us to accept certain restraints and limitations in spite of our opposition. This is probably the fate of every documentation and archival project. One should not forget that they were created with the intention of becoming a useful study material/archive for further research and analysis, and a stimulation of interest for the artists, as well as the curators and critics, particularly from the younger generations.

## Documentary and archival projects

- ZKM's 40 Years of Video Art in Germany with 10 DVD compilations with referential works from different decades
- Video Edition Austria – Release 01 – a compilation of Austrian video art
- Lux compilation Rewind + Play. An Anthology of Early British Video Art
- The One Minute Festival Amsterdam
- Videodokument: Video Art in Slovenia 1969-1998, a comprehensive overview of thirty years of video art in Slovenia, Open Society Institute – Slovenia: Soros Center for Contemporary Arts – Ljubljana, 1999
- Video Art in Serbia I & II, Belgrade: Center for Contemporary Arts, 2000
- FRITZ, Darko, Archives in progress: [projects 1987-2007], Zagreb : Hrvatsko društvo likovnih umjetnika, 2008
- Inserť/Retrospective of Croatian Video Art, ed. Tihomir Milovac, MSU: Zagreb, 2008
- Archiving of multimedia art. Three Case Studies, Project Room SCCA, Ljubljana, 2010
- NIMK – Montevideo (Amsterdam), Lux (London), Transitland (Sofia, Berlin), Transmediale (Berlin), ZKM (Karlsruhe), Ludwig Boltzmann Institute (Linz), imediathek (Bremen), and AV-arkki (Helsinki), Argos (Brussels), Ursula Blickle Video Archiv (Vienna), n.b.k. Video-Forum (Berlin), Academic Film Center (Belgrade), Austrian Film Museum (Vienna), Ursula Blickle Video Archiv (Vienna), New York: Electronic Arts Intermix, Interference Archive, Franklin Furnace Archive; Infermental – archive as a journal published solely on videocassettes.

## Web Archives

- ZKM, Karlsruhe  
<http://www.medienkunstnetz.de/mediaartnet/>  
 Electronic Arts Intermix – <http://www.eai.org/eai/>  
 Net Art Anthology <https://anthology.rhizome.org/>  
 DIVA – Digital archive of video and new-media art, SCCA – Ljubljana <http://www.e-arhiv.org/diva>  
 Transitland <https://www.transitland.eu/>  
 Forgotten Heritage <https://www.forgottenheritage.eu>  
 Heure Exquise <http://www.heure-exquise.org>  
 iMediathek <http://193.175.23.115/imediathek/media-arts-numeriques>  
<http://www.arts-numeriques.info/>  
 Rhizome ArtBase <http://www.rhizome.org/artbase/>

- Video Data Bank <http://www.vdb.org/>  
 Archive of Digital Art <https://www.digitalartarchive.at/nc/home.html>  
 MARCEL – Multimedia Art Research Center and Electronic Laboratories  
<http://www.mmmarcel.org>  
 The Vasulka Archives: <http://www.vasulka.org/> and <https://www.vasulkalivearchive.net/Video>

## Conferences on Archives (with the participation of the author):

- What is to be done with audiovisual archives?, Kapelica Gallery, Ljubljana, 2005
- Transmediale 07. Festival for art and digital culture: Many Years of Video Art – Historical Views on Art and Media, Akademie der Künste, Berlin, 2007
- The GAMA – Gateway to Archives of Media Art portal at Ars Electronica, Linz, 2009
- DIVA at Škuc Gallery, lectures and discussion on archives, Škuc Gallery, Ljubljana, 2009
- Race with Time. Performance and Video in a Rear-view Mirror: panel discussion on documentation and archives, National Theatre Institute, Ljubljana, 2014
- Museums of Film – Film in the Museum*, MSU – Museum of Contemporary Art, Zagreb, 2015
- Emergence de l'art video en Europe* (1960-1980), Bibliothèque nationale de France, Université Paris 8, INHA – Institut national d'histoire de l'art, Paris, 2016
- The emergence of video art in Europe*, ECAL / Ecole cantonale d'art de Lausanne, 2017
- Revisiting Heritage (Forgotten Heritage – European Avant-Garde Art Online)*, Warsaw, 2018

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- Barbara Borčić** is an art historian and media theorist, Director of SCCA-Ljubljana, Center for Contemporary Arts (2000-2015), and head of video programs and DIVA Station (2005-2019). She is active as a curator, lecturer, and publicist. She has curated media exhibitions, e.g. Miha Vipotnik: Faces of Analogue/Quantisation of Red, Slovenian Cinematheque, Ljubljana (2020); Projected Visions. From art in the urban context to fiction and dystopia (e.city-Ljubljana), Apollonia, échanges artistiques européens, Strasbourg (2018); Multimedia Practices and Venues of Production (with Igor Španjol), Museum of Contemporary Art Metelkova, Ljubljana (2017); Race with Time. Performance and Video in a Rear-view Mirror (with Ida Hiršenfelder), National Theatre Institute, Ljubljana (2014); Archiving of multimedia art. Three Case Studies (with Ida Hiršenfelder), Project Room SCCA, Ljubljana (2010); DIVA at Škuc Gallery, Škuc Gallery, Ljubljana (2009); Videospotting, Gallery 3,14, Bergen (2008); What is to be done with audiovisual archives?, Kapelica Gallery, Ljubljana (2005); Videospotting and Videodokument, Bunker, Udine (2004). She has regularly lectured and published texts on media practices, e.g. Video Art from Conceptualism to Postmodernism, Impossible Histories: Historical Avant-Gardes, Neo-Avant-Gardes, and Post Avant-Gardes in Yugoslavia, 1918-1991 (Cambridge, MA: MIT Press 2003); A Painter's Visually Skilled Hand in Grasp of Technology and Engineering, Mehatron Noordung (Zagreb, Museum of Contemporary Art, 2004); Myths and Legends About Early Video Art Works (with Ida Hiršenfelder; Ljubljana: Maska Magazine, no. 123-124, 2009); What Television Can Be, And What Artists Can Use It For, Amuse Me (Ljubljana: Mestna galerija, 2013); The ŠKUC Gallery, Alternative Culture, and Neue Slowenische Kunst in the 1980s, NSK from Kapital to Capital. Neue Slowenische Kunst - The Event of the Final Decade of Yugoslavia (Ljubljana: Moderna galerija & Cambridge, MA: MIT Press, 2015). She is the author of the book *Celostna umetnina Laibach. Fragmentarni pogled [Gesamtkunst Laibach. Fragmentary View]*, (Ljubljana: Založba / \*cf., 2013).

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Jurica Mlinarec,  
Luja Šimunović

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