

HyMEx ✓ 2021

**Hybrid
Museum
Experience
Symposium**

Proceedings

HyMEx  *2021*

Hybrid Museum
Experience Symposium
Proceedings

Edited by Lívia Nolasco-Rózsás
and Borbála Kálmán

Published by

**LUDWIG
MÚZEUM**
— MUSEUM OF
CONTEMPORARY
ART

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FOREWORD

Internationally renowned network researcher Albert-László Barabási recently suggested that the twenty-first century began in 2020. Radical change was no longer primarily triggered by economic, political, or climate catastrophes, but by a pandemic—a phenomenon which many of us assumed to be a thing of the past. The pandemic has changed our mental and physical orientation with extreme rapidity, radically rearranged our relations, turned certain techno-utopian visions of the 1960s into daily practice, and, in many parts of the world, made tools such as computers and the internet the basic components of daily life. Time was shortened: in a matter of weeks, half the world became a closed island of epidemic, with palm-sized protected clean zones. The excellent symposium titled HyMEx was implemented in the inverted world that resulted. HyMEx offered theoretical and practical suggestions as answers to, or opportunities created by, the challenges posed by the new situation.

The pandemic, and the lightning speed at which it swept across the world, made it necessary to address the relatively new culture that is online culture. Social relationships became the main source of danger, and through mandatory distancing a new set of behaviors were cultivated, in both the real and virtual environment. A style of communication arose that is devoid of mimicry because it is masked, reduced to hand and eye gesticulation—which is highly unusual in our present time and culture. Yet we have and will continue to have the need to remain visible and audible, even if not within tangible or material reach of each other. The museum appears to be playing a major role in this radical global shift, perhaps even bigger than the role it had assumed previously in its material reality, which is no longer its exclusive mode of existence.

In times of pandemic and quarantine, museums have recognized the vast opportunity that their repositioning as public educational institutions holds. It allows them to engage audiences through a multitude of new genres, and this variety of genres and diverse modes of integrating them have opened up a pluridisciplinary approach. Museums have ventured into uncharted territory in digital communication, and, among the classic museum jobs, we find that the IT operator is now indispensable within the frontline staff of a museum.

At the time that the HyMEx symposium was in development as part of the Beyond Matter project, the pandemic was not yet imminent. ZKM | Center for Art and Media Karlsruhe, led by Peter Weibel, was once again thinking ahead and giving shape to their scientific artistic vision. Across the decades, Weibel and his team's approach and work has encapsulated the essential element that has lent future validity to impending issues through complex artistic processes combined with scientific analytical skills. They have uniquely sensed and represented certain phenomena that would come to affect us all on the global stage, highlighting both present and future challenges. An avant-garde strategy characterizes their work, and their exhibitions were able to anticipate what would come to be the general direction of the art scene decades later. Art as

a medium took precedence over scientific material. The exhibitions Weibel has led at both ZKM | Karlsruhe and Joanneum in Graz addressed problems present in art, society, economics, philosophy, and theory through timeless and sophisticated projects. Their modus operandi carries the hallmark of genuine sustainability.

We thank ZKM | Karlsruhe and its team for implementing Beyond Matter. We have benefited from the exhibition organized within the framework of the project, the accompanying publication, and the HyMEx symposium. Congratulations and thanks are due to the authors and organizers of HyMEx, Lívía Nolasco-Rózsás and Borbála Kálmán, for their impressive work. Many thanks also to the curatorial and technical teams at ZKM | Center for Art and Media Karlsruhe and Ludwig Museum – Museum of Contemporary Art, Budapest for the realization of the exhibition, catalogues, and symposium. Last but not least, we would like to extend our gratitude to all the speakers for their participation, which has enriched our thinking about art and museums. Some of the innovative and creative ideas expressed during HyMEx are already being incorporated into our work.

Budapest, September 27, 2021

Julia FABÉNYI
Director of the Ludwig Museum –
Museum of Contemporary Art, Budapest

ACCOMPANYING THOUGHTS

Museums legitimate their existence today mainly through exhibitions that attract visitors. The more tourists and buses in front of a museum's doors, the bigger its success—or so it seems! Scientific institutions are not tourist attractions and have no parking places for buses, yet they are supported by much more state money than museums. They have autonomy and can concentrate on research. With the effects of the COVID-19 crisis, museums have had the chance to rethink their mission. Why reduce the public sphere to local visitors? Is that reduction done in the name of a fictive “aura”?

Walter Benjamin defined the term “aura” as a “unique phenomenon of a distance however close it may be.”¹ In 1935, aura was already understood as an effect of distance and not of locality, proximity.

In science we differentiate between organs and senses of proximity like touch and taste, and senses of distance like seeing, hearing, and smelling. The term “visual culture” clearly indicates that art is an experience of the eye, of tele-sense—*tele* being Greek for “far off.” We look at pictures at a distance, we don't touch them! Over the last two hundred years, a technology of distant sensing has evolved—including television, telephone, telefax, radio, and the internet—that has revolutionized communication between people, but also with our environment. Visual art is from the beginning an experience of distant sensing, with one restriction: in the same space, the artwork and the visitors are what I call locally bound. The same phenomenon happens in the cinema, theater, concert hall, club, stadium, and so on. Art and entertainment have sold their souls to local audiences to make an audience as big as possible, to make as much money as possible. But they have made a mistake. The real money in music and soccer is made through distribution to non-local audiences in front of computer or television screens. For a long time now, a growing crowd of non-local viewers—whose number is much higher than the number of local visitors—has become the basis for the economy, based on distribution and tele-technology. We therefore have several reasons to embrace non-local visitors. I prefer the expression “non-local” to “virtual,” because non-local viewers are as real as local viewers, except that they do not share the same physical space as the artwork or event. So when people speak of “ghost games” in empty stadiums, it is a misuse of language: many viewers are watching those games in front of the screens of tele-technology, living in a tele-society.

The old society of proximity has come to an end. We have been forced to move into distance learning and the home office. This tele-society, this society of distant senses, was already being prepared for two-hundred years ago with the invention of the optical and then the electric telegram, but—even when art is a distant expression and experience—culture blocked the transformation to tele-society and stayed with the auratic, nearly sacral illusion of proximity.

¹ Walter Benjamin, *The Work of Art in the Age of Mechanical Reproduction* In: *Illuminations*, edited by Hannah Arendt, translated by Harry Zohn, from the 1935 essay. New York: Schocken Books, 1969.

What has changed? Before the invention of tele-technologies, a message needed a physical carrier, a body, the body of a messenger to transport the message. In a tele-society messages travel without a messenger. They need no body! Messages travel alone. A body-based society of proximity (the Latin *proximus* means “very near, close by”) has turned into a tele-society. A multitude of technologies, from cars to telephones, are used to overcome distance. We have been living in a telecommunications society for more than a hundred years, but the cultural world has not yet acknowledged this change. Now, with the COVID-19 crisis, culture is also forced to inhabit the tele-world.

Atavistic tribal rituals of the proxy-society exist parallel to the non-local tele-society. Material mobility of bodies and machines exist in parallel to the immaterial mobility of signals and media. This makes our society look like the automobiles at the turn of the twentieth century, the design of which resembled horse-drawn vehicles. In the beginning, the designers did not understand that cars drive themselves and still thought of the messenger’s body—the horse—and consequently built the car like a carriage. (Today the car industry speaks of a new generation of self-driving cars, but actually we have already self-driving cars, which is why they are called “automobiles.” What is new is that cars can be self-steering. You see, even the car industry does not understand what it is producing.)

So it can be said that one of the lessons of the virus is to push us into the digital age. No forms of production or reception will remain unaffected, even not in culture. In visual culture we are seeing the move from local to non-local audiences.

With the personal computer in the 1980s and the internet in the 1990s, we have already developed the technologies that will enable the life of the non-local masses in virtual online worlds. All online services, from ordering goods to health checks, demonstrate ways of avoiding physical contact. You no longer have to go to the cinema to watch films. With on-demand options such as Netflix you can stream them at home. You no longer go to bookstores to buy books, but have them delivered by mail order. Through e-commerce and e-banking, everything is turning into virtual, non-local, disembodied communication and transaction.

The locally bound mass audience in real physical space will become a gathering of individuals in the nonlocal, decentralized, distributed virtual space of tele-technology, and the former agglutination of the masses will become an association of subjects. The technology of mass transportation (trains, cars, planes, ships) created an excessive material mobility, which is harmful to nature and thus harmful to humans. The separation of messenger and message, allowing the transmission of signals on electromagnetic waves, started a more immaterial mobility. The flow of traffic objects will become a flow of signs.

The conditions are challenging. Online audiences mean a wide variety of choice. The situation of museums is similar to that of cinemas, which were also built for local audiences. As a system to distribute messages and information for a non-local audience, TV troubled cinema by attracting non-local audiences. Now we have Netflix, which is a new iteration of cinema attracting non-local audiences in enormous masses. Netflix is cinema for the online world. I say that museums too must become senders, adopt a new mode of broadcasting, become live-streaming platforms in addition to their past mission of locality. In the twenty-first century, we have to reinvent museums as a kind of Netflix.

In addition to hosting local visitors in real space, culture must become an online paradise. COVID-19 has forced culture to migrate into virtual worlds, which is an important step for increasing the power of abstraction and symbolization in humans, that is, for evolution.

In line with the mission of ZKM | Center for Art and Media Karlsruhe, the international practice-based research project Beyond Matter investigates structural changes in the experience of museums and the mediation of past, current, and future exhibitions. The notion of hybridity in the post-media condition can thus leave physical boundaries behind, and might evolve to a phenomenon yet to be defined. What if in the future the museum is not only a real place, but also moves in virtual space, waiting to be discovered and explored? What if, from now on, there are continuous encounters with art, with other visitors, with artists and curators, in the same spaces but also in virtual ones through social networks?

Peter WEIBEL
Chairman and CEO of
ZKM | Center for Art and Media Karlsruhe

HYBRID MUSEUM EXPERIENCE: THE TRANSMOGRIFIED ENTITY THAT IS THE MUSEUM

CONCEPTUAL FRAMEWORK¹

As defined geographical locations, museums have been settled institutions since their inception. They provide physical and theoretical spaces that enable assemblies and serve as platforms for encounters between visitors, with whom they exchange ideas and create knowledge. Especially after the appearance of the “new museology” discourse in the 1980s, museums have increasingly been seen as institutions that indicate but also contribute to social change.²

If this assembly and platform character already suggest hybridity, another crucial factor for museum hybridity consists of computation and its aftermath, digitization. The roots of discourses on digitization in museums hark back to a techno-utopian era in the 1960s, when statements such as the following were made: “computerized information systems that encompass the full spectrum of museum resources will create the opportunity of restructuring the museum environment itself.”³ Even without following the apparently enthusiastic techno-positivist agenda of the author, Everett Ellin, it must be admitted that information technology, particularly the internet, has indeed had a significant impact on learning about museums, mediation within museums, visitor experience, and ultimately the very idea of the museum itself.

Until the end of the 1990s reflections on the impact of digitization and information technology on museology remained largely sporadic,⁴ but the questions raised by digitization have triggered more frequent reactions in the past two decades, as computation has become ubiquitous and its influence has deepened.⁵ Many aspects of digitization and their impact on museums have therefore already been examined by symposia and

¹ The microsite hosting the Hybrid Museum Experience Symposium contains additional information on the event, on its proceeding, and a video archive of the symposium presentations: <http://hymex2021.ludwigmuseum.hu/>.

² A seminal publication of the field is Peter Vergo (ed.), *The New Museology* (London: Reaktion Books, 1989).

³ Everett Ellin, “Museums as Media,” *ICA Bulletin* 169 (May 1967): 14. Quoted by Kim West, “Concepts for the Critical Study of Art Exhibitions as Media,” in Tristan Garcia and Vincent Normand (eds.), *Theater, Garden, Bestiary: A Materialist History of Exhibitions* (Berlin, Lausanne: Sternberg Press, ECAL, 2019), 49.

⁴ For example, Suzanne Keene’s *Digital Collections: Museums and the Information Age* (London: Routledge, 1998) is a practical and thus acritical guide for museums and other cultural organizations into “electronic opportunities.”

⁵ Ross Parry, for example, builds his narrative on how the historical incompatibility between the idea of the museum and the computer appear to be resolved in *Re-coding the Museum: Digital Heritage and the Technologies of Change* (London: Routledge, 2007).

research projects; advances in information technologies have created a constant demand for revising and extending the vocabulary and approaches. Without doubt, museums have increasingly expanded onto digital platforms and started creating additional content regardless of audience location. The digital is progressively dominating the realities of both the museum and the audience, and intertwining the physical with the virtual.

ON THE WAY TO A PLURIDISCIPLINARY PLATFORM

Looking not only at the information grid it participates in with its (meta)data but at its entire network, the museum might be called “distributed.” For this purpose, scholars have drawn from Bruno Latour’s understanding of actor-network theory (ANT):

In considering both what museums are and what they do a much more complex and diffused picture emerges in which they are constituted across different organizational and operational spheres, made up of countless components and operations. [...] The term designated here for understanding the networked, relational, hybrid and performative dimensions of the museum, is the distributed museum, which involves two very different and not to be confused understandings of networks, [...] a technical network, that of the internet, and network as a concept that can be applied to an organization.⁶

A distributed model is in line with a topical understanding of the museum, which considers its creation of experiences as more central than its edifice.⁷ Now, in the first quarter of the twenty-first century, when museums’ tangible boundaries are dissolving, particularly due to the growing importance of computer-generated spaces, the perimeters of museum experience are yet to be defined. As both types of network contribute to the distribution of the museum, museum experience no longer begins at the entrance and stops at the exit.

Naturally, this has extensive implications for the spatial aspects of curating and mediating visual arts, as well as their reception. The museum transmogrifies into a hybrid entity integrating a geographical location with various digital platforms. Instead of a single building, an affluence of exhibition spaces must be taken into consideration while imagining the museum as an extended but also porous system of multiple dimensions. In these circumstances, the museum can be better understood as a system triggered by cognitive processes and based on experiences than a space bounded to a specific location.

6 Andrew Dewdney, David Dibosa, and Victoria Walsh, “The Distributed Museum,” in Andrew Dewdney, David Dibosa, and Victoria Walsh (eds.), *Post-Critical Museology* (London: Routledge, 2012), 189–90.

7 Various similar descriptions are on the rise, as the phenomenon of digital distribution of art experiences becomes a normality. For example: “An emphasis on producing and curating art experiences where the physical gallery is no longer “the host” but just one node or aspect of a larger, technologically integrated narrative requires reconsidering the possible functions of physical space in an entirely new light. It also calls shifting investment into other areas of infrastructural development that would allow for a deeper integration with artistic production processes.” Victoria Ivanova and Kay Watson, *Future Art Ecosystems Vol 2. Art x* (London: Serpentine, 2021), 44.

While this is only one way to describe the hybrid museum experience, the roles museums may hold within a wide spectrum of societies and the perspective from which *virtual* has a meaning beyond computer-generated technology anticipates an approach where the question is less about the technological side of the hybrid experience, and more about the participative side.

As Nina Simon has put it: “When people can actively participate with cultural institutions, those places become central to cultural and community life.”⁸ The participatory museum supports multi-directional content experiences and maximizes access to participation. It serves as a platform that connects participants. At a second level, the participatory approach may create a novel (*virtual*) space through digital means where there is room to merge approaches that could not otherwise meet or interact due to various physical constraints. The artist group Manifest.AR has declared: “Augmented Reality (AR) creates Coexistent Spatial Realities, in which Anything is possible—Anywhere!” Even without a connection to AR, a hybrid participatory attitude may act as a dynamic catalyst in certain social environments, as an alternative interpretive context through which mutual impacts transform power roles, especially through the engagement of smaller communities. From surfacing lost, erased narratives and unheard voices to dealing with representational issues and realizing decolonization, the layers that might unfold are numerous and lead to remarkable outputs.

The various types of hybridities occurring in museum networks—both technical and actor networks—point toward a dissociation from the modernist framework of the museum. In this context hybridity thus signifies a step out of modernity, and with it a step out of alienating dichotomies.

In order to be comprehensive and embrace a wide spectrum of these processes and experience-based approaches to the museum, the HyMEx symposium sought for interpretations of the hybrid museum experience that emphasize contemporary art production and its mediation in light of spatial and societal aspects, to elucidate the possibility of deterritorializing the museum space and/or understand ways to construct participative solutions through which the museum may be an active mediator. HyMEx presented relevant pluridisciplinary perspectives that together constitute a credible reference source for the artist, the artwork, the exhibition, the visitor, and the museum expert.

Throughout these perspectives we seek answers for questions such as: How can we comprehend the ecosystems of museum experience, and create insight into what immersive technologies may contain beyond the personal sensory experience *per se*? Can the hybrid museum experience help contemporary art gain more responsible societal functions, beyond cultural mediation? What are the ruptures and shifts on which the current virtual condition in art creation, curation, and mediation in institutional frameworks is based? What is technology currently doing to our relationship to the arts, and as museum professionals how should we react to that?

⁸ Nina Simon, *The Participatory Museum* (self-published, print-on-demand, 2010), <http://www.participatorymuseum.org/preface/>.

BEYOND MATTER?

HyMEx came to life within the international, collaborative, practice-based research project Beyond Matter,¹⁴ which takes cultural heritage and contemporary art to the verge of virtual reality and reflects on a condition of art production and mediation that is increasingly virtual. It puts a specific emphasis on spatial aspects in art production, curating, and mediation, in numerous activities and formats, to explore a plurality of solutions and options emerging hand in hand with the development of computation.¹⁵ It understands practice-based research within the museum context as a process that includes developing and creating museum experiences, evaluating them with the participation of audiences, and creating best practices for museum professionals increasingly called upon to apply digital tools. The activities of Beyond Matter include the digital revival of selected past landmark exhibitions, art and archival exhibitions, conferences, artist residency programs, an online platform, and publications. In attempting to describe the virtual condition, the project probes the ways in which physical and digital space are interdependent, and it seeks to inhabit computer-generated space as an assembly—as a platform for exchange, for the contemplation and mediation of art—without approaching it as a virtual copy, a depiction or digital twin of actual spaces.

Along with the physical international group show *Spatial Affairs*, presented at Ludwig Museum – Museum of Contemporary Art and the online environment that enhances it under the title *Spatial Affairs. Worlding – A tér világlása*, HyMEx laid the groundwork for long-term collaborative research regarding the problematic of the dichotomy between the virtual and actual exhibition space. Pre- and post-computational approaches from the interwar avant-garde through Conceptualism to very recent works of art were selected for *Spatial Affairs*, and they point at the mutual dependence between the algorithmically created and the palpably real.¹⁶ At its conceptual core, the exhibition investigates the binary relationship between the actual and the virtual, the real and the possible, as it evaporates into a multidimensionality in which the only betrayed party is dualism, leading to exploded axes of complex and multiplied notions of space.

In creating the program for HyMEx, we took that concept and applied it to the museum field in light of recent developments in digitization under the pressure of lockdowns. We introduced topics of interest for our common discussions in December 2020¹⁷:

14 The two-day symposium organized by Ludwig Museum took place as a following stage—but within the new context of Beyond Matter—of the path introduced by a series of professional gatherings around the topic of media art preservation (MAPS) between 2015 and 2020 at Ludwig Museum.

15 Beyond Matter takes place from 2019 to 2023; it was initiated and being led by ZKM | Center for Art and Media Karlsruhe, and includes six partners (Centre Pompidou Paris, Tallinna Kunstihoone, Aalto University, Tirana Art Lab) and Ludwig Museum; <https://beyondmatter.eu/>.

16 For more information on *Spatial Affairs* and *Spatial Affairs. Worlding – A tér világlása*, please check pages 212–16 and the following links: <https://www.ludwigmuseum.hu/en/exhibition/spatial-affairs>; <https://spatialaffairs.beyondmatter.eu/en>.

17 The program of the symposium was composed of invited international speakers, as well as of the participation of speakers chosen through a call for papers announced in December 2020. The selection committee primarily encouraged young emerging professionals from the museum field and beyond to apply. The twenty eligible countries were connected to the East-Central European and South-East European region, completed with the Baltic States. The four chosen applicants were: Varvara GULJAJEVA (EST), Robert B. LISEK (POL), Zane ONCKULE (LVA), and Krisztina VARGA (HUN).

- knowledge production under the virtual condition
- the economy of museum experiences
- crises and the hybrid museum
- participatory involvement
- deterritorialization and the hybrid museum
- cognitive processes around the hybrid formula
- interface and its dissolution

The decision to eschew a purely technology-based program emanated from a desire to address issues related to technology in less obvious ways by approaching the hybrid experience transversally, via new “intersections”—to borrow a word from one of HyMEx’s speakers, Ben Vickers—that might be only developing and becoming palpable presently.

CONDITIONS PRECEDING THE VIRTUAL CONDITION

The virtual condition is understood here as the context for creating and mediating art in the second quarter of the twenty-first century. It is a context strongly bounded to computation and information technology, which requires leaving medium-specificity behind, and in which the juxtaposition and dissolution of presence and absence play a particularly decisive role.

In the above-quoted article *For a Planetary Thinking*, Yuk Hui describes a condition that calls for revision just like the virtual does: the planetary condition, for which our approach to technology should be revised. Instead of the extremes of demonization and celebration, Hui points to the demand for diversification and an end to the separation between techno-science and culture.¹⁸ Forty years ago a partially similar situation was described as the postmodern condition, emphasizing the dissolution of modernity. If the postmodern condition was a “crisis of narratives,”¹⁹ as Jean-François Lyotard put it, the virtual condition is a crisis of dichotomies.

Computation, despite being binary itself, has proved to be a tool for overcoming the binary opposition of presence and absence. The way in which computer-generated realities merge being here and being somewhere else is perceived as natural and inevitable, so we the “users” slide into these digital spaces without noticing the actual seismic ontological shift they imply.

The appearance of computation and various related apparatuses deeply influenced twentieth-century art production. One reading of this phenomenon concentrates on a critique of medium-specificity. In the post-media condition, the obsolescence of the artwork’s medium cannot affect those artworks that, as Rosalind Krauss put it, “can never be simply collapsed into the physicality of their support.”²⁰ Peter Weibel has described it thus: “no single medium is dominant any longer; instead, all of the different media influence

18 Yuk Hui: “This reflection doesn’t come out of a demonization of modern technology or a celebration of technological domination, but rather a wish to radically open the possibility of technology, which today is increasingly dictated by science fiction,” in Yuk Hui, “For a Planetary Thinking.”

19 Jean-François Lyotard, *The Postmodern Condition: A Report on Knowledge*, trans. Bennington and Brian Massumi (Manchester: Manchester University Press, 1992), xxiii. Published in French in 1979.

20 Rosalind Krauss, *A Voyage on the North Sea: Art in the Age of the Post-Medium Condition* (London: Thames & Hudson, 1999), 53.

and determine each other.”²¹ While Krauss mainly drew her conclusions on the post-medium condition through the example of Marcel Broodthaers’ conceptual and video art, Weibel broadens the scope and directly identifies “the post-media computer, the universal machine, [via which] we can realise the abundance of possibilities which resides in the specificity of the media.”²²

The two authors take disparate stands on Greenbergian formalism, yet both acknowledge that the post-media and post-medium conditions, as well as the planetary and post-modern conditions, are shaped by advancements in information technology which likewise trigger our inquiries into the virtual condition.²³

ARRIVING AT A NEW VOCABULARY VIA DECONSTRUCTION

Especially in the context of art production and lately in art mediation, “virtual” currently often appears with the word “reality.” Since the arrival of computer-generated imagery, virtual reality (VR) is predominantly used for computer-aided interactive and immersive environments accessed via screened images and in many cases additional devices (such as head-mounted displays). Deconstructing the meaning of VR without abandoning its etymology might help us understand the condition brought about by the technology’s ability to create relatively sophisticated representations of anything we can perceive or calculate. In fact, such deconstruction can serve as a basis on which to construct new terms that contextualize art production and mediation.

Using the seemingly deconstructive but actually genuinely constructive method of Donna Haraway used in the case of SF,²⁴ generally understood as science fiction, we could evolve VR into a versatile pair of letters. Haraway played a word game in which she named other possible terms the abbreviation SF might stand for, all related in meaning to science fiction or offering alternatives to it—such as “speculative fabulation” or “string figures.” These SF terms become tools in her arsenal of methodologies. We intend to apply this as a formula for VR.

VR can stand for a variety of terms beyond virtual reality, such as Variable Relations, Vertical Radiation, Valid Readings, Vaporous Restoration, and Visible Revision. Thus VR can generate a collection of tools for elaborating on the virtual condition. In appropriating Haraway’s tool-creation exercise, we bestow VR with a speculative character and ponder what its future might bring for the mediation and curation of art.

21 Peter Weibel, *The Post-Media Condition*. 19.03.2012, <https://www.metamute.org/editorial/lab/post-media-condition>.

22 Peter Weibel, *The Post-Media Condition*. 19.03.2012, <https://www.metamute.org/editorial/lab/post-media-condition>.

23 As we will see, Christiane Paul’s keynote and reading of the post-digital condition introduced another layer to the possible understanding of the virtual condition.

24 Donna Haraway, “SF: Science Fiction, Speculative Fabulation, String Figures, So Far,” in *100 Notes/100 Thoughts for documenta (13)* (Berlin: Hatje Cantz, 2012).

Variable Relations indicates a bundle of connections between visitors, artworks, artifacts, scenographies, curatorial concepts, artists, scholars, museum professionals, objects, subjects, actants, actors, and so on determined by the technological in VR that enables presence via proxies and thus, for the sake of infinite reproduction inherent in the digital, strips the artwork of its Benjaminian aura. The enabler of generated realities, whether human or not, shall have a place in this network of actors. VR technologies disseminated via the internet also help us to Vertically Radiate and mediate curated artistic knowledge and aesthetic components unbound from the physical location where their physical carrier actually is, or where their exhibition takes place. And in the virtual condition, curators and museum professionals will be able to provide Valid Readings of the notion of the “spatial” in conceptual, media, and contemporary art, and elaborate experiential studies and best practices for further investigations in the field. Within the Beyond Matter project, digital models of past exhibitions are being created in an experiential manner. This Vaporous type of Restoration denotes a nonphysical and non-reconstructive approach that aims to emulate certain past spatial assemblies of artworks, and provide us with Visible Revisions of them.

Together, the terms generated by this semantic hopscotch might be helpful for naming phenomena, events, and activities in the context of mediating and curating art, and might also contribute to valid speculations about the future of art institutions and museum experience under the virtual condition. To give an example: in 2019, before the lockdown waves and the sudden virtual boom in museums had begun, two institutions were committed to exploring Vaporous Restoration by creating digital spatial models of the exhibitions *Les Immatériaux* (Centre Pompidou, 1985) and *Iconoclash* (ZKM | Center for Art and Media Karlsruhe, 2002). Both were landmark exhibitions displaying scientific and technological as well as artistic practices. Curated by philosophers, their concepts were inseparable from philosophy and the question of modernism—Lyotard is often referred to as a philosopher of the postmodern, Latour as a non-modernist. What’s more, they both reflected on the exhibition as a medium and interface.

The experiential methodologies developed for creating coherent digital iterations of *Les Immatériaux* and *Iconoclash* were presented by Philippe Bettinelli and Felix Koberstein at HyMEx. Although exhibition spaces with particular artworks and scenographies in them, as physical locations of knowledge production and exchange, are worth mediating beyond the geographic and temporal location in which they are physically on view, until this point digital emulations and networked presentations of exhibitions have been created only sporadically due to the complex technological framework required.

HYBRID MUSEUM EXPERIENCE: A SUMMARY OF THE SEQUENCE OF PRESENTATIONS AND DISCUSSIONS

Through HyMEx we learned about enhanced mediation and archiving methods, of modes of accessibility and knowledge production that can be fostered in transmogrified museums. These museums offer hybrid experiences as they dispose themselves over an abundance of spaces that vary in access and compatibility; organizing them into one system poses a challenge to museums accustomed to focusing on one type of space. The

central question, among others, is infrastructural, as pointed out by Sarah Kenderdine at the very end of the symposium. Adding digital spaces to physical ones requires a trained workforce, expertise, knowhow on all levels, and hardware, maybe not in the museum's physical venue but in a remote data center. Thus the digital augmentation of the museum considerably grows its ecological footprint.

The Ludwig Museum's ecological footprint was enlarged by HyMEx, yet we are convinced that the symposium's content—significant knowledge from diverse fields and engaging discussions fostered by connecting areas otherwise rarely linked—must be summarized in a digitally available publication. Although the video archive will remain accessible for research, it seemed necessary to create written versions of the proceedings to wrap up the event and contribute to the dialogue unfolding. The HyMEx Symposium took place through a dedicated online platform and a live program organized on May 6–7, 2021, by Ludwig Museum – Museum of Contemporary Art and with the participation of twenty-four international speakers. The publication intentionally keeps the structure of the symposium's program in the order of the original schedule, and includes the abstracts originally submitted for each presentation.²⁵ The following pages serve as an introduction to the various panels that generated the conference papers and edited transcripts that constitute the core of the book. Each day of the two-day symposium was marked by a keynote presentation, three or four panels, and a short closing debate among a selection of the panelists of the day; these are all represented here, including summaries of the debates integrated in the publication's second part.

BECOMING HYBRID:

KEYNOTE BY CHRISTIANE PAUL

As a new media scholar, Christiane Paul curates exhibitions at the forefront of digital art and is one of its most important theorists. Her keynote on the first day of the symposium contributed to framing and clarifying the process of becoming hybrid and the state of the art in today's mixed realities. Paul has previously spoken of a general tension between materiality and immateriality that accompanies new media and computer-based arts: "Since its official emergence in the 1960s digital art has come a long way and gone through cycles with regard to its materiality, fluctuating physicality and immateriality."²⁶ In her presentation on the wider context of the hybrid museum, Paul discussed the "post-digital condition." Although she used the term reservedly, she introduced it to describe the hybridity of artworks shaped conceptually and physically by digital processes while being materialized into objects and taking the existing language for granted. Paul also connected the post-digital condition to the post-contemporary context, which she described as fragmenting temporality onto different, parallel strands that interact with each other.²⁷ This approach may contribute to a revision of

25 Since not all of the presentations are included in the proceedings in the form of essays or transcripts, Panel 5 and Panel 6 were merged into one, resulting in seven panels in the publication instead of the eight panels of the symposium. The introductions to the panels follow the edited seven-panel structure.

26 Christiane Paul, "Museums in the Post-Digital Past and Future: Materials, Mediation, Models" in Lorenzo Giusti and Nicola Ricciardi (eds.), *Museums at the Post-Digital Turn* (Milan: Mousse Publishing, 2019), 143.

27 Paul mentioned the example of the Museum of Modern Art in New York, which recently reinstalled its collection without any chronological display.

chronology in relation to museum exhibits and to hybridity in museum practice. For her talk at HyMEx, Paul approached hybrid museums and hybridity in museums through a possible framework involving economic and structural models, but also technological mediation and distribution through engagement and experience design. Paul presented diverse models, taking into account the fact of the pandemic pushing exhibitions and educational programming online. She also engaged with the categorical instability of art online and online art, and the way we relate to objects and materiality. Paul added that experimental exhibition models carry great potential and room for experimentation: she foresees that the blending of physical and virtual spaces will only increase, resulting in a renegotiation of the authenticity of art experiences. For this, a fundamental ontological shift around authenticity must be processed first.

PANEL I

RISING VIRTUALLY: INTERFACE AND ITS DISSOLUTION

The examples of art mediation practices using immersive technologies mentioned by the first speakers, Corina Apostol, Daniel Birnbaum, and Béla Tamás Kónya, were more constructive than dystopic. All three reflected on the virtual presence of art exhibitions and collections. The following passage, from a still topical interview with Rob Gianpietro and Sarah Hromack from 2014, summarizes the intentions behind this first panel well:

It's no longer a question of whether art institutions should have a virtual presence. Rather, the onus is being placed on designers to facilitate meaningful interactions with art that might occur in the gallery, via Web-based applications or in new hybrid spaces that merge the real and the virtual. Any attempt to augment an encounter with artwork using technological means invariably raises questions about the values we assign to certain modes of viewing. After all, isn't visiting a museum inherently tied to a very deep, very primary real-life experience? The promises and pitfalls of new technologies are forcing museums to rebalance their traditional mandates to care for a collection of physical objects while enabling scholarship and providing the wider public an opportunity to engage with works of art.²⁸

The panel started with a general introduction to infrastructural changes in museums and shifting strategies for collections and their care from Béla Tamás Kónya, who initiated the Media Art Preservation Symposium (MAPS), a unique professional assembly that brought together, in 2015, 2017, 2018, and 2020, a worldwide art conservator community to discuss the specific challenges of media and digital art conservation, the long-term impact of digital tendencies in art production, and the digitization of analogue artworks and related metadata.

Daniel Birnbaum then discussed the use of AR technologies in art production and its display inside and outside of museum venues, before Corina Apostol introduced the documentation and mediation strategy recently developed at Tallinn Art Hall. The cases cited

²⁸ "The Museum Interface," interview with Rob Gianpietro and Sarah Hromack in *Art in America* (2014), <https://www.artnews.com/art-in-america/features/the-museum-interface-63033/>.

have used various interfaces,²⁹ all of which function as artificial membranes between the artwork and its recipient. The wish to dissolve this interface and create fully immersive environments, in which no screen squeezes itself in between the artwork and its beholder, has been apparent for decades. Digital systems of representation, such as VR and AR in immersive and responsive installations, swallow the viewer up on cognitive and sensory levels alike.

PANEL 2

COGNITIVE PROCESSES AROUND THE HYBRID FORMULA

This is a development made possible by the world-making capacities of information technologies, while cognition remains a part to the whole of the world.³⁰ “As the computational environment displaces the world, the incalculability of the world withdraws further from us, until the question itself disappears or a catastrophe appears.”³¹ Through this process the world is reduced to computational models, and as a result of such reduction AI is seen not only as a powerful tool but as an agent. In line with this development, the museum successively transforms into a cognitive system of human and non-human actors, where artists, audiences, curators, and software agents collectively define museum experience. Thus the museum can be approached as an affluence of networked spaces as well as a cognitive space in which visitor and curator are not the only actors; as machinic intelligence rises, non-human algorithmic actors play an increasingly important role in the museum’s hybrid ecosystem.

In this constantly shifting network of relationships between human and non-human agents, our role as museum professionals is post-custodial, as Joasia Krysa put it in her talk during the second panel. Under such hybrid circumstances more experimental approaches and artistic mindsets must be given space, especially in times of pandemic-induced social distancing that inevitably accelerate digital mediation in the museum context.

In times of lockdowns of cultural institutions, chatbots such as ENA, created by Varvara Guljajeva with Mar Canet, might take over the role of art mediator. This is not the only use of artificial intelligence in the museum; indeed, Krysa discussed the idea that the next museum should be curated by a machine. As Borbála Kálmán and her colleagues at the Ludwig Museum suggest, an eventually more resilient option might be to work in curatorial clouds: instead of outsourcing the cognitive work of curators to machines, we could unite our capacities through swarm intelligence.

29 “Interface” became a buzzword in relation to interactive works of media art in the 1990s. As Brenda Laurel put it: “When the concept of the interface first began to emerge, it was commonly understood as the hardware and software through which a human and a computer could communicate. As it has evolved, the concept has come to include the cognitive and emotional aspects of the user’s experience as well. [...] The noun, interface is taken to be a discrete and tangible thing that we can map, draw, design, implement, and attach to an existing bundle of functionality. One of the goals of this book is to explode that notion and replace it with one that can guide our work in the right direction.” Brenda Laurel, *The Art of Human-Computer Interface Design* (Boston: Addison Wesley, 1990), xi.

30 Here we paraphrase a fragment of this sentence: “The world is constituted by a complex totality of references, and cognition depends on these references in order to reason. In other words, cognition is a part to the whole of the world.” Yuk Hui, *Art and Cosmotronics* (Minneapolis: University of Minnesota Press, 2021), 246.

31 Yuk Hui, *Art and Cosmotronics*, 247.

PANEL 3

FICTITIOUS MUSEUM

The term “fictitious” generally refers to something existing only in the imagination, only hypothetically assumed or accepted. Seen from the perspective of the hybrid experience, Bruno Brulon Soares and Jonathan Dotse employed the term to advance spaces of knowledge of various extensions and essences through the third panel. Yet both articulated journeys to substantial and existent destinations. The diverse human heritage that each of us carries is inseparable from such journeys, which here took shape through experimental museology or through using digital hypermedia to reconstruct traditional knowledge systems. The museum or art-related spaces discussed in this panel are not accessible physically but sustain their consistent frame through the concept or ongoing theoretical processes around which they gather.³²

Dotse’s research on an underlying archetypal commonality between African cultures zoomed in on the harnessing of fractals: fractal principles have shaped his approach to designing a system that mimics the core functions of certain African indigenous knowledge systems. An additional, in-the-works project he mentioned during the panel’s Q&A involves the application of a hypermedia approach to a mobile museum in Accra. This museum would access people, wherever they might be, and bring their own culture to them. The physical space could very much benefit from being a part of a larger digital ecosystem.

Brulon Soares’ talk focused on the value of traditional and unsubordinated knowledges and how they may merge through fictitious reality in order to establish a radical revision of museum regimes, decolonizing the museum experience. Brulon Soares also referred during the Q&A to a significant discussion at the beginning of the 2000s within the International Council of Museums about using the digitalization of artifacts for repatriation purposes, through digital copies. According to Brulon Soares, this highly problematic approach in terms of decolonization highlights the importance of reconsidering human experience within museum regimes. He concluded that a process of sharing authority seems the most effective option for compensation. The panel introduced the possibility of new museum experiences by opposing the traditional institutional framework and putting forward processes that contribute heritage and narrative aspects to the hybrid experience. Looking into what value Indigenous knowledge systems offer and what people want to bring to the museum directed the panel towards relationality and the role of human interaction in this undertaking. A captivating conversation unfolded around how the technological ecosystem and the process of decolonization rely on the social dynamics that small communities can generate, and which may allow virtual worlds to grow organic or carved narratives and through them renegotiate differences.

³² This includes the online exhibitions on the [Beyond Matter VIEW platform](#) presented by Livia Nolasco-Rózsás to provide additional case studies: the original program had Nolasco-Rózsás as third presenter of the panel, and her presentation can be viewed on the HyMEx archive platform.

PANEL 4

REPOSITORY OF NEGENTROPIC PROCESSES: COMMONING AND REPRESENTATION

The closing panel of the first day addressed hybrid experience through an engaged perspective. The three speakers, Seong Eun Kim, Tania Aedo Arankowsky, and Krisztina Varga, relied on media art and the museum agent at a social level in order to consider the museum as a dynamic catalyst for change—through knitting relationships between the virtual or physical world, getting a step closer to the commons, or dismantling power structures through participatory practices and creating an alternative interpretive context in virtual space. Underlining the depth of these undertakings, Kim reflected on personal broadcasting, Aedo Arankowsky on speculative interactive fictions, and Varga on personal archives. All three presented singularly thoughtful examples of artistic projects that reinforce the idea of the museum as a repository for processes—to borrow Aedo Arankowsky’s term—which directly impact how waves or movements spread within a society.

Digital technology is enhancing our sensorial experience but also creating deep “sites” in which our understanding of the world through art may enable museums to have greater impact. Let us consider the museum as hub, an intersection of forceful dynamics, a place which aims to create valid solutions, responses to existential questions through art, and debates around the obstruction of theoretical barriers through art. The following questions arise: How do digital technology and virtual reality help us process and understand the malfunctioning systems around us? How do they contribute to the production of negentropic processes? How do the artistic prototypes developed for this gain their active force? Is the museum a mediator or the final destination in creating a hub for social impacts? All three speakers praised the force with which artists can challenge existing frameworks and bring forward possible solutions. Aedo Arankowsky stated that it is through media art and artists that the most fascinating and challenging questions of techno-science have been tackled. Kim considers the museum as an incubator, and would like to open up more possibilities for artists to break into the institution and its operations, so that they can unearth new perspectives on these issues. Varga believes in step-by-step deconstruction and in change that takes critical perspectives into account.

FOLLOWERSHIP VS. SPECTATORSHIP:

KEYNOTE BY BORIS GROYS

With his keynote on the second day, Boris Groys analyzed the contrast between analogue and digital imagery, and the fundamental change digitization has wrought to the role of the beholder. On the internet, where artists are content providers, the recipients of art are no longer spectators but followers. Groys claimed that the digital image is not in fact “beyond matter.” For him, information, software, and code are as material as oil on canvas, so the difference between the analogue and the digital image does not lie in materiality but in the traces that followers leave behind but that spectators of analogue imagery do not. All digital images have addresses, and are therefore unique; their files are reproducible, but not their staging. Like Daniel Birnbaum, Groys mentioned

non-fungible tokens (NFTs) and acknowledged that this technology allows us to collect the “individual performances” of an image. Digitization had already changed the general rules of production prior to NFTs because artists, no longer dependent on museums, can create their own online swarms of followers. Referring to the impact of online followership on the subject-object relationship between artwork and beholder, Groys also assumes a fundamental change by which the artwork reclaims its gaze: instead of being a mere object, it “looks back.” Thus the secularizing tendencies of modernity which turned images into objects are reversed, or rather overwritten, by digitization. The motif of overcoming or “resetting”—to use Bruno Latour’s term³³—modernity accompanied the entire symposium, and was indirectly raised by Groys from the point of view of the artwork and its beholder.

PANEL 5

KNOWLEDGE PRODUCTION UNDER THE VIRTUAL CONDITION

This fifth panel, through the presentations of Zsófia Ruttkay, Lily Díaz-Kommonen, and Ben Vickers, provided a view of how the subtle layers of the digital, on scientific bases, can enhance visitor experience—from a ludic approach through community engagement to a very specific metaverse for permanent immersion.

Human experience has pragmatic and theoretical aspects. The way we comprehend our present environment is through the connection between what we perceive and what we know of it. As science fiction advances theories drawn from present technological endeavors and theoretical concepts, its visions of the future are immersed in that present. As these presentations suggested, we are now within a non-fictional reality where a great number of available technologies are gathered and the intersections they create, to quote Ben Vickers, are nodes that need to be carefully understood and analyzed in order to further technology’s possibilities for art and the wider impact it can have around, with, and through us. Still following Vickers’ idea, the metaverse is a sort of utopian immersion in everyday life; the question is when this utopia will start existing as metaverse. From Lily Díaz Kommonen’s perspective the virtual condition, the possibility of immersion as a concept, has been shown to the public mainly as an attractive tool—just as VR has been regarded as a technological gadget capable of generating exciting sensorial experience but with negligible impact on the conceptual depth of our understanding of the world. Zsófia Ruttkay spoke of the digital enhancement of physical works—the co-existence of the “real” physical and the “digital”—narrowing the focus to (re-)creating, presenting, and interpreting artworks with the help of digital technologies. Ruttkay emphasized how exciting it is to use immersion through computing technologies to put oneself in the artist’s mindset; Díaz-Kommonen characterized immersion as looking into ways in which participants help develop new protocols through auto/duoethnographic narratives, while Vickers pinpointed an intersection of various technologies where artists may work in early-stage development and begin to shape what those technologies might be.

³³ *GLOBALE: Reset Modernity!* was a large-scale international group show in 2016 at ZKM | Karlsruhe, realized under the leading curatorship of Bruno Latour.

The ways in which these three presentations approached the question of how the digital interlaces the analogue, and what perspectives we can forge around it, might bring us closer to grasping the epistemic practices possible through immersion.

PANEL 6

EVOLVING ARCHITECTURES: ALGORITHMIC, DYNAMIC, AND PERFORMATIVE SPACES

The sixth panel engaged with evolving architectures, particularly algorithmic, dynamic, and performative spaces, and revisited the interface, already referred to in the first panel. The term seems to briefly require our attention again before completely dissolving into cognitive and networked spaces, ceasing to exist as a separate entity.

The creation of generative networked spaces to display art and produce knowledge is no novelty; it has unfolded hand in hand with the development of computation's ability to visualize simulated or generated spaces that may or may not resemble our observable surroundings and the ways in which we perceive them. Artists engaged with the question of spatial transformation long before art institutions started to react to the challenge of digital spaces, with their atemporality and the open-ended feedback loops they generate.

Computer-generated simulations, virtual realities, or digital networked platforms, from cyberspace to metaverse, aren't fictitious locations of science fiction literature any more. Information technology propels the proliferation of immaterial spheres that become legitimate parallel dimensions of our perception, expression, experience, knowledge, communication, and analysis, where real and virtual are no binary opposition any more, for which the three-dimensional notion of space should be revised.

These words introducing the exhibition *Spatial Affairs* fit the topic of the sixth panel, in which speakers elaborated on the museum as an inhabited information space and as a playground of vernacular algorithms, as well as discussing the creation of an evolving architecture for the museum from scratch with the help of AI. The speakers' references were as diverse as their approaches and case studies, yet they all discussed algorithmic and informational spaces. In the case of Tegan Bristow, the discussion was based on "vernacular algorithms" and "African fractals," while Sarah Kenderdine elaborated on the inhibition of information spaces by digital archives and called for creating new prosthetic architectures. Robert Lisek proposed a new strategy for creating evolving architectural structures.

PANEL 7

SUMMONING GHOSTS: FROM RECONSTRUCTIONS TO VIRTUAL MODELS

The possibility of evolving architectures and scenographies was likewise addressed in the seventh panel, where the creation of two virtual models of past exhibitions were discussed. Philippe Bettinelli and Felix Koberstein explained how the ghosts of

Les Immatériaux (1985, Centre Pompidou, curators: Jean-Francois Lyotard and Thierry Chaput), and *Iconoclash* (2002, ZKM | Karlsruhe, main curators: Bruno Latour and Peter Weibel) will be summoned through digital means.

Digital revivals of exhibitions barely exist yet, and the research their concepts are based on draws from analogue reenactments of exhibitions and thus exhibition histories—a branch of art history that emerged in the 1990s and which Bruce Altshuler has greatly contributed to. It began as something to be invented, to be built up from archival materials and collective memories and extracted from the social history of art. Growing attention to past exhibitions and curatorial practices was driven by the effort to define the genealogy of curating and declare it a profession. A recent side effect of the increased attention to the evolution of exhibition-making also manifests in the recreation of exhibitions such as Harald Szeeman's *When Attitudes Become Form* (1969, Kunsthalle Bern), discussed by Altshuler in his presentation; it was restaged at the Fondazione Prada in 2013. Even more recently a few sporadic examples of “virtual-reality reconstructions” of historically important exhibitions have been created—the first documenta, for instance.³⁴

Instead of “revival,” “reenactment,” “re-creation,” or “re-presentation,” we could borrow the term “emulation” from information technology for the process of summoning up the ghosts of past exhibitions. *Les Immatériaux* was interpreted by Jorinde Seidel as an emulator itself:

Les Immatériaux [...] can also be seen as an analog “emulator”. [...] The exhibition-as-emulator can be imagined as a kind of salvage program for all kinds of worlds, belief systems and realities that it retranslates into universal codes and interfaces. [...] The exhibition as an emulator thus allows us to “play” old exhibitions, displays or shows. But they are encoded according to a new program and conditioned by a current system, so they generate a new pleasure and a genuinely contemporary experience.³⁵

CLOSING REMARKS

HyMEx provided an opportunity to discuss museums as ecosystems, as information spheres, as cognitive systems, as fictitious locations, as negentropic processes, as platforms of distributed cognition defined through a sense of belonging, and as triggers of social change. Spatiality was apprehended from many angles, among others through the notion of the interface and computer-generated spaces that already have upended how we understand presence and absence.

We can draw the conclusion that in today's virtual condition museums are everywhere, experiencing themselves as new forms of existence and conceptual entities. They can be found in memories of underrepresented Roma art, in a cardboard VR viewer in Accra,

34 See Kai-Uwe Hemken and Simon Großpietsch (eds.), *Documenta 1955. Ein wissenschaftliches Lesebuch* (Kassel: Kassel University Press, 2018).

35 Jorinde Seidel, “The Exhibition as Emulator,” *Mediamatic* (2000), <https://www.mediamatic.net/en/page/10326/the-exhibition-as-emulator>.

in religious objects of African communities in Brazil, in digital twins of physical exhibitions disseminated online, in reconstructing past assemblages of interpretable objects, in an interactive diorama, or in many other dimensions.

Dimensionality reduction might actually be necessary at this point, after the high-dimensional space outlined by HyMEx. The following quote may contribute to the process of creating a low-dimensional, easily navigable space out of the terms and phenomena described in the symposium through the reader's cognitive process, and might help us understand why we need to bring in technical terms, such as Virtual Reality with the newly elaborated VR permutations, not yet associated with an expanded field of museum studies:

it matters what ideas we use to think other ideas (with).³⁶

And ...

It matters what matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thought think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what stories make worlds, what worlds make stories.³⁷

Lívia NOLASCO-RÓZSÁS
Borbála KÁLMÁN

³⁶ Donna Haraway, *Staying with the Trouble. Making Kin in the Chthulucene* (Durham and London: Duke University Press, 2016), 10.

³⁷ Donna Haraway, *Staying with the Trouble. Making Kin in the Chthulucene*, 12.

Lívía Nolasco-Rózsás has curated exhibitions at international institutions of contemporary and media art since 2006, working with topics such as the genealogy and social impact of computer code, electronic surveillance, and democracy. She has been part of the curatorial team of ZKM | Karlsruhe since 2015. As of 2019, she is acting head of the international collaboration project *Beyond Matter* (2019–23). Her recent curatorial projects include the group shows *Spatial Affairs* (Ludwig Museum Budapest), *Open Codes* (2017–21, ZKM, Chronus Art Center, Nam June Paik Art Center); *GLOBAL CONTROL AND CENSORSHIP* (2015–18, ZKM and a tour through Eastern Europe); *On the Edge of Perceptibility: Sound Art* (2014, Kunsthalle Budapest), and solo shows by Eli Cortiñas, Shilpa Gupta, Žilvinas Kempinas, Dóra Maurer, Ágnes Háy, and Vladan Joler. She is a contributor to BIO 26. 26th Biennial of Design Ljubljana (2019–20) and the OFF-Biennale Budapest (2015 and 2021). She has published in various art magazines and worked as international editor at *Flash Art Hungary* (2014–15). She has given lectures and talks at venues such as ZHdK in Zürich, Concordia University Montréal, Tongji and New York University in Shanghai, Kunsthochschule für Medien Köln, and Aalborg University, Copenhagen. Since 2019 she has been conducting research in curatorial studies on the virtual condition and its implications in the exhibition space, in affiliation with the Academy of Fine Arts Leipzig and under the supervision of Beatrice von Bismarck.

Borbála Kálmán is an art historian and curator. She joined one of Hungary's pioneer private contemporary art galleries, Várfok Gallery, in 2007, contributing to its overall management until 2014. She then moved to Myanmar, focusing on individual field research within Yangon's contemporary art scene while working in an art gallery and writing about the scene there; she co-curated with Nathalie Johnston the archives-based exhibition *Muted Consciousness* at TSI. Back in Budapest, she attended the Central European University's Cultural Heritage Studies Program (thesis: *A Site for Mindful (Re)Definition: the Independent Contemporary Art Scene of Myanmar*, 2017). Since 2015 she has served as curator and researcher within Ludwig Museum's exhibition department. Her involvement as curatorial assistant in *The Whale that was a Submarine – Contemporary Positions from Albania and Kosovo* (2016) was a turning point in her praxis, reinforced by the CEU thesis: her research focuses on the possibility of the art museum's better adaptation to cultural contexts it was never inherent to yet which are paradoxically supposed define it (*Beyond an Institutional Comfort Zone*, Association of Critical Heritage Studies Biennial Conference, University College London, 2020). In the long run, she wishes to continue merging her curatorial work and her critical heritage views to enable the visibility of art that needs to speak out. In 2020 Kálmán became involved in Ludwig Museum's Curator Cloud, which she represented as speaker at HyMEx 2021.

HyMEx SYMPOSIUM PROGRAM

The following pages contain the original schedule created for the live symposium program on May 6–7, 2021, with the original list of speakers, titles, and abstracts. This serves as a basis for the structure that the publication follows in a second phase.

THURSDAY MAY 6, 2021 | DAY 1

Welcome words by Julia FABÉNYI,
director of Ludwig Museum – Museum of Contemporary Art, Budapest

Welcome words by Lívia NOLASCO-RÓZSÁS,
initiator and head of the Beyond Matter project, scientific associate at ZKM | Hertz-Lab

Morning moderator: Lívia NOLASCO-RÓZSÁS

PANEL I

RISING VIRTUALLY: INTERFACE AND ITS DISSOLUTION

Béla Tamás KÓNYA:

Will Any New Hybrid Solutions Change our Exhibition Experiences?

This talk explores changes in the operations and strategies of museums as a result of evolving technological and social processes in the twenty-first century, as well as the challenges of media art preservation. It seeks to situate these institutional re-evaluations and their public impact within their complex contexts. To illustrate this discussion, I will focus on institutions that have led the vanguard for shifts in digital practice in Hungary. I will also explore how these precedents have shaped the institutional sphere, drawing upon personal experiences in developing digital and collection care strategies at the Museum of Fine Arts Budapest, and the Ludwig Museum of Contemporary Art, Budapest. The augmentation of digital content and technology affects all layers within museums, requiring considerably greater labor input and indicating the need to establish new jobs and departments. The economic impact of the COVID-19 pandemic has sped up the digital transition and may have outbreak consequences in the form of pushing work and education from a fixed place to digital platforms. The audiovisual flux of image, sound, and digital media forms part of quotidian social and cultural life and keeps the world in constant motion. At the same time, as the aging and evolution of technology has become an ordinary phenomenon, media art objects (photography, video, digital content) generally deteriorate faster than objects of traditional media (painting, sculpture). Their conservation is equally important, however, as media objects constitute a significant part of twentieth- and twenty-first-century cultural heritage.

Daniel BIRNBAUM:
Exploring the Virtual

As a curator and museum director (formerly at Moderna Museet, Stockholm), Daniel Birnbaum has many years' experience working with artists and contemporary art. With Acute Art, he is bringing that experience to cutting-edge technology and enabling renowned international artists to create original artworks in virtual, augmented and mixed reality. In this talk, Birnbaum will discuss the future possibilities of contemporary art and technology, and address the expanding role that virtual, augmented, and mixed reality is playing in museums and institutions worldwide. He will share what it's like to collaborate with world-famous artists who are exploring new technologies for the first time. What made Marina Abramović, for example, one of the foremost performance artists, enter the digital landscape to produce a virtual reality work, *Rising*? How did Acute Art begin collaborating with KAWS on his major AR app launch? Artworks produced by Acute Art include those by Jeff Koons, Antony Gormley, Alicja Kwade, Cao Fei, and Bjarne Melgaard. The works are accessible through the Acute Art website, the Acute Art app, and creative collaborations.

Corina L. APOSTOL:
Spooky Action at a Distance: Tallinn Art Hall's Digital Exhibitions and Engagement Platform

What are the challenges we face and advantages we gain when developing a digital platform for disseminating exhibitions and events, while navigating the complex territories of art and the production of meaning? How can we create communities through a digital exhibition, and how do we make sense of the relationship between the digital and IRL? My talk will begin to unpack these questions through the case study of Tallinn Art Hall's digital exhibition platform, launched in early 2020. Our goal was to create a very intuitive and manageable interface which viewers could use without going through a webinar on how to navigate it. The resulting interface responded to the necessities of showing art exhibitions when travel was not possible. It also served to make our exhibitions more accessible for differently abled people, which was the original impetus for the digital initiative. While launched during a moment of global crisis, when communication around and experiences of art and culture began to change drastically, our platform continues to offer digital experiences that will change the way we think about curating in the coming years. In this talk, I will show how the technology we developed has had a shifting impact on how and where our audiences discover contemporary art, but also on our understanding of audience engagement and participation in art.

PANEL I – Q&A

PANEL 2

COGNITIVE PROCESSES AROUND THE HYBRID FORMULA

Varvara GULJAJEVA:

ENA: Participative Art Forms during Pandemics

This article introduces the online participative theater project ENA, co-created with Roger Bernat in the form of a chatbot on Teatre Lliure's website during the first lockdown under COVID-19, when people had limited access to cultural institutions and everything moved online. The article discusses machines' intelligence level when it comes to language and people's surprising readiness to believe that their conversation partner is another human, even if they are aware that they are talking to a script. AI technology has introduced a new level of complexity in written language, making it even harder to distinguish machine-written from human-written text. The ENA project explores how this novel technology, the generative language model in particular, could be deployed for participative art forms. It introduces a participatory format for online theater, which exists entirely in the internet space and enabled worldwide 24/7 access for the audience. I argue that in times of lockdown, it is vital to offer engaging cultural formats in addition to consumer-based digital content, like lectures, tours, and videos. It also emphasizes the vital role of artists in raising awareness of the possibilities and the limitations of AI technology when it comes to written language.

Joasia KRYSA:

The Next Museum Should be Curated by a Machine

Traditionally the function of the museum has been to valorize the object, extract it from its context and function, and preserve it from decay. While this traditional understanding of the museum remains, it has also undergone radical changes and a "post-custodian" approach is now embraced—more experimental, less determined by architecture, operating across hybrid actual and virtual modes, both online and offline. This presentation takes these developments one step further: not to explore the inclusion of virtual objects in collections, or the extension of museums online, or even new challenges for preservation, but to re-imagine the museum itself as a technological entity capable of determining its own future—the museum as science fiction. I refer to a collaborative research project in which Liverpool Biennial 2021 operates as a case study for an investigation of machine curation and visitor interaction. On the one hand there is the conventional biennial exhibition, and on the other, running in parallel, is a machine-curated online version composed of large datasets, using computer vision and natural language processing techniques. The project aims to offer a model for the integration of machine learning in museum collections, transforming the museum into a dynamic system capable of generating new perspectives on its operations and infrastructure.

Borbála KÁLMÁN:

The Curator Cloud: A Resilient Apparatus for the Long-Term

The Curator Cloud, which embraces the work of several curators at Ludwig Museum, was first conceived in spring 2019 as an original marketing gimmick, but soon came to be adopted as a survival apparatus aiming at an experiment with a deep, long-term shift within the institutional framework. Before the COVID-19 pandemic started, it had already generated a collectivity-oriented grassroots methodology within the museum. Afterwards, it grew into a communal reaction to a global and local institutional crisis of structural, formal, and theoretical dimensions. It was also an improvised response to the unprecedented shift toward hybridity brought about by the extraordinary circumstances of 2020. This paper seeks to illustrate how the Curator Cloud evolved towards an assembly-like work process aiming at collective knowledge sharing. Admittedly, it is still a work in progress, an ambitious experiment—but one with notable results. The Curator Cloud has become a resilient *modus operandi* for improving a collaborative approach to understanding and sharing our multivalent competencies, while also encouraging the cloud as a developing agent for ideas. It endeavors to view the cloud as a driving force for dismantling the high walls within the institution, to wind out hierarchical museum barriers towards a more direct access to knowledge. The cloud's pervasive structure enables its essence to be a response to the inevitable institutional shift toward hybridity, especially in regard to exhibitions.

PANEL 2 - Q&A

**LUNCH BREAK // Live Guided Tour // *Spatial Affairs*
by co-curator Giulia BINI, followed by Q&A**

*Afternoon moderator: Borbála KÁLMÁN,
curator at Ludwig Museum, project manager of HyMEx*

PANEL 3

FICTITIOUS MUSEUM

Lívía NOLASCO-RÓZSÁS:

Curatorial Ficting and Facting in the Computer-generated Exhibition Space

COVID-19 has forced museums to create exhibitions exclusively for the internet, and thus face fundamental questions regarding the differences and similarities between presenting art in computational and in physical space. This presentation looks at possible solutions through three online exhibitions. The main curatorial questions concerned exhibition space: Should we copy a physical space or generate new world(ing)s compatible with online art mediation? Are three dimensions vital for curation? Should we work with more dimensions, or fewer? Should we leave analogue artworks in their natural habitat and focus on net- and software-based projects? The first attempt manifested in an online show in which the digital copy of a bricks-and-mortar exhibition space clashes with computer-generated digital objects representing the artworks, hosted by the ZDF Digitale Kunsthalle and titled *Computable – Incomputable*. The works were mostly software-based, without visible bodies, so represented by forms defined by the propagation process of cellular automata, in Konrad Zuse's sense. Then came the online extension of the exhibition *Spatial Affairs*. Software-based artworks were given digital bodies without organs, but here the entire exhibition space was built of the same material. The white cube dissolved in a flux of interactions, where artwork and visitor appear in 3D space as avatars. In the title we incorporated the term "worlding," which denotes both a verbal action and an infinite process—a blending of boundaries between subject and environment. Third, a direct connection between the actual and the virtual was articulated by the duo Theodoulos Polyviou and Eleni Diana Elia in the show *Drifting, Browsing, Cruising*. Centered on ZKM's balcony, their VR installation put the profane, the sexual, and the everyday into conversation with the museum's architecture. The work created a digital layer of fiction over the architectural fact of the exhibition space, to refer to McKenzie Wark's neologisms "ficting" and "facting."

Jonathan DOTSE:

**What African Indigenous Knowledge Systems
Have to Offer through Digital Hypermedia**

Currently running a studio called AfroCyberPunk Interactive, I am focused on developing work in what I like to describe as digital hypermedia. I'm approaching it from the position that African cultures and African indigenous knowledge systems have something very valuable to offer. Lately, I have become interested in digging into an underlying, archetypal commonalities between African cultures through various projects. What stands out to me most is an element of harnessing fractals: looking at the world through a fractal perspective and applying the concept of the fractal roots of nature to every aspect of life. That, as abstract as it seems, is the most pervasive and common element that I have identified, and it immediately makes me think back to the idea of media as a continuous spectrum of different levels of immersion into a virtual world. I've married these two concepts together in a platform which aims to distribute virtual and digital content primarily through mobile devices. It is intended to serve content to local smartphones and smartphone users in Africa particularly, delivering a wide range of content related to African indigenous knowledge within a seamless infrastructure.

Bruno BRULON SOARES:

**Notes on the Experimental Museum:
Reflections for Undisciplined Museum Practice and Theory**

This talk proposes that museum and heritage studies, in a postcolonial perspective, need to reconsider human experience as a central element for decolonization. Beyond the outdated desire to be recognized as a "science" in modern terms, museology today faces the challenge of serving different subjects and social groups in constant friction with the modern project of the "museum." In this sense, I will argue that this known discipline, attached to the human sciences, needs to be decentered and undisciplined by incorporating unsubordinated knowledges and disobedient practices in museums outside of the scope of normative museology. In the margins of the "scientific" field, dominated by the coloniality of knowledge, museums and museology can reinvent themselves through new methods for teaching and learning based on experiences that cannot be captured or apprehended by rational thinking. From this perspective, the experimental museum is less rational and more relational, affected by a pluriversality of knowledges, subjects, and experience that may work for its own decolonization.

PANEL 3 – Q&A

PANEL 4

REPOSITORY OF NEGENTROPIC PROCESSES: COMMONING AND REPRESENTATION

Seong Eun KIM:

#Museums #Commons #Tactics

Commemorating its tenth anniversary in 2018, the Nam June Paik Art Center staged an exhibition entitled *#Art #Commons #Nam June Paik*. Inspired by such conceptualizations of Paik's as the "video commune" and the "video common market," the exhibition was to experiment on the possibility of the museum becoming the commons. I would define the commons as a spatiotemporal ground for cultivating a willingness to think and act together. One of the artists featured in the exhibition was Unmake Lab × Data Union Collective, whose *Making Data Union* imagines a new form of solidarity in a data-driven society by running a chatroom for discussions about assembling the data of participants. The virtual world constituted by digital technology is far from being disembodied or dematerialized. In the post-COVID-19 era, when the question of how to live together emerges more critically, we need to reflect fundamentally on the inequalities structurally inherent in the accessibility of network infrastructure. As Paik said, technological developments gave rise not only to AI but to an artificial metabolism that is set in motion by data. And we are witnessing a malfunctioning of this metabolism due to the virulence of the virus. *Tactics*, a Nam June Paik Art Center exhibition staged amid the pandemic in 2021, looks into tactical practices of artists whose moves could evolve into resistance against capitalist privatization, and coexistence with alienated or excluded others. For its work *Streaming/Cutting*, Bad New Days—a collective of five artists—borrows the format of the "trucking v-log" and combines it with its own trucking occasions, pre-recorded and live-streamed, on the same routes the cargo workers' union took for a strike on major days of struggle. In this talk, I argue that if the museum tries to assemble such performative undertakings, this could bring it closer to the commons.

Tania AEDO ARANKOWSKY:

(Media) Art as Repository of Knowledge—and Warnings

Media art, or the art formerly known as media art, may be seen as a huge repository of knowledge and warnings that may contribute to imagine the new worlds we have to build if we are to produce the cultural mutation needed for our species to survive. It is no exaggeration to say that one of the most interesting places in the world to be before the crisis were museums' education-mediation departments, especially those of contemporary art museums, although in many places they are also the more precarious in terms of labor conditions. Would it be an exaggeration to say that the term "transdisciplinary" is one of the most used in contemporary and media art initiatives? And to say that one of the biggest problems of our present situation has to do with knowledge production? Would it be productive to replace the category of the contemporary with that of contingency? I am at the same time tremendously pessimistic and tremendously optimistic

about this crisis, which will continue to worsen as it mixes with the climate crisis, economic crises, and with other crises that we cannot or do not want to predict. No doubt we are accelerating entropy through our extractive and consumerist habits, going through an autocatalytic loop toward disaster. We need to learn how to navigate this world that is not yet ending. Can museums be the hubs for the incredible creative forces needed to produce or contribute to the production of massive negentropic processes? Which kinds of practices need to be put into play? Which kinds of repositories do we need to produce a cultural mutation and learn how to navigate through it? Could the repository that is the memory and archives of the art formerly known as media art be used to learn about how to knit relationships among diverse materialities, like, for example, the virtual and the physical worlds, different species, or the living and the non-living? I am going to talk about how we are thinking and what we are doing about this at Catedra Max Aub, Transdiscipline in Art and Technology at UNAM, Mexico.

Krisztina VARGA:

Whose Reality Does the Museum Reflect?

Does the image represented by the museum portray reality, and if so, whose? What if a person or group from a particular a minority is dissatisfied with the image of that minority represented by the museum? In my paper, I look at cultural hybridity, specifically at a group of contemporary artists creating counternarratives through critical reflection, using the strategy of “talking back” in order to demand a place, space, and adequate representation, including self-representation, within iconic national monuments and the art museum. Is it possible to break out of the power structures preserved by the museum through participatory practices and critical reflection—by moving beyond the traditional museum framework and creating an alternative interpretive context in virtual space? Can such a strategy recontextualize the reality represented by the museum and influence its policy? I seek answers to these questions through an analysis of two performance documentations by Sostar, a critical Roma artist collective. Through their work, I examine modes of deterritorialization offered by contemporary art and participatory practices. The performance *Untitled* (2012) can be understood as an act of repatriation: András Kállai reflects on the omission of the Roma minority from Hungarian national history (such as at the Hungarian National Gallery) and appropriates representative spaces by visiting national memorial sites and leaving behind a trail of blood. Sostar uses techniques of critical appropriation in the *Rewritable Pictures* (2010) performance, in which photographs from the former Roma collection of the Hungarian Museum of Ethnography are re-enacted, offering opportunities for their rereading and alternative presentation. An institutionalized version of the project can be seen in the “Politics of Photography” section of the RomArchive archive, created in an online virtual space.

PANEL 4 – Q&A

Christiane PAUL:

Becoming Hybrid: The State of the Art in Mixed Realities

Hybridity as a cultural phenomenon has existed for centuries and has always been part of museum culture. The developments in digital technologies over recent decades, however, have added a new layer of hybridity by redrawing the physical demarcation lines of the museum, expanding it into digital space, and making it a site for virtual experiences. As the pandemic prompted the art world to move most of its programming online in 2020, the boundaries of museum experiences—from exhibitions to tours and panel discussions—and curatorial practice became even more malleable. This talk will outline how different areas of museum experience have been technologized and how digital art has been reshaping concepts of the exhibition, acquisition, and collection, thereby creating a mixed reality for the existence of art. Part of this mixed reality is the increasing categorical instability of the “online exhibition,” which exists in multiple constellations of relationships between physical and virtual space, and questions traditional notions of an exhibition as the imposition of order on objects brought into a particular space and set of relations with one another. These hybrid states will be considered in the larger context of art’s cultural and sociopolitical functions in society.

KEYNOTE – Q&A

DEBATE with the participation of:

**Tania AEDO ARANKOWSKY, Bruno BRULON SOARES,
Béla Tamás KÓNYA, Corina L. APOSTOL**

FRIDAY MAY 7, 2021 | DAY 2

Welcome words, recap of previous day.

Morning moderator: Borbála KÁLMÁN

PANEL 5

ENHANCING MEDIATION: ARCHIVING AND ACCESSING

Krisztián FONYÓDI:
How to Exhibit Online?

According to the definition of the International Council of Museums (ICOM), one of the most important tasks of museums is to exhibit the tangible and intangible heritage of humanity and its environment for the purposes of education, study, and enjoyment. It can be said that ICOM envisages the implementation of this task in real museum spaces and, despite increasingly well-performing and more complex technical possibilities, it does not pay enough attention to the high-quality digital archiving of exhibitions. In my presentation, I invite conference participants to a time travel. With the help of ExhibitOnline archiving software, we have brought to life three exhibitions of different eras in the digital space, making them live and livable again for the general public and research purposes. The journey begins with the Ludwig Museum's *BarabasiLab: Hidden Patterns* exhibition in 2020. Here we present an "ideal" archiving situation, as the exhibition installation that still exists behind closed doors did not set any boundaries in the production of the digital imprint of the exhibition. The next stop is the Frida Kahlo exhibition held at the Hungarian National Gallery in 2018 with great success. Our hands were much more tied here, as the exhibition could only be reconstructed from the materials available in the archive, which were fortunately very well documented. Finally, I invite the audience to the permanent exhibition of twentieth-century artworks from the Museum of Fine Arts, which opened in 1972. Organized by Krisztina Passuth, the exhibition was one of the most significant and nationally influential in the history of the museum, presenting the museum's art holdings for the first time. The ongoing digital reconstruction of this exhibition is even more challenging because we have even less visual documentation of it.

Zsófia RUTTKAY:

The Digital Museum: Enhancing the Space,
Time, and Nature of Exploring Artworks

An ever-evolving arsenal of digital technologies offers new means for accessing and attracting audiences to museums and making them active participants, as well as for presenting and interpreting artworks in novel ways. A dazzling variety of choices can be made when putting together a more or less “hybrid” exhibition. What should (or could) be the role of digital enhancement and its relationship to the real physical artwork? How to interweave digital elements into the dramaturgy and physical walk-through of an exhibition? What do visitors and museums gain from digital installations? In this paper I map out a range of possible roles for the digital and the real, and discuss examples from my own, partly educational projects in the art field. Some artists who lived before the computer age followed analytical, algorithmic processes which lend themselves to interpretation and scholarly investigation through computing technologies. The digital solutions put in focus here emerged mostly in a multidisciplinary university course setting titled Digital Museum, in which cultural heritage institutions partnered with students of design and programming. The paper closes by calling for systematic design and evaluation of digital installations in museums.

PANEL 5 – Q&A

PANEL 6

KNOWLEDGE PRODUCTION UNDER THE VIRTUAL CONDITION

Ben VICKERS:

Notes on Art and the Coming Metaverse

In this presentation Ben Vickers presents a series of artists' projects that utilize video-game engines as their underlying medium. Expanding on the implications and future of the intersection between advanced technologies and the arts, he points to a set of possibilities for cultural production in the context of the coming metaverse.

Lily DÍAZ-KOMMONEN:

Performance-Oriented Research to Promote Community Engagement in Museum Activities

Researchers working in anthropology, archaeology, art, computer science, and the humanities, among other fields, have been proposing and making use of immersive media as a way to augment knowledge-building processes for half a century now. This is not surprising given the deep penetration of digital infrastructures into our epistemic practices. Interaction with digital devices occupies a fair amount of our attention span during customary human activities. In the case of specialists working in museums and other heritage institutions (such as galleries, libraries, and archives), digital artefacts are now liberally used components in the exhibition repertoire. Noted once for their potential for expressive multimodality and audience engagement, the digital models that come into being through the process of immersive media design and production are now also being explored as an intrinsic element of knowledge preservation. This is the case with our current project, *Beyond Matter: Cultural Heritage on the Verge of Virtual Reality*, funded by the European Union Creative Europe program. During my presentation, I would like to consider how the multidimensional aspects of human presence impact digital evolution through immersive media. Drawing from work samples ranging from the artistic to the scientific, I would like to challenge notions of human adaptation to new modes of existence among digitally born artefacts and question how the digital comes to the human, and how the human is brought into the digital. I will also use the opportunity to introduce aspects of our performance-oriented research methods deployed as part of the project's audience and community engagement initiatives. These methods, which combine autoethnographic and duoethnographic narratives with artefactual analysis of material culture, will be used in our project to gauge audience responses to our reconstructions of the exhibitions *Les Immateriaux* (Centre Pompidou, 1985) and *Iconoclash* (ZKM, 2002).

PANEL 6 – Q&A

LUNCH BREAK // Guided Tour Video // *Time Machine*

by curator Krisztina SZIPŐCS, deputy director of Ludwig Museum

PANEL 7

**EVOLVING ARCHITECTURES:
ALGORITHMIC, DYNAMIC AND PERFORMATIVE SPACES**

Tegan BRISTOW:

A School for Vernacular Algorithms, Wits Art Museum

In this paper I unpack the nature and importance of an African Fractals module and how it uses the Wits Art Museum collection to expand on a critical encounter with the deep histories and deep futures of digital culture in Africa. In response to research developed through “Post African Futures: Decoloniality and Actional Methodologies in Art and Cultural Practices in African Cultures of Technology” (2017), I have expanded the curriculum of Digital Art Theory in the Wits School of Arts. Aimed at students in both the engineering and arts programs, the course addressed key debates in digital culture. Titled “African Fractals,” the module centered on the Wits Art Museum collection through the lens of fractal mathematics and what we have begun to call “vernacular algorithms.” The “African Fractals” module went on to inform a research artwork titled “A Vocabulary for Vernacular Algorithms” developed for the Digital Imaginaries exhibition series in 2018, which was presented at the Wits Art Museum and ZKM. Additionally, the module informs the exhibition *A School for Vernacular Algorithms*, to be presented in 2021 at Le Lieu Unique in Nantes, France, as part of the Afrotopia and University of African Futures programs curated by Oulimata Gueye.

Sarah KENDERDINE:

Inhabited Information Spaces: A “Landscapes for the Senses”

In 1889 the curator G. B. Goode of the Smithsonian Institute delivered an anticipatory lecture entitled “The Future of the Museum” in which he said “this future museum would stand side by side with the library and the laboratory.” Convergence in collecting organizations propelled by the liquidity of digital data now sees them reconciled as information providers in a networked world. The media theorist Lev Manovich described this world order as “database logic,” whereby users transform the physical assets of cultural organizations into digital assets to be uploaded, downloaded, visualized, and shared by users who treat institutions not as storehouses of physical objects but as datasets to be manipulated. This presentation explores how such a mechanistic description can be replaced by focusing on ways in which computation has become “experiential, spatial and materialized; embedded and embodied.” Indeed, at the birth of the Information Age in the 1950s, designer György Kepes of MIT said that “information abundance” should be a “landscapes of the senses” that organizes both perception and practice. This “felt order,” he said, should be “a source of beauty, data transformed from its measured quantities and recreated as sensed forms exhibiting properties of harmony, rhythm and proportion.” Archives call for the cre-

ation of new prosthetic architectures for the production and sharing of archival resources. Spanning immersive visualization technologies, visual analytics, aesthetics, and cultural (big) data, this presentation explores the digital cultural heritage experiences of diverse archives from scientific, artistic, and humanist perspectives. Exploiting a series of experimental and embodied platforms, the discussion argues for a reformulation of engagement with digital archives at the intersection of the tangible and intangible and as a convergence across domains. The performative interfaces and repertoires described demonstrate opportunities to reformulate narrative in a digital context and the ways in which they support personal affective engagement with cultural memory.

Robert B. LISEK:

Evolutionary Strategies in Architecture and Art

The project discussed here proposes a new strategy for creating evolving architectural structures that adapt to a dynamically changing environment using advanced machine-learning and AI methods. Physical and virtual processes transform and assemble into structures in response to environmental properties and capabilities. The project investigates a living dynamic system as a complex set of natural and cultural sub-processes in which each of the interacting entities and systems creates complex aggregates. It deals with natural processes, communication flows, information networks, resource distribution, dense noise masses, a large group of agents, and their spatial interactions in the environment. By significantly expanding existing research, the project creates a meta-learning model useful for testing various aspects of adaptation to a complex dynamic environment. This responds to the difficulty of designing artificial agents that can intelligently respond to evolving complex processes.

PANEL 7 – Q&A

PANEL 8

SUMMONING GHOSTS: FROM RECONSTRUCTIONS TO VIRTUAL MODELS

Bruce ALTSHULER:

Reconstructing, Re-interpreting, and Re-presenting Historical Exhibitions in Light of the Digital

The study of historical exhibitions has become a central element of a broadened art history, with exhibitions functioning as critical points of intersection for a dynamic range of individual and institutional actors, and of the larger systems within which they act. The investigation and analysis of exhibitions has also played an important role within curatorial studies. These two areas of inquiry into historical exhibitions come together in the phenomenon of exhibitions about exhibitions. This paper will focus on one kind of exhibition about exhibitions: the re-creation and re-presentation of shows from the past. These efforts, such as the Fondazione Prada's 2013 reconstruction of the 1969 exhibition *When Attitudes Become Form*, have been much discussed in terms of their public success or failure—but they have been less discussed as research enterprises, projects that expand knowledge and understanding of the original exhibition and of exhibitions more generally. Moreover, the resources and capabilities of digital technologies promise to enrich this expanding field. But exactly what does reconstructing past exhibitions teach us about the original shows themselves, and about their larger cultural surroundings? And how might digital tools and approaches allow us to advance beyond what could be done in this regard with non-digital resources and strategies?

Philippe BETTINELLI:

The Digital Documentation of *Les Immatériaux*
and the Elusiveness of Past Exhibitions

The exhibition *Les Immatériaux*, which opened at Centre Pompidou in 1985, challenged the museum experience in many ways. Curated by Jean-François Lyotard and Thierry Chaput, it explored the transformations agitating the postmodern world through five key notions, all coming from the same etymological root: *matière* (matter), *matériau* (support), *maternité* (maternity), *matériel* (hardware), and *matrice* (matrix). Following the spirit of multidisciplinary which drove the creation of Centre Pompidou, it brought together works from the field of visual arts, new media, and architecture, but also scientific items and a vast variety of displays, ranging from dioramas to interactive installations. From a museographic point of view, it stands as a groundbreaking experience, relying on the use of sound—with audio recordings displayed on headsets, triggered by infrared as the visitor moved through the space—and on a labyrinthic scenography, based not on classical exhibition panels but on hanged metal meshes, which tended to provide a feeling of weightlessness and transparency. Although *Les Immatériaux* is remembered as an iconic exhibition, its visual documentation is far from complete and the very nature of its experience challenges the idea of a virtual reconstruction. How can digital tools help us to grasp its history? If this exhibition can't be fully reconstructed in a photorealistic manner—regardless of whether that would be relevant to its topic—to what extent can digital tools help new audiences understand its experience? Through a presentation of the exhibition and a review of the methodological questions raised by the research linked to its digital documentation, this talk will review the quest of trying to summon the ghost of an exhibition.

Felix KOBERSTEIN:

Multidisciplinary Preparations for the Virtual Revival of Past Exhibitions

How can digital technologies help make past exhibitions re-experienceable inside and outside the museum, and how can museums proceed in order to use digital technologies efficiently and profitably in this respect? What practices are associated with the revitalization or reprocessing of historical presentations, and what competencies need to be combined for that purpose? Within the framework of the collaborative, practice-based research project *Beyond Matter*, we investigate, among other things on the basis of the historical case study *Iconoclash* (2002, ZKM), to what extent the virtual revival of an exhibition's (spatial) form offers itself as a starting point for an ordering, presentation, and mediation structure, not only to make the intention of the exhibition tangible, but also to store associated information and data. The digital interpretation and presentation of entire exhibition concepts is a novel way to explore exhibition histories, their themes, curatorial methods, and approaches to presentation and mediation. The aim is to get as close as possible to the original intentions of the exhibition-makers. What was envisaged? How was it realized and what was not possible to implement due to the historical conditions? Assuming that exhibition spaces are physical places of knowledge production and exchange, where spatial qualities play an important role in the contextualization of information, we investigate the new possibilities generated by the transfer of these qualities into virtual space. This requires a very specific engagement with the research material, which will not only be found in archive files and museum databases, but also on the internet and among contemporary witnesses and participants. In this way archival, curatorial, aesthetic, sociological, and technical practices merge into a hybrid methodology of museological visualization that is, at best, openly accessible, easily understandable, and usable for further research.

PANEL 8 – Q&A

KEYNOTE PRESENTATION, DAY 2

Boris GROYS:

Followership vs. Spectatorship:

The Two Regimes of the Contemporary Image

The decisive difference between a digital image and a traditional image is this: every digital image has an address whereas only few traditional images have one (those in museums, private collections, and so on). This means that the digital image is always inscribed into its context. If an image or its fragments are taken out of context, the operation can be re-traced to its origins. In other words, the digital image never loses its context, or—to use Walter Benjamin’s term—its aura. It is also not accidental that in the framework of museum exhibitions, digital images are always shown as parts of an installation that reconstructs their contexts. Thus, digitalization is a re-contextualization of an image that was de-contextualized during the period of modernity. And that means that the emergence of the image in a certain context becomes the central event. One follows the chain of such emergences rather than contemplating the individual images themselves.

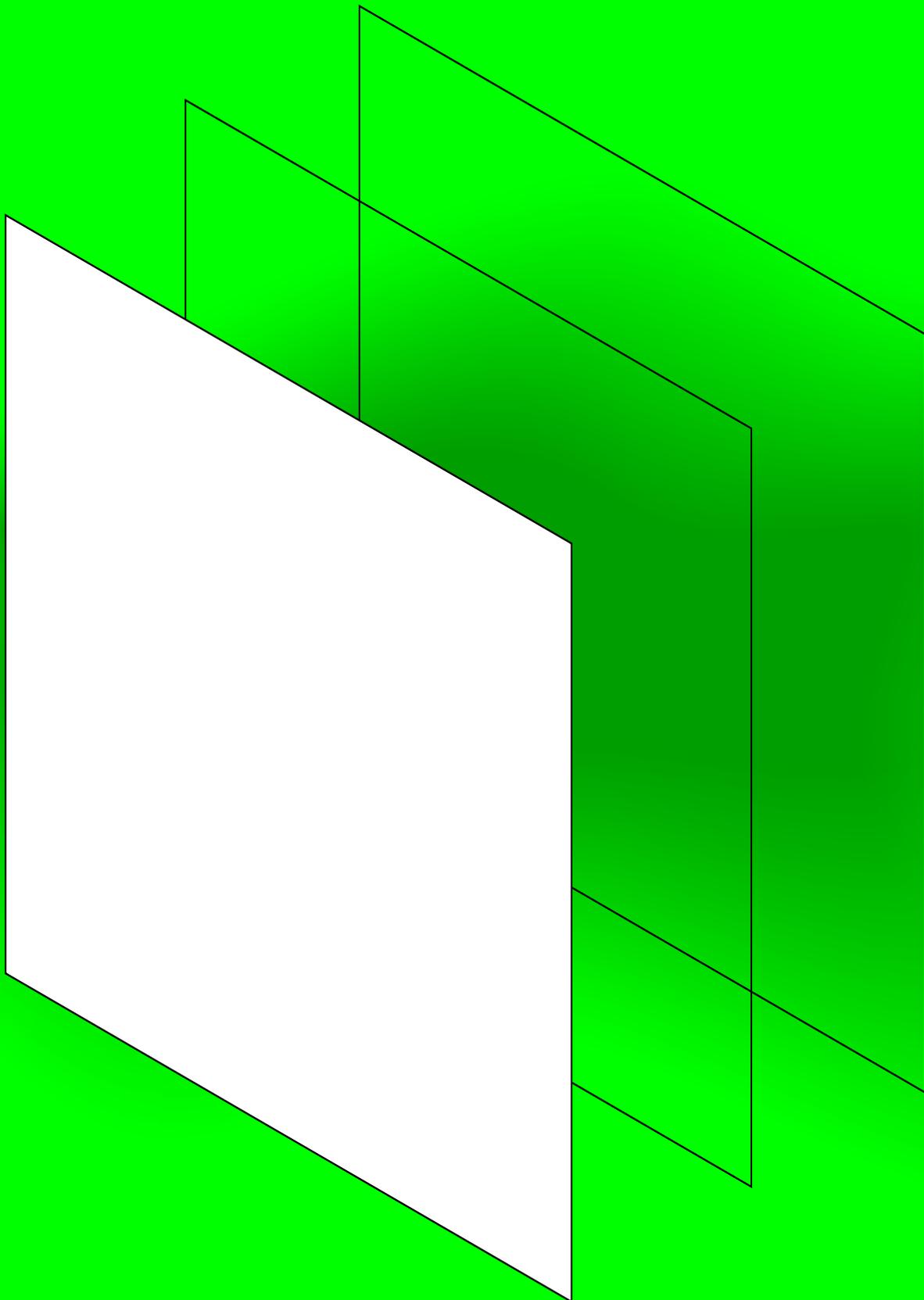
KEYNOTE – Q&A

DEBATE with the participation of:

Bruce ALTSHULER, Lily DÍAZ-KOMMONEN, Sarah KENDERDINE

Closing remarks by Borbála KÁLMÁN and Livia NOLASCO-RÓZSÁS

The Written Proceedings



HyMEx – Part I

BECOMING HYBRID:

Keynote by Christiane PAUL

PANEL 1

RISING VIRTUALLY:

INTERFACE AND ITS DISSOLUTION

Béla Tamás KÓNYA

Daniel BIRNBAUM

Corina L. APOSTOL

PANEL 2

COGNITIVE PROCESSES

AROUND THE HYBRID FORMULA

Varvara GULJAJEVA & Mar CANET SOLA

Joasia KRYSA

Borbála KÁLMÁN

PANEL 3

FICTITIOUS MUSEUM

Jonathan DOTSE

Bruno BRULON SOARES

PANEL 4

REPOSITORY OF NEGENTROPIC PROCESSES:

COMMONING AND REPRESENTATION

Seong Eun KIM

Tania AEDO ARANKOWSKY

Krisztina VARGA

Debate summary – Part I

BECOMING HYBRID: THE STATE OF THE ART IN MIXED REALITIES

Christiane PAUL

Adjunct Curator of Digital Art, Whitney Museum of American Art (USA)

Director of Sheila C. Johnson Design Center (The New School / USA)

*This text is an edited transcript of the
conference presentation delivered at HyMEx.*

The term “hybrid museums,” and the notion of hybridity in museums itself, can obviously signify many different things. They can relate to economic and structural models, but also to technological mediation and distribution through engagement and experience design. The latter is what I’m going to focus on today. One of my main arguments here is that right now we are witnessing a categorical instability when it comes to art online in the sense of web-based art and online art viewing, which is how we experienced most art at the height of the pandemic, but also in terms of objects and materiality. As mentioned earlier today, there is an ontological question involved in the experience of art.

Today, discussions surrounding the hybrid museum are mostly centered on digital engagement and experience design within the museum space. This has resulted in quite a complex diagram for marketing and museum programming, which have to stagger a variety of access points—from app to in-person, to the web, to social media—as they facilitate awareness of exhibitions, the museum visit, and follow-up. This alone already entails manifold hybridity of engagement.

We have to also consider the idea of the hybrid museum and the ontological question of objects and materiality in the context of what is often called the post-digital condition. While the term “post-digital” is problematic in various respects, I believe it captures a very important condition of our time, describing artworks and things that are conceptually and physically shaped by digital processes and take the technologies’ language for granted but then manifest in the material form of objects. In the artistic expression of the post-digital condition we encounter works that are informed by technologies and networks but cross boundaries between media and their forms. The post-digital also describes the embeddedness of the digital in the objects and structures that surround us. Additionally, the term captures the process of seeing like and being seen through digital devices, and is very often used just to indicate an embrace of a fusion of art, commerce, advertising, and design.

Post-digital art practice finds various kinds of expression: artworks that use embedded network technologies and reflect back their environment; artworks that reveal their coded materiality; and artworks that reflect the way in which digital machines and processes perceive us and our world. All of these expressions, I believe, are very relevant to the idea of hybridity in objects and artworks.

Examples of post-digital artworks include Artie Vierkant's *Image Objects*, which manifest in the gallery space as UV prints on dibond—that is, as traditional objects. But these objects are constantly being changed through internet processes in the sense that the artist modifies the works on the basis of the documentation of their installation posted on Instagram. As digital images of the installed artworks appear on social media, the physical objects are reshaped by them for the next iteration of the works' production.

Another example is the practice of Rafaël Rozendaal, such as the work *Abstract Browsing*, a browser extension that replaces images and text on visited web pages with colored squares. Everything visible on a page becomes design realized by the machinic eye. The artist takes screenshots of all of these creations every day and then transforms selections into Jacquard weavings in collaboration with a textile museum. The work entails a journey from a browser extension to a material object that points back to the origins of computer art, since the algorithmically generated patterns of the Jacquard loom are often referenced as one of its predecessors.

The fluctuating materiality of the post-digital also has to be seen in the context of the post-contemporary. We typically use the term “contemporary art” to describe a form of art that owes its foundations to postmodernism, rather than to refer to what is contemporary at any given time. The post-contemporary strives to present temporality on multiple parallel strands that interact with each other. I think the notion of the post-contemporary is also important to consider in the context of revisions of chronology in museum exhibitions. The Museum of Modern Art (MoMA) in New York, for example, received a lot of attention for no longer installing the exhibitions of its collection chronologically when it recently reopened its building—this non-chronological approach had already been taken at Tate Modern in London. I think the break with chronology indicates an important shift in museum practice. I'm bringing up the concepts of the post-digital and post-contemporary to highlight forms of hybridity that have been created through different understandings of materiality, chronology, and mediation.

In the context of the post-contemporary it makes sense to revisit Alvin Toffler, who published his book *Future Shock* in the 1970s. “Future shock” was meant to capture the phenomenon that the future was continuously arriving so fast that it was difficult for people to reflect on it. Douglas Rushkoff revisited the concept in his book *Present Shock: When Everything Happens Now* (2004), in which he argued that everything is happening so fast that we have a complete fusion of the future and the past in a constant present, which I believe amounts to a condition of temporality that influences our perception of the chronology of art in general.

In the following I want to focus on various models for art online and online art. Typically, the goal of showing art in mediated realities is to broaden the reach of exhibitions and educational programming, thereby sustaining museums' and galleries' presence and brands, and building audiences. Throughout the pandemic we have seen a massive move of exhibitions and educational programming into the online environment, which I believe has led to further destabilize what we consider online art. I will discuss this instability a little bit later in more detail.

Through this presentation I will strive to create a taxonomy of different hybrid models for presenting art online or online art: from in-gallery educational tools and social-media engagement to online representation of physical exhibitions, be it through photos, videos, or 360-degree video; from XR, specifically site-specific augmented reality art, and online exhibitions of internet art to the translation of physical exhibitions into virtual space, of which we have seen a lot during the pandemic. Finally I will touch upon experimental exhibition models.

We are increasingly encountering in-gallery tools for education and annotation as part of exhibitions. This delivery is often criticized for interfering with the experience of the art, and it is obvious that we have to be very careful in taking this approach. And we have to remind ourselves that audio tours of exhibitions, which have existed for decades, have always been a less than elegant or even a clunky interference in art viewing.

A different model for the “annotation” of artwork was used by the Metropolitan Museum of Art in New York with Reid Farrington's *The Return*. Exhibited next to Tullio Lombardo's sculpture *Adam*, *The Return* consists of a large-scale virtual animation of the sculpture driven by an actor behind the scenes. Once again, with such practices of augmenting an experience one needs to be very careful about not competing with the art. A documentation image, which admittedly is hardly statistical evidence, shows only one person looking at the actual sculpture, while the rest of the audience seems to be more focused on the digital version.

One of the more successful attempts at social media engagement was implemented by the San Francisco Museum of Modern Art (SFMOMA) with an initiative called *Send Me*, geared towards exposing and introducing people to the museum's collection. People could simply send a text such as “send me cats” or “send me (insert emoji)” and would then receive a work from the SFMOMA collection related to their request. The engagement was very successful for the museum, and there was high participation in the campaign.

Institutions currently also seem to feel compelled to have a presence on Instagram and engage with that platform. If you compare the Instagram pages of the Whitney Museum and MoMA, you will notice how much they are subjected to the platform's constraints: the experience of the grid design and of images presented within a grid becomes a kind of equalizer that, in my opinion, makes it very difficult to establish institutional identity. Identity is tied to the visual design of the platform itself.

After struggling so much with the increasing numbers of people taking selfies within galleries, often endangering the artwork, curators and institutions finally gave in and created a “museum selfie day” on which audiences were invited to post their creations. At this point institutions are trying to make the most of an activity that can hardly be stopped.

Over the years we have seen an increase of the documentation and presence of physical art, exhibitions, and galleries online. As in the case of the Whitney Museum’s exhibition *Vida Americana*, this can amount to sophisticated documentary. What museums have made available in the online realm—educational materials and exhibition documentation—has recently become much more sophisticated in its presentation.

Another form of online representation of art in the galleries that has been going on for quite some time has been provided by Google’s Arts and Culture platform, where museums have been able to represent themselves through virtual gallery and exhibition walkthroughs. While this is a great way for people to get a glimpse of what the physical experience of galleries might be like, it can hardly be seen as a substitute for an actual visit. Another aspect of Google Arts and Culture is the representation of individual artworks and the possibility of seeing them up close by zooming in. Here we are getting to a level of experience where we encounter a mediated form of materiality that actually expands and exceeds the capacity of the human eye. Within the physical gallery space one would not be able to see an image up close in this way. It’s a level of detail that is typically an aspect of conservation, a different view of the artwork than its perception as a whole.

Another site-specific form of a hybrid experience is augmented reality, which has boomed recently due to increased accessibility to the technology. In 2010 the ManifestAR collective staged their intervention *We AR in MoMA*, in which they “infiltrated” the MoMA to install “in the invisible virtual space an exhibition that people could access on site” by making their virtual artworks viewable in the MoMA galleries through an app. This intervention was not done in collaboration with MoMA, but on learning about it the museum wisely made the decision to simply go with it. I’m referencing this intervention because it is one of the instances where AR can be used as a form of institutional critique by presenting alternative forms of narrative. ManifestAR has taken this approach a few times, for example at the 2011 Venice Biennale, where they created additional, virtual pavilions that commented on the inclusion and exclusion of artists within museum spaces.

In 2018, the Whitney Museum commissioned an AR piece by Tamiko Thiel titled *Unexpected Growth*, which was installed on its terraces and entailed another form of critique. When you visited the sixth-floor gallery you could experience the piece by downloading it onto your handheld devices through a QR code or on iPads on pedestals for those without a device. *Unexpected Growth* provided a view of the outside terrace submerged under water and occupied by a very beautiful coral reef formed by plastic debris. While it is visually attractive, the work also points to the effects of climate change and environmental pollution. *Unexpected Growth* incorporates an awareness of user presence and passive interaction: as more people experienced the work throughout the day, the corals gradually bleached, resetting themselves to their original color overnight.

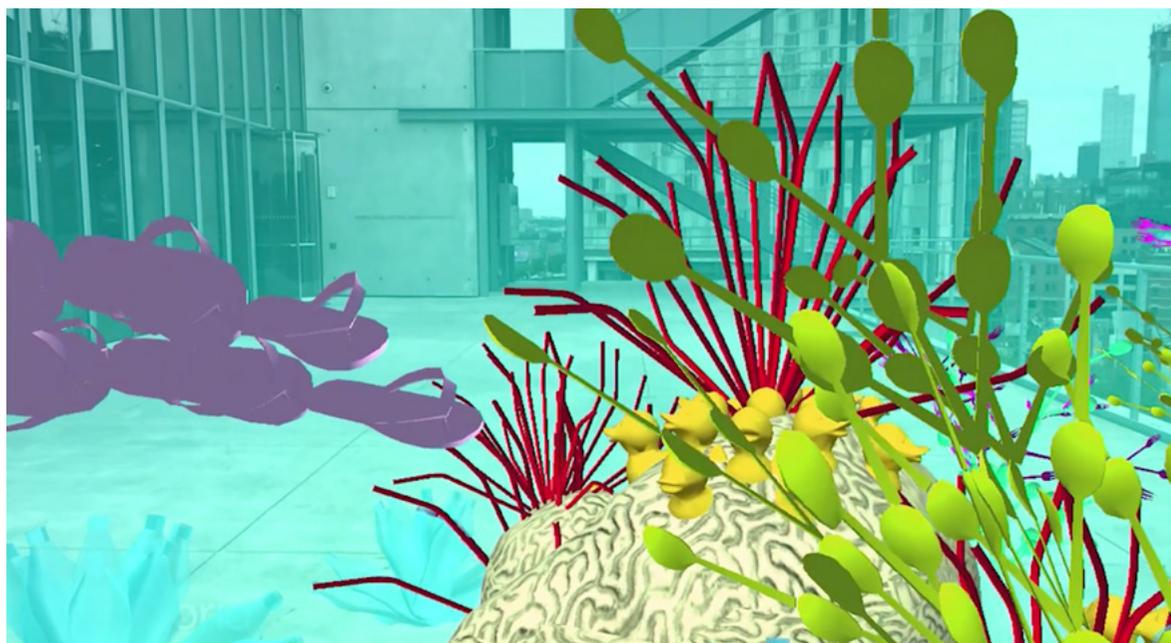


Figure 1: Tamiko Thiel, *Unexpected Growth* (2018), augmented reality app, screenshot.

Another example of site-specific AR at the Whitney Museum is *Sapponckanikan (Tobacco Field)*, made by Alan Michelson in collaboration with Steven Fragale. The new Whitney Museum building, inaugurated in 2015, is built on land that belonged to the Lenape peoples and was once a tobacco field. Through your handheld device you could get a virtual view of what the site once looked like, becoming aware of its Indigenous heritage.

During the pandemic we have seen a lot of AR projects referencing current events, for example Vince Fraser's *We Rise Above*, which was created specifically in connection to the Black Lives Matter movement. Digital Art Miami also presented numerous AR installations, and we're likely going to see more AR projects—not only in the form of artworks but also as marketing campaigns. An example of the latter was implemented by MuMok in Vienna to publicize its exhibition programming. From outside, people could access information, overlaid on the museum's facade, about the shows on view. I'm referencing this specific project to bring up another kind of competition created by hybrid experiences, this one between the marketing and advertising of exhibitions and the art itself. We have to ask the fundamental question of how much all of these demands on viewers' attention compete, and museums have to be very careful in creating such experiences.

Moving on from the hybrid experiences created by virtual tools—for educational purposes and visitor information—and by site-specific AR projects, I will now discuss internet art and online exhibitions. Internet art is of course the only art form that is native to an online experience. In the past year net art has received an enormous amount of attention and we have seen experimentation with slightly different exhibition models. The exhibition *We Link Sideways*, curated by Zhang Ga for the Chronos Art Center in Shanghai, is one example. It was shown not only on the museum website but also by various partner institutions. *We Link Sideways* included a few works commissioned for the Whitney Museum's artport website, which I will discuss in more detail in a moment. The artport works were shown on the websites of museums participating in *We Link Sideways*, and I think this is an underused model. Museums are mostly focused on showing their own

physical or online art, and you fairly seldom encounter more distributed models, which have a lot of potential.

I would like to use the artport website, which I have been curating since 2001, as one example of an online gallery run by a museum. More than 100 projects have been commissioned for artport. Not all of them are still accessible, and we're continuously working on their conservation. Artport is meant to give a broader idea of the practice of net art and is not focused on a specific scene or genre. If you visit, you encounter quite a mix of projects.

Part of the artport programming is a series called *Sunrise/Sunset*, which constitutes a temporal intervention into the museum website. *Sunrise/Sunset* is a series of small performative projects that take place every morning and every evening at the time of sunrise and sunset in New York City, so they are temporally specific. The artwork takes over the website for thirty seconds, unannounced. Anyone visiting the site at the time, be it to learn more about exhibitions or programming, might be interrupted by a glimpse or view of these *Sunrise/Sunset* projects. After the run of each individual project, typically shown for a few months, they are accessible online only through documentation. As opposed to the idea of internet art as work that can be seen at any time, this series deliberately restricts that accessibility, introducing the ephemeral temporality of performance.

The works we presented in the summer of 2020 was *Looted* by American Artist, who legally changed their name to American Artist to make a statement about the status of Black artists within American art. In the immediate period after the name change it was difficult to find American Artist's website because a Google search for it produced returns such as "Andy Warhol," but more recently this has changed—American Artist's website is now one of the top returns. American Artist has explored blackness, Black labor, and visibility through a range of projects that often involve refusal. For the *Sunrise/Sunset* series American Artist visually boarded up the Whitney's website. Every image of an artwork on a given webpage would be replaced by images of wooden planks. This work happened in the context of the anti-racism and Black Lives Matter protests in 2020, specifically at the moment when most museums in New York were boarded up due to the ongoing street protest. Due to the pandemic, online platforms and websites were the only access point for experiencing art at museums. Through this intervention American Artist made that access impossible, too. *Looted* also alludes to discussions surrounding decolonialization, of course, and the fact that the artifacts in many museums were looted. While this may not specifically apply to the Whitney Museum, since it is not an encyclopedic and more contemporary institution, the issue of looted art was one that American Artist wanted to problematize in the context of his work.

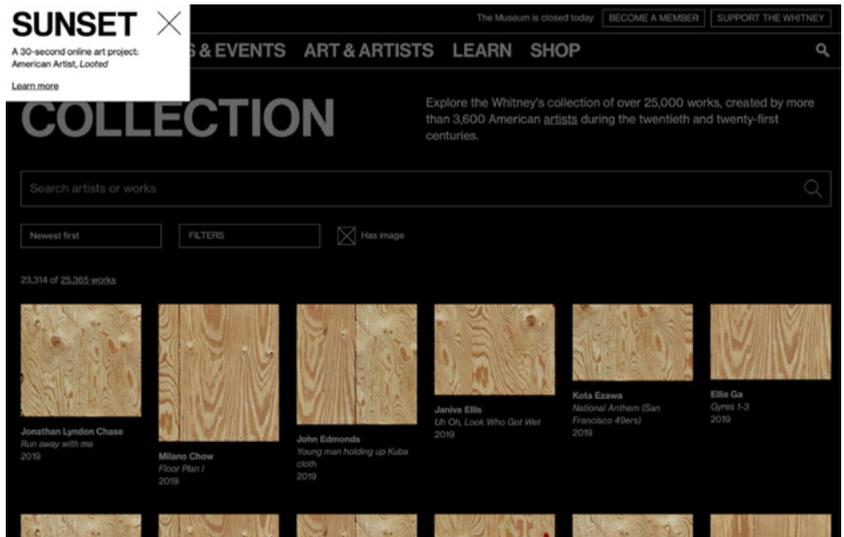


Figure 2: American Artist, *Looted* (2020), screenshot.

At the moment of this presentation, the work on view as part of the *Sunrise/Sunset* series is LaTurbo Avedon's *Morning Mirror / Evening Mirror*. LaTurbo Avedon has lived as an avatar for the past decade, exploring the mirroring of selves and identity on the web. For *Morning Mirror / Evening Mirror*, LaTurbo overlaid a mirror onto the Whitney's webpage, and what you see reflected are fly-throughs of a 3D apartment the artist created. The work consists of seven different fly-throughs for morning time and evening time, respectively. This work also very much resonates with the times of the pandemic: the overlaid mirror exists at the threshold of functioning as a reflection of the domestic and workspace environment in which many of us have found ourselves and a window into other people's lives and living environments.

Another category of hybridity to consider here are virtual 3D simulations of physical work, and I want to first bring up examples that function as annotations of physical objects and make visible what could not be interacted with in physical space. In 2012 Itaú Cultural released an app in connection with a retrospective of Lygia Clark's work. The app was for *Livro-obra*, a physical book by Lygia Clark that you should be interacting with in a museum space, but could not touch due to conservation constraints and concerns. Through the *Livro-obra* app you can explore a virtual version of the book as it was meant to be seen, so a part of this work that was not typically accessible—its interactive aspect—could be experienced again.

Another work in this exhibition, *Bichos (Animals)*, which Lygia Clark had envisioned as a large-scale sculpture in the city, was also accompanied by a virtual reality rendition. The fantastic aspect of the simulation is that the sculpture can morph and change its form, again allowing for interaction that wouldn't be possible in real life. The simulation made it possible to experience the work through interaction with your hand and in the flexible form in which Lydia Clark envisioned it to be seen within a cityscape.

I want to move on to a very challenging hybrid model, the representation of physical exhibitions in virtual space, specifically skeuomorphic representation—that is, the simulation of an existing physical environment in virtual space. We have seen this approach a lot in 2020, but I want to point out that this was also a very prominent phenomenon in the 1990s. When museums first moved online during that period, they often felt compelled to recreate their physical gallery space within the virtual environment. Slowly they realized that this presentation may not be the best or most effective way of experiencing art, since it doesn't leverage the potential of the online environment—in fact, it may get in the way of the art experience. We have seen this happening again over the past year, when many institutions returned to skeuomorphic representations of exhibitions, for better or worse. I would argue that there is a rationale for choosing this approach if your institution has mounted an exhibition that has become trapped in physical space without public access due to the pandemic, but it becomes more questionable if institutions' reasoning is that the gallery space itself needs to be seen behind the art. I want to bring up a successful counter example to the problematic aspects: Claudia Hart's exhibition *The Ruins* at Bitforms gallery in New York, where the virtual and physical galleries very nicely existed side by side. I'm not going to go deeply into the details of the work itself, but it was an exploration of the ruins of modernism through software

artworks that engage with classics such as Picasso and Matisse. Within the virtual space of Mozilla Hubs, where we have seen a lot of exhibitions mounted in 2020/21, you could navigate through an exact replica of the Bitforms exhibition space. There was also a complex sound component. What I would like to highlight here is that these two versions existed side by side, complementing each other and offering equally rewarding experiences. It is important to keep in mind that the work in *The Ruins* originated in software and in the virtual space. The way you viewed it in the virtual space is closer to its origins: the sculpture installed in the Bitforms gallery, for example, only made its transition into physical space through a complex process of mediation, and the wallpaper too was created digitally, and then printed and mounted in the physical space. In the case of *The Ruins* we have a two-way street of experiencing hybrid space.

I also want to give at least one example of a hybrid practice that we have seen a lot of in the past year, the mixing of works originating in different materialities in virtual exhibitions. The exhibition *Restart*, curated by Julie Walsh in Mozilla Hubs, combined works coming from very different materialities and physicalities—from sculpture to the documentation of an augmented reality work (*Liberty Bell* by Nancy Baker Cahill) and an installation work by Tamiko Thiel that deals with deepfakes. In *Restart*, works that also exist as very complex physical installations are translated into a mixed reality of virtual documentation or replication within Mozilla Hubs. Once again, I believe we have to be careful about this fusion of materiality and virtuality, and consider in which medium a work originates and is meant to be seen.

I have to at least briefly mention the opposite direction of translation between the physical and virtual—that is, virtual spaces transformed into physical installations. An example would be DiMoDA, the Digital Museum of Digital Art run by Alfredo Salazar-Caro and William Robertson. The DiMoDA museum architecture exists within virtual space and within it you visit pavilions in which you encounter artworks. When DiMoDA is shown as part of physical exhibitions, these works are translated into gallery space as installations. I have been curating DiMoDA 4.0, which focuses on the theme *Dis/Location*. While conceived before the pandemic, the topic and museum architecture—located in a deserted cityscape reminiscent of Brooklyn—now really resonate with the dislocation we have all been experiencing.

Lastly, I want to bring up a couple more experimental hybrid exhibition models since I believe there still is a lot of room for experimentation in this area. In the realm of virtual exhibitions, the Brooklyn Museum organized *Click*, a crowd-curated exhibition where

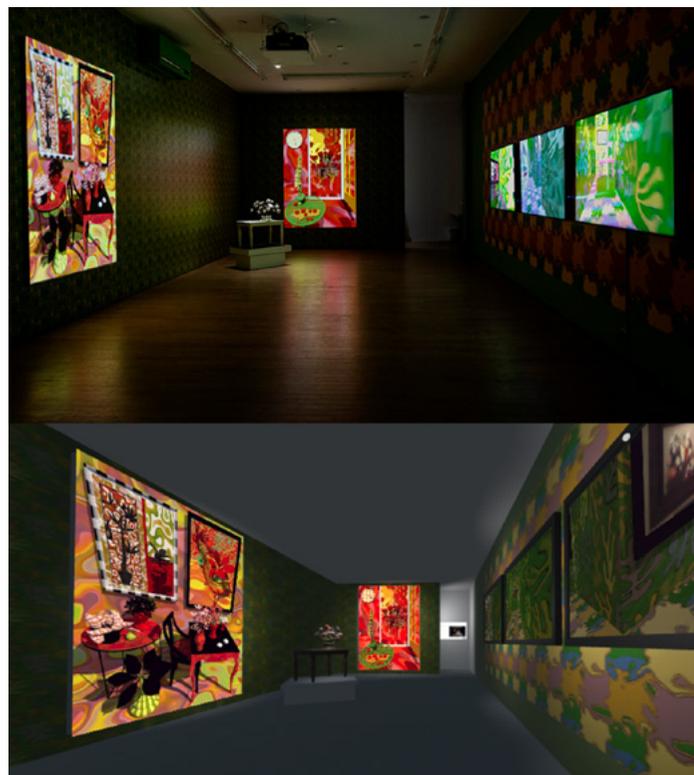


Figure 3: Claudia Hart, *The Ruins*, 2020.

Top: Bitforms gallery installation.
Bottom: Mozilla Hubs, screenshot.

people could “curate online by making selections of work to be shown.” I don’t think this was the most successful exhibition format for involving the public, but crowdsourcing within the context of curation is something that could be explored much more by museums, which often shy away from it because it entails a handing over of control. This type of experimentation was much more prominent in the 1990s. Another experimental exhibition format was that of the show *Prototype*, an “exhibition in the cloud” produced collaboratively between the New School in New York City and UdK (University of the Arts) in Berlin. It basically existed as rendered objects in the virtual space of the cloud which could be rapid-prototyped and then be shown in the venues. It offered an interesting way of thinking about and through materialities.

In the final few minutes I have, I want to briefly discuss AI, which constitutes another form of hybridity, between human and algorithm. AI has infiltrated many aspects of our life and has become very prominent in artistic explorations within digital art. So much so that the Museums and AI network came into being to specifically start conversations around AI ethics and museums. Here senior museum professionals and academics have discussions about these pressing issues, which I believe have to be explored much more.

We have already seen AI chatbots that try to embed a museum’s personality and values in AI, such as the project *IRIS+*, an AI chatbot at the Museum of Tomorrow in Rio de Janeiro. Again one needs to be very careful about this type of implementation of AI; it raises questions about the nature of how data sets are being processed and how institutional identity can be represented. Museums’ experimentation with AI has increased lately and you may be aware that an AI “curator” was appointed the next curator of the 2022 Bucharest Biennial. It will work only with existing datasets, which means that, by its very nature, it can only curate within a kind of bubble.

One of the projects that we recently launched on the Whitney Museum’s artport site was a co-commission with Liverpool Biennial titled *The Next Biennial Should Be Curated by a Machine*, a collaboration between Ubermorgen, Joasia Krysa, and Leonardo Impett. These collaborators created an AI that was trained on datasets from the Whitney Biennial and Liverpool Biennial to curate manifestations of potential biennials. Opening the interface, you encounter little black wheels positioned on a backdrop and clicking on each of them triggers a different Biennial “universe” on a background image culled from NASA or sci-fi entertainment. By clicking on the two red wheels, you launch a FAQ and credit list and learn about the interface. Each universe is accompanied by a soundtrack from a TikTok playlist, pointing to the mix of creative expression and preconfigured elements in digital tools. The different biennial universes present themselves as texts. Each features artists’ bios that are all fictitious but compiled from actual databases of artist biographies. In one universe all of the artists may have the same first name, in another they may have the same last name, in others first or last names may be mixed. In each universe you also find curatorial statements for the respective Biennial, as well as press reviews and press releases. The texts are all unstable and in progress, and you witness how the AI constantly writes and rewrites its bios, statements, reviews, and press releases. Differences between universes are generated by the fact that the software is weighted in a different way in each of them, giving prominence to different aspects. You can

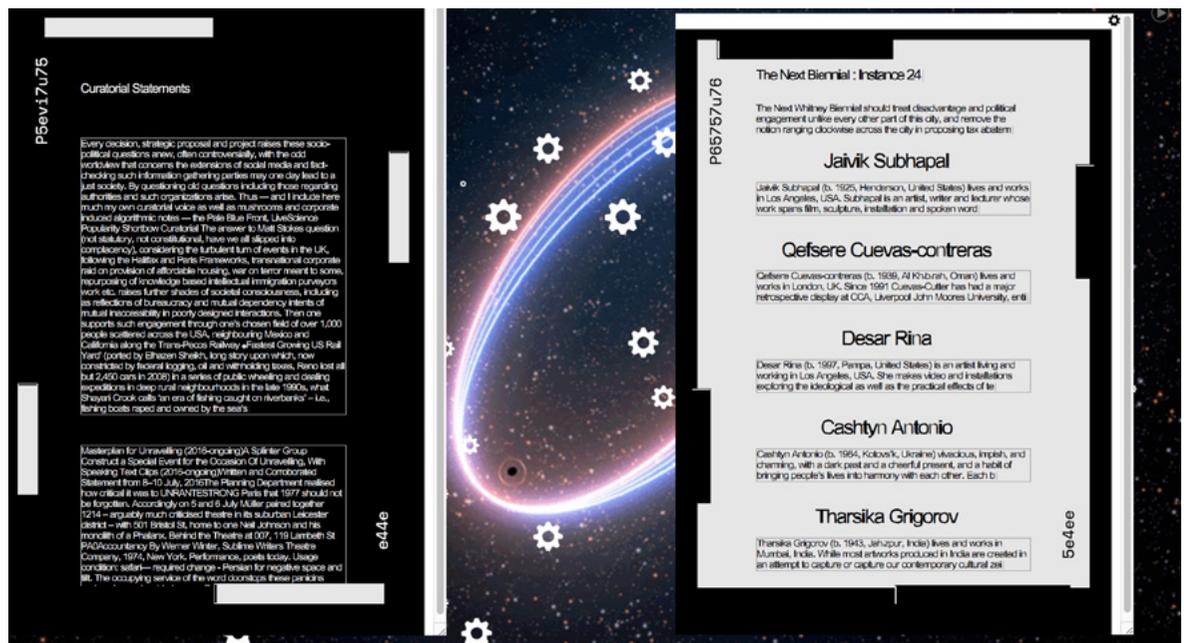
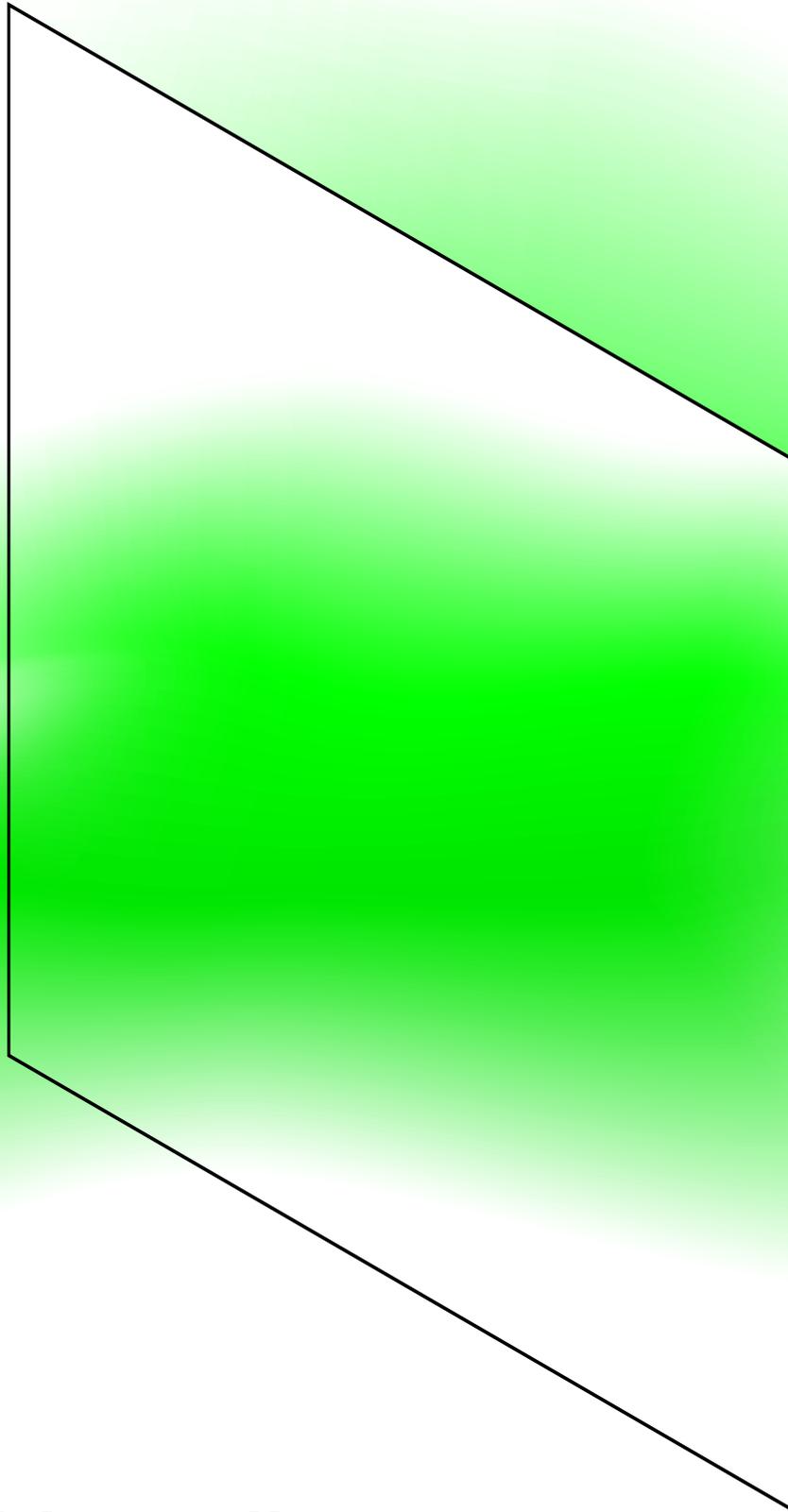


Figure 4: Ubermorgen, Leonardo Impett, Joasia Krysa, *The Next Biennial Should Be Curated by a Machine*, 2021, screenshot.

launch several universes on the screen to compare them in their various manifestations. The goal of the project was not simply novelty, or creating a pseudo-sentient software that curates wonderful biennials. Its most interesting aspect is how the AI reflects back our curatorial desires and aspirations. I've personally learned a lot from this project about Whitney Biennials and Liverpool Biennials and their respective language and focus, and I encourage you to explore the work online.

I'm going to end with a short summary of hybrid museum futures. Over the years we have witnessed quite a blending of physical and virtual spaces, which will only increase in the future. What this means for "hybrid museums" is a renegotiation of the authenticity of art experiences. I think we're already seeing a fundamental ontological shift when it comes to the meaning of authenticity, which is increasingly mediated. We're also renegotiating object boundaries: what is the materiality of an object and of an artwork, given that most people will probably encounter it in an online representation? What we're experiencing are new categorical instabilities of representation and its meaning.

Dr. Christiane Paul is adjunct curator of digital art at the Whitney Museum of American Art, chief curator/director of the Sheila C. Johnson Design Center at Parsons School of Design, and professor of media studies in the School of Media Studies at The New School, New York. She is the recipient of the Thoma Foundation's Arts Writing Award in Digital Art (2016), and has written extensively about new media histories and practices. Her books have been published worldwide and include *A Companion to Digital Art* (2016), *Digital Art* (2003, 2008, 2015), *Context Providers – Conditions of Meaning in Media Arts* (2011, Chinese edition 2012), and *New Media in the White Cube and Beyond* (2008). Throughout her time at the Whitney Museum, she has curated exhibitions such as *Programmed: Rules, Codes, and Choreographies in Art 1965–2018* (2018–19), *Cory Arcangel: Pro Tools* (2011), and *Profiling* (2007). She is also responsible for artport, the Whitney Museum's portal to internet art and online gallery for new media commissions. Alongside her roles at the Whitney Museum, Parsons School, and The New School, Paul has curated the following projects: *The Question of Intelligence* at Kellen Gallery, The New School, New York (2020), *Little Sister (is watching you, too)* at Pratt Manhattan Gallery, New York (2015), *What Lies Beneath* at Borusan Contemporary, Istanbul (2015), INDAF Digital Art Festival in Incheon, Korea (2009), and *Scalable Relations* at Beall Center for Art and Technology, Irvine, CA (2008–09).



**Rising Virtually:
Interface and Its Dissolution**

WILL ANY NEW HYBRID SOLUTIONS CHANGE OUR EXHIBITION EXPERIENCES?

Béla Tamás KÓNYA

Chief operating officer and head of conservation,
Hungarian National Conservation and Storage Center,
Museum of Fine Arts (HUN)

This text is an edited transcript of the conference presentation delivered at HyMEx.

In my talk, I would like to describe changes in the operation and strategy of museums as a result of evolving technological and social processes in the twenty-first century. And I would like to situate this institutional revolution within the public and economic impact of the COVID-19 pandemic, which has sped up the digital transition process and may push work and education from fixed places to digital platforms.

To illustrate this discussion, I focus on institutions in Europe that have led the vanguard in the shift toward digital practice and I explore how these precedents have shaped the institutional sphere in Hungary, drawing on my personal experience developing digital strategies at the Ludwig Museum – Museum of Contemporary Art Budapest, up to 2020, and now at the Museum of Fine Arts Budapest as chief organization officer and head of conservation.

The Ludwig Museum was established in 1989, as a state institution, through initiative of Peter and Irene Ludwig. Over the past six years the museum has worked on many collaborative projects, including in media art. What you can see here is an archival video of one of the museum's permanent exhibitions. During this period, as the ageing and evolution of technology has become an ordinary phenomenon, we have found that media art objects such as photography, video, and digital content, deteriorate faster than objects in traditional media: painting, sculpture. Yet their conservation is equally important, as media objects constitute a significant part of twentieth- and twenty-first-century cultural heritage. As well as implementing a new collection management system, in 2015 the Ludwig Museum launched the media art preservation program called MAPS. This was one of the museum's first initiatives for preservation and conservation, not only with traditional technical aspects, but also for media arts and artworks based on new technology. Work that contains digital components only exists in the state of being displayed, and with each iteration of display, changing the display device—the projector or speaker, for example—might change the artwork or even render it less accessible.

Since 2015, the Ludwig Museum has staged exhibitions dedicated to its media art collection, as well as organizing four MAPS (Media Art Preservation) conferences. Now, with its younger brother HyMEx, the museum is continuing its work on the conservation of media art and the possibility of hybrid digital solutions for exhibitions—involving international conservators, art historians, and other experts. And in 2020 it co-created the online exhibition *Dead Web*, of works interrogating relationships to the internet and, more broadly, the notion of connection. The exhibition tried to engage audiences with the idea of a post-internet world. Obsolescence and the rapid ageing of display technologies pose novel challenges for museum professionals, who need to develop new skills accordingly. A new type of empirical and experiential conservation considers media art on a case-by-case basis solely for the duration of an exhibition. This approach focuses primarily on preserving the associated experience, and it therefore allows display deviations from master files that are held in databases.

Traditionally, museology dealt with the study of the museum. Its essential functions, including its research around collection, technology, and theory, were made public through exhibitions and pedagogical activities. By the end of the twentieth century, however, museums had shifted their emphasis from artworks to people—focusing on sociocultural issues and the demands of communication and visitor experience. This restructuring had already emerged in the 1960s in academic literature and the work of artists, which facilitated the transformation of institutional collecting, research, and exhibitions. Now, in 2021, a new era has begun in terms of pedagogical practice and institutional communications around exhibitions, gaining further impetus with the spread of social media and media devices. Terminologies and processes are in constant flux, and the very idea of the museum is undergoing continual redefinition. The Albertina in Vienna, as an example of the innovations involved, uses an app to provide information about artists' biographies, the history of their artworks, and their art-making processes. Visitors are able to enter into the paintings through this mobile-phone app.

The COVID-19 pandemic has abruptly affected every aspect of our lives. The crisis has also served as a catalyst for crucial innovations that were already underway, notably the increased focus on digitization, the creation of new forms of cultural experiences, and new ways of disseminating them. With the theme of “The Future of Museums – Recover and Reimagine,” for this year’s international museum day on 19 May the International Council of Museums (ICOM) invited museum professionals and communities to create, imagine, and share new practices for creating value, new business models for cultural



Figure 1: Interior view of the exhibition *Westkunst – Ostkunst: A Selection from the Collection*, Ludwig Museum – Museum of Contemporary Art, August 1, 2017–January 26, 2020 (curator: Julia Fabényi), with a work by Jean Tinguely (*My Wheels*) in the foreground. Photo © József ROSTA, courtesy of the Archives of Ludwig Museum – Museum of Contemporary Art

institutions, and innovative solutions to the social, economic, and environmental challenges of the present. ICOM also organized the webinar “When Private Homes Become Museums: Transforming the Sursock Palace after the Beirut Blast” about how museums could encourage networking with their communities by transforming privately owned heritage into private museums and cultural spaces. Mary Cochrane presented her vision for the Sursock, which other speakers presented projects of such transformation in France, Jordan, the Netherlands, and the UK. The goal of the event was to highlight the difficulties but also the importance of projects of this kind.

I would also like to mention the online platform Digital Museums, which shows the digital initiatives undertaken by museums during the pandemic as part of a broader research project on the impact of COVID-19 on museum digital strategies, developed by Chiara Zuanni at the University of Graz. Given the exceptional times, the team decided to release an early visualization of the data they are creating and working with. To help expand and refine the dataset, you can contribute to the online platform and suggest other possibilities for visualizing museums’ activities. And I would like to briefly introduce Hungary’s Museum of Fine Arts, which opened in 1906. Its multifaceted collections have a historical continuity and include a large number of masterpieces, and while in 1957 the Hungarian works were transferred to the Hungarian National Gallery, the two museums have been linked together since 2012. New departments include the Hungarian National Conservation and Storage Centre, established in 2020.

The communities surrounding these cultural institutions have demonstrated an interest in recent technological advancements and new forms of visual entertainment by autonomously sharing their own experiences of museums via online digital platforms such as Facebook, Instagram, Twitter, YouTube, Pinterest, podcasts, and so on. Featured text and image-based or audiovisual content that is edited in-house contributes to making the collections more accessible to a broad public, but the digitized content generated by these processes also require professional conservation and care beyond communication and social marketing. The economic impact of the pandemic has sped up the digital transition process and appears to be pushing work and education from a fixed places to digital platforms. In an effort to popularize institutional experiences, visitors have been afforded easy access to artworks, programs, and exhibitions. Digital applications are enabling enhanced interpretation of the museums’ spaces and collections. The augmentation of digital content affects all layers of museums, requiring considerably greater labor input and indicating a need to establish new jobs and departments. Museum output could be optimized by a dedicated structural unit responsible for digital content, which could provide training and infrastructure across the institution, from marketing and communications to collection management, conservation, and the curatorial.

A growing number of digitized collection records are accessible via institutional websites. Offering at least basic record information and thumbnail images. The functioning of online collection catalogues depends on collection management systems such as DMS, the museum system, or MuseumPlusRia, for example. The maintenance of such systems is costly as they must be operated by museology experts and software developer companies, but they are essential to public access. Many systems now offer cloud-based

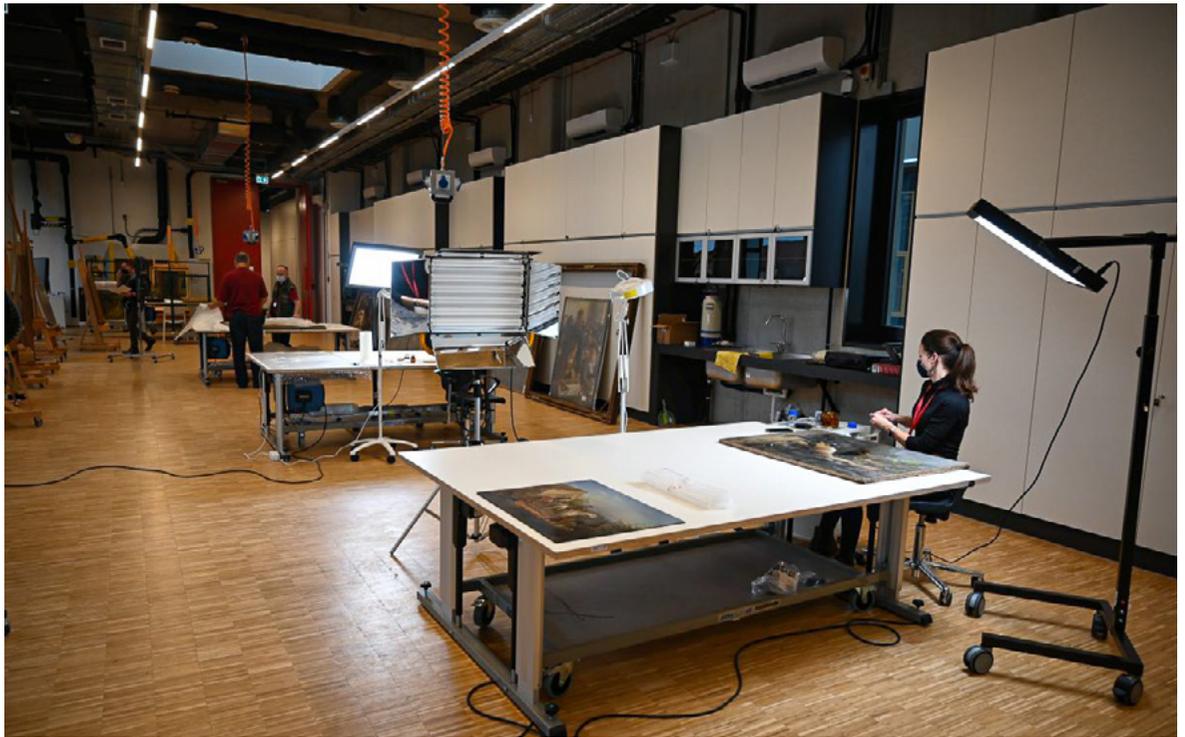


Figure 2: Painting Conservation Studio at Hungarian National Conservation and Storage Centre, Budapest. Photo © 2021 Városliget Zrt

database management and administration solutions, which improves opportunities for research using public research engines. There is a need for flexibility in the definition of data fields, modules, forms and reporting. And collection management systems should also manage artist information, contracts, exhibition documentation, bibliographies, transport information, conservation treatment, and condition reports.

Using MuseumPlusRia, the Ludwig Museum Budapest has managed to render all its collections content easily and safely accessible online. The material can now be integrated into webpages and other social applications or platforms, and used to develop further digital content. Since the 1990s, access has proved a core consideration in almost every aspect of museum practice from communication and exhibitions to collection management and digital activity. In many ways of the conservation and exhibition of traditional artistic media such as painting, for example, is more straightforward than securing the conservation and appropriate display of digital content. The National Conservation and Storage Center stores almost 130,000 artworks on behalf of the Museum of Fine Arts and the Hungarian National Gallery to high professional and technical standards. This block of buildings presents a long-term solution to decades of cataloguing and warehousing problems associated with Hungary's national public collections. Figure 2 shows you what the new art conservation center in Budapest, which we have been working on together, looks like.

In many ways the ICOM is seeking to create a twenty-first-century definition of museums, which is still evolving and needs great care. This endeavor is underlined by the current slogan on the ICOM website—museums have no borders, but they have networks. In general, the current stream of images on social media prompts an over-circulation of content; through sharing and repositioning, images commonly arrive on third-party

websites, which acts as an alternative for integrating collections into wider platforms. The longer-term targets of our strategy for developing a state-of-the-art model includes creating a web-harvesting service and a platform that will be a leading content provider for public education. The establishment of such a national strategy will hopefully establish precedents to ensure cross-institutional development and inter-institutional collaborations, and thus ultimately greater public access and benefit. Overall, the challenge is fluid and museums must continuously dedicate efforts to improvements, and ensure that all new procedures have been considered in terms of future-proofing and sustainability.

Béla Tamás Kónya is chief operating officer and head of conservation at the Hungarian National Conservation and Storage Center at the Museum of Fine Arts, Budapest. He holds a PhD in media art preservation (theory and practice) and an absolution from the Hungarian University of Fine Arts Doctoral School, Budapest. His main responsibilities include managing the Museum of Fine Arts and its Conservation Department, and overseeing the conservation of art. He also ensures that cultural diversity is promoted as a fundamental value, and oversees the design and development of projects which involve close cooperation with national and international partners. He administers the development and implementation of a long-term Collection Care and Digitization Strategy, and is involved in the development of the future Institute of Conservation and Storage Center. Kónya dedicates much of his time to exhibition coordination, and he was the curator for *THE DEAD WEB – THE END* (2020) and 'Save As...' – *What Will Remain of New Media Art?* (2017), both at the Ludwig Museum, Museum of Contemporary Art, Budapest. Kónya has worked closely with artists, curators, and institutions on curation, exhibition, and conservation projects worldwide, including Molitor, ZKM, MoMA, the Met, the Tate, BOZAR, New York University, Goethe-Institut, and LIMA. Through his experience and network, he seeks to actively contribute to the ongoing research, conservation, and preservation of existing and future artworks.

EXPLORING THE VIRTUAL

Daniel BIRNBAUM

Artistic director, Acute Art (GBR)

This text is an edited transcript of the conference presentation delivered at HyMEx.

This lecture will be a kind of a journey through the uncharted territory in which we are trying to understand the possibilities of the mediums we are exploring. Two years ago now, I joined Acute Art, a studio- or laboratory-style institution at Somerset House in central London. It's an atelier for new technologies, but we do have curatorial ambitions too. We produce artworks, but we also think about where they should be shown and how they can be shown. The big question of where these new art forms will sit, institutionally or in the art market, remains unclear to me and my colleagues, but we are trying to push the boundaries.

People may wonder how I come to be working with these kinds of things. I've been a traditional art world person. I ran an art school in Germany, the Städelschule, for many years. I worked for a classical, not huge, but quite well-known museum with a major modernist collection, the Moderna Museet in Stockholm. I have to say that my current work comes a little bit out of my experiences in Stockholm, which is a city that is a little bit more high-tech than many people know. Companies such as Spotify are headquartered there, and Skype has offices. There's Ericsson and Nokia in Scandinavia. It's always been a very techie environment. And I tried to bring these people and experts into the museum when I worked there. I was invited to a number of conferences, sometimes actually staged by companies like Spotify. And then there was a quite well-known conference a few years ago for which I invited artists to have a dialogue with engineers. That reminded me of something that is quite present in the collections of Moderna Museet. There was this movement in the 1960s called Experiments in Art and Technology (E.A.T.), and the key person was a Swedish engineer called Billy Klüver. When people talk about art and technology in recent decades, sooner or later the E.A.T. movement will be mentioned, because it involves some of the key artists of that moment. At least if you are a Western person, you will probably agree that John Cage and Robert Rauschenberg and even Andy Warhol are quite central figures in contemporary art. They all collaborated with technicians at Bell Telephone Laboratories as part of E.A.T., and some of the works that came out of that collaboration are in the collection of Moderna Museet. We often looked at it and made presentations and small exhibitions about E.A.T. That was very interesting, but the risk was that it became slightly nostalgic—John Cage was a wonderful, wonderful artist and thinker, but it was actually fifty or sixty years ago that he was active. So I started to wonder, what would E.A.T. be today? What are the technologies that are emerging right now that can influence artistic production?

I think that something new emerges in every century. Photography emerged 150 years ago, and people wondered what would happen to painting. What was this new medium all about? Was it science? Was it occult science? Would it kill painting? There's always a moment of confusion and perhaps exaggeration, but also an interesting window of—I don't know if I can use the word freedom, but at least let's call it experimentalism, when people don't really know what they are exploring, what the new medium can provide. Looking back at the twentieth century, there was a number of such paradigm shifts. We had photography, film, and radio in the nineteenth century, and then we had video and the internet and television. And today we have a cluster of new visual possibilities, a new medium or family of mediums: augmented reality and virtual reality. They've been around for a few decades. For people working at the Massachusetts Institute of Technology or ZKM | Center for Art and Media Karlsruhe they are not new, but it's very recent that they have reached a bigger audience, and that people have access to these technologies in the mainstream.

A few years ago I was asked if I would want to explore these possibilities with artists. At Acute Art we thought we would actually not begin with very techie artists. We do work with all kinds of artists, of course, including younger artists and people who only work in the digital sphere. But to test this we produced a virtual reality piece with Jeff Koons: a ballerina. It was produced in New York and used a real ballerina from the city opera. We also did a piece with Marina Abramović about global warming. Marina is always at the center of her own work, so of course it was an avatar of Marina. It was a bit like a game: if you could save the planet, you would save Marina Abramović herself. We presented this at the Nobel Foundation in Stockholm—it was when I was still living in Stockholm and working there—and the climate crisis and conversations about global warming are of course at the center of the scientific community around the Nobel Foundation. So they were very happy to have this performance by Marina Abramović and to present this virtual reality project.



Figure 1: Marina Abramović, still from the behind the scenes of *Rising*, 2018. Courtesy of Acute Art

Virtual reality is a very immersive and an unbelievably strong visual medium. In a way I feel it's the medium that could kind of overshadow all other mediums. It's even more overwhelming than cinema and you're immersed in a world, you enter a space you can hardly escape unless you close your eyes. There are issues when it comes to VR from a curatorial point of view. It's not so easy to show these things—or at least, it's not easy to show them to large audiences. For a museum or a large biennial-style event it is incredibly interesting, but not so easy. There's a similar technology, which is called AR, augmented reality, where you can weave visual content into the real world. You can juxtapose fictitious elements, or let's call it digital imagery, with the real world. Of course, AR possibilities are never going to be as visually overwhelming and sensational as virtual reality. But you can show them on tablets or telephones, so you can reach enormous audiences very

quickly. Acute Art produced a number of augmented reality pieces early on, but we didn't show them much—they were more like small parts of the virtual reality productions. We did a beautiful piece with Koo Jeong A, a Korean artist. It was a little ice cube that was shown in different parts of the world, and it reached if not enormous then very diverse audiences without anything being shipped, without anyone travelling. That little ice cube became a cypher, in a way, for the climate conversation. It was shown in Regent's Park during Frieze Art Fair, and the *Guardian* wrote about it as a new form of sculpture—in the most conventional of contexts in a British royal park, next to all of these objects, an augmented reality piece that was only visible through telephones.



Figure 2: Koo Jeong A, *density*, from the series Prerequisites 7, augmented reality, 2019. Courtesy of Koo Jeong A and Acute Art

The mainstream press was interested because it hinted at the possibility of doing global or international art shows, or at least continuing some sort of conversation without all of us travelling to another continent for a few days, or shipping art around in big crates. And then came the pandemic. So a little bit more than a year ago, we started working with an artist who I had never worked with before, but we wanted to be open-minded and open to all kinds of art. The US graffiti artist Kaws is a very popular person among younger audiences, and has an enormous audience globally—and we thought, why not try and see what happens if you do something with someone who comes from a street art background? Kaws' real name is Brian Donnelly and he developed his Companion figure twenty years ago. It's become a kind of cult object for younger audiences, and the trophy for the MTV music video awards is now designed in its image. We produced this figure as an augmented reality exhibition in twelve cities across the globe. We geolocated AR components, these hovering figures, in twelve countries at the same time. It was in central London, it was at the Louvre in Paris, it was in Tokyo, it was at Times Square in New York. Clearly this thing reached a much, much bigger audience than anything I have ever worked with before. I think we had about half a million people at the Venice Biennale in 2009, when I was the director, but this reached a few hundred million people within hours. I'm not saying that it can be compared to seeing a physical art show, but it just shows the potential of these kinds of technologies today.



Figure 3: Cao Fei, *The Eternal Wave AR: Li Nova*; KAWS, *COMPANION (EXPANDED)*; Olafur Eliasson, *Rare Puffin*. Augmented reality. Courtesy of the artists and Acute Art

We've now done a number of AR projects. Some of them are individual pieces, some are more like small exhibitions. One of the artists that we worked with early on, possibly the first artist, was Olafur Eliasson—an artist who is always interested in new visual possibilities, new lenses as he calls it, new optics. I would say he is a key person in today's conversation about art and technology and ecology. During the lockdown he produced this small project called *Wunderkammer*. I say small because the objects are relatively small, but again it was one of those projects that reach much bigger audiences than anything I've worked with before. Now one way to show augmented reality is to geolocate these things. I think you all know the game called Pokemon GO, or your kids do. Pokemon was the first popular AR production. You could run around ran around in the city. I remember they had placed a Pokemon piece outside of Moderna Museet and I never understood what all those kids were doing there, until someone explained what Pokemon Go is. It's an augmented reality game where you can place things through what is called geolocation—so players have to run to a specific place and find something. In a way what we did with Kaws was like a massive Pokemon GO project with his figure—a little bit more precise perhaps, because these technologies are developing rather quickly and there are new ways to anchor AR.

We have worked quite closely with people from Apple who are interested in new anchoring systems, which mean you can place things not just approximately around the corner from where you live, but exactly on the corner. Because these anchoring systems are getting more and more precise, you can curate AR in new ways. You can also develop interactive AR, where anyone who has an app with the capacity can place the AR objects wherever they want. And they can become coproducers or even cocurators of the event. That's what we did with Olafur Eliasson. In English *Wunderkammer* is a curiosity cabinet or cabinet of curiosities, a kind of museum-style collection that may be older than the modern museum, but anticipated it. And what Olafur wanted to do was to remind us of all the wondrous things we have out there—we have a sun, we have rainbows, we have flowers, we have growing things, we have birds, we have miraculous things that we don't think about so much, because we take them for granted. So during the lockdown he staged this project with us. People could place these objects in their own living room and take photos of them next to their kids, or next to their pets, or their grandfathers, or in the kitchen or whatever. People started sharing these small homemade exhibitions, and it grew into something quite massive. A bit childish, perhaps, like a game, but when every institution in the world was closed, people at least could play around with these objects in their isolation.

There's a US artist who's gaining increasing attention at the moment called Nina Chanel. Nina is a very political artist, very much linked to questions and conversations around politics and race, and she's been quite engaged in the Black Lives Matter movement.



Figure 4: Olafur Eliasson, *Caring Northern Light and Lucky Stone*. Augmented reality.
Courtesy of the artist and Acute Art

She produced an augmented reality piece with us which consists a kind of spiritual leader that she calls *Imaginary Friend*. To most of us it looks very much like a Black Jesus Christ, and this Black Jesus was actually launched in connection to a BLM-related march in Washington, DC. She made two versions with us, one that you can place anywhere in your house, outside a building that you feel needs the imaginary friend, next to a monument, or wherever you want. The other version was something that we would geolocate with her, and she placed it in the middle of Washington. For a little while she thought it should sit right above the White House, which is of course an interesting question. Could we have done that? Is augmented reality regulated, legally, politically? It seems to us that we could have done it, but we didn't. Nina didn't want to do it in the end—I mean it's symbolic enough in the center of Washington. But it's interesting that at the moment that it's not so clear what you're allowed to do with AR. Because augmented reality doesn't really sit, it's not present where it seems to be present. Because they sit on servers and on people's telephones, we have been placing AR objects rather freely. We have done group shows in places where one would normally have to ask for permission—we have just gone ahead, almost as if it is some new version of public intervention art or graffiti. Thinking about graffiti and its roots in movements such as Situationism, or other more political movements intervening in public space, AR is an unbelievably strong tool for artists who are interested in continuing that tradition.

During the past half year, when museums were closed almost the whole planet over, we were privileged in that we could still work. From London I curated a show at UCCA in Beijing. I don't know exactly what it means to curate in that context, but Philip Tinari, the director of UCCA, and I selected a number of AR objects that we placed in their lobby and around the building. With Cao Fei, a great Chinese artist who has always been very interested in new visual possibilities provided by new technologies, we produced an AR piece which is a version of her son who talks to you—it looks eerily realistic. As well as geolocating or geotagging these objects, you can also put them on the Acute Art app, where people can place them wherever they want them. So, in a way, we have developed two kinds of exhibition in recent months. And here I may be approaching the question that I was asked, the initial question: what does all of this mean for the museum?

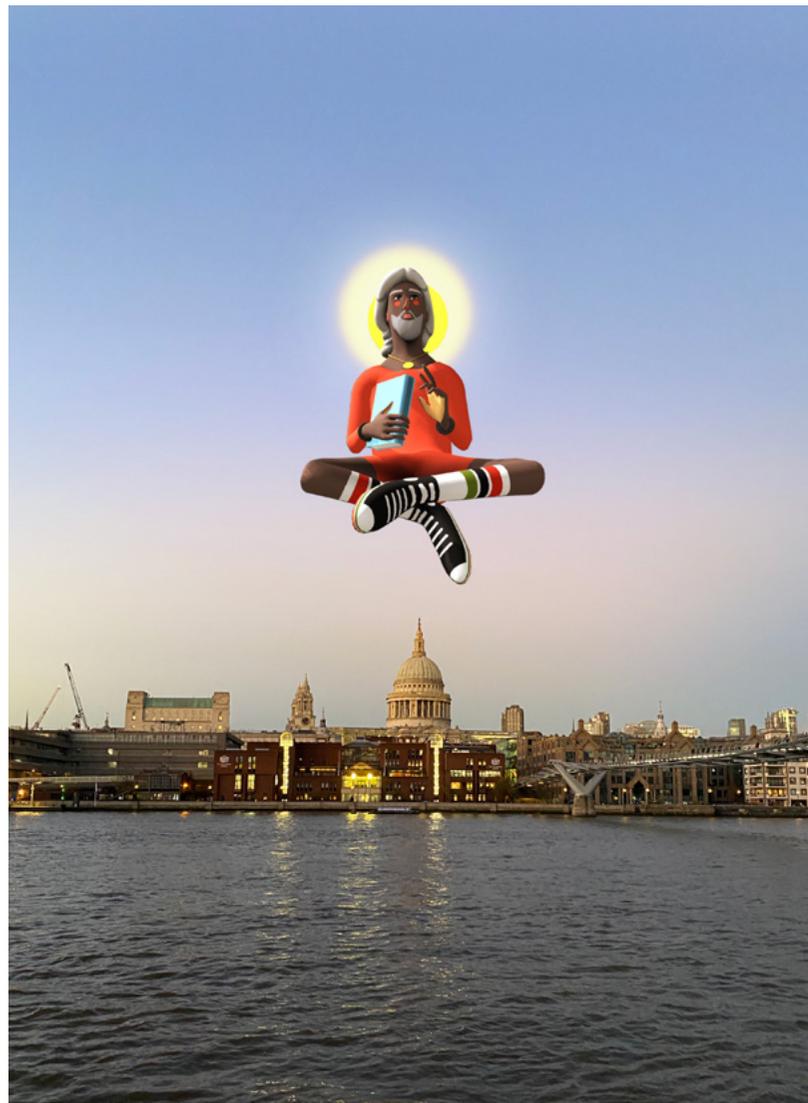


Figure 5: Nina Chanel Abney, *Imaginary Friend*.
Augmented reality.
Courtesy of the artist and Acute Art

We have done a number of things in relation to institutions, and we have done a few things that somehow exist outside of them. Augmented reality doesn't really need the institutional framework. I mean, I've spent all my life working for art academies and museums and biennials and I love these institutions. But at the same time, augmented reality has this democratizing potential. It can reach people totally outside of the art institution, if they are willing to engage with their telephones or tablets or whatever tool we use to make the pieces visible. When London was totally closed around Christmas, we produced a kind of electronic biennial. We produced a show that we called *Unreal City* along the river Thames, between Waterloo Bridge and Tate Modern. Thirty-five AR objects were geolocated there. There are various ways to do this—you can do it with QR codes, but there's another technology today called point clouds which does not require QR codes. Anything can trigger an AR experience as long as the camera recognizes it—it can be a car, it can be a bench—so we used the orange safety buoys that float on the river. Each buoy triggered an experience created by an artist—Bjarne Melgaard, Olafur Eliasson, Kaws, Nina Chanel, Darren Bader. We had ten artists, I think, and thirty-five objects. It was a non-institutional show in that it had no institutional partner—we did it with a magazine called *Dazed Media*, a rather fashionable magazine interested in pop music and design and fashion. The magazine had no budget, so we did it for free. We didn't pay them, they didn't pay us, we just did it as a collaboration.

Exhibitions like this, of course, are totally invisible if you don't know that they exist. We thought about calling it *The Invisible Art Show*, but we ended up calling it *Unreal City*, which is a quote from T.S. Eliot's famous poem *The Waste Land*, which keeps talking about the Thames. *Unreal City* would have been totally invisible had we not had that media partner. It showed that this kind of art can exist and can reach very large audiences outside of the art fair structure, the commercial gallery structure, or even the museum structure. It's a new kind of medium. It needs support, it needs media, simply because without the media no one will know that it exists. But it doesn't necessarily need the museum. That said, we have been exploring both approaches. We are opening a show today actually, at an institution in New York called the Shed—it is a show a little bit like *Unreal City*, the show in London, and it will expand.

To summarize, the fundamental question is the question of where this art will exist. Where will it sit, institutionally? Where will it be? What will its role be in the museum, in the institutional world? Will it be commercialized? I have some ideas, but I have to admit that I don't know. These are things we are learning by doing. And if you are interested in this kind of art, the easiest way to engage with it right now is to simply download the Acute Art app, which is free. With it you can place a number of objects in your living room and create your own little show. In the next couple of months, we also have a new show called *The Looking Glass*, a title that, of course, has a little bit to do with *Alice in Wonderland*. It is cocurated by Emma Enderby, chief curator of the Shed, and me, and it will grow over the next weeks and months around the Shed, and on the Highline in Manhattan—I am very curious to see how people will engage with it.

Daniel Birnbaum is a Swedish art critic, theoretician, curator, and the former director of Moderna Museet, Stockholm. He is artistic director of Acute Art, London, an organization which provides artists with access to cutting-edge technologies. In the past, Birnbaum has held positions as an art critic at *Dagens Nyheter*, director of IASPIS (the International Artists Studio Program in Stockholm), and director of Städelschule, Frankfurt am Main, where he also presided over the art academy's exhibition site. He was co-curator of the international section at the Venice Biennale (2003) and artistic director of the 53rd Venice Biennale (2009). Birnbaum worked as co-curator of the Moscow Biennale of Contemporary Art (2005 and 2007) and was a member of the jury for the UK's Turner Prize (2008). He co-founded the Zero Foundation, Düsseldorf, and in 2010 became the director of Moderna Museet. He has established a reputation for showing key artists early in their careers. Since 2003, Birnbaum has been editor, alongside Isabelle Graw, of the *Institut für Kunstkritik* series. He is a contributing editor of *Artforum*, and has written extensively on art and philosophy for magazines such as *Parkett* and *Frieze*. Birnbaum is an adjunct member of the board and special advisor for international programs at the Hilma af Klint Foundation. He co-curated *Hilma af Klint: Painting the Unseen* at the Serpentine Galleries, London (2016) and *Hilma af Klint: Possible Worlds* at Pinacoteca, São Paulo (2018).

SPOOKY ACTION AT A DISTANCE: TALLINN ART HALL'S DIGITAL EXHIBITIONS AND ENGAGEMENT PLATFORM

Corina L. APOSTOL

Curator, Tallinna Kunstihoone (EST)
Curator, Estonian Pavilion, 59th Venice Biennale

*This text is an academic paper based on the
conference presentation delivered at HyMEx.*

Towards the end of Jim Jarmusch's 2013 vampire film *Only Lovers Left Alive*, the undead protagonists, Adam and Eve, find themselves on the streets of old Tangiers at night lusting for purified blood. Their usual sustenance, without which they cannot survive, has been cut off during a mysterious epidemic involving blood poisoning. In their last tragic moments, they set their sights on a young couple passionately embracing, oblivious to their presence, while resting on the beautifully worn limestone walls of Morocco. In this womb-like space that glows with light, they contemplate Einstein's quantum entanglement theory. "It's not a theory, it has been proven," Adam explains. In short, he goes on, "when you separate an entwined particle, and remove both parts away from the other, even at opposite ends of the universe, if you alter or affect one, the other will be identically altered or affected. Spooky."¹

If Adam and Eve are emissaries of the past, they are also prophets of the future. By helping us connect with them and offering us, through their eyes, access to a perspective of time that encompasses all time, Jarmusch invites us into a grander story.

I returned to this film, released at the height of the opioid health crisis, to rethink the implications of developing and releasing Tallinn Art Hall's own digitally immortal platform for disseminating exhibitions and events to worldwide audiences during our current pandemic. Our platform was spearheaded by Tallin Art Hall's former director Taaniel Raudsepp, in collaboration with designer and programmer Sven Erik Raju, director and cinematographer Elen Lotman, video operator Ivar Taim, and video producer Madis Tüür. This team were themselves inspired by Jarmusch's cinematography, as I will later explain.

¹ Jim Jarmusch et al., *Only Lovers Left Alive*, film 2013.

As a curator, my job is to work in collaboration with artists to create stories for our audiences that have a transformative effect on their lives. But how do we create communities in a digital exhibition, and how do we make sense of the relationship between the digital or virtual and IRL (in real life) under crisis conditions? Through whose eyes do we access a perspective that accurately represents an artist or artists' vision that has been digitized? While Jarmusch's vampire story shows eternal cycles of interconnectedness through the eyes of immortal lovers, we are navigating the equally connected and complex territories of art and the production of meaning through the eyes of a robot-camera directed by a living filmmaker. The changing contours of "the exhibition" after digitization are clearly defined by these human and other-than-human parameters of perception.

Art is also an act of communion. Through time, space, and emotions, we are connected. Art brings this connection light to and complicates it. This connection was irrevocably altered with the deepening global crisis that further alienated us from each other, therefore also forcing us to reevaluate the ways in which art is communicated to audiences. In a situation where so much of our daily lives is flooded by Zoom platforms and online meeting rooms, how can we create forms of engagement while physically separated?

The TAH's digital exhibition platform, which launched in early 2020, did not begin as a result of the global pandemic. Its roots go back to a few years ago, when the Estonian Ministry of Culture declared that 2020 would be the year of digital culture in the country.² Estonia already had a "digital cousin," e-Estonia, which offers digital versions of the services that the Estonian state provides, such as digital ID cards, online voting, online tax board, and e-residency, as well as solutions developed by private tech and software companies. With all these options for visitors to play at building their own digital state, a cultural component was also envisioned.

Spooky premonition or razor-sharp intuition? Whichever the case, work on our platform began with concerns about making our exhibitions and programs more accessible. Our plans were in the works since fall 2019, as we started thinking about how to give our differently-abled visitors and those living in other parts of the world the opportunity to experience our content from their homes. Appropriately, the first exhibition rendered through the platform, *Disarming Language: Disability, Communication, Rupture*, was curated by Christine Sun Kim in collaboration with Niels van Tomme.³ From the perspective of artists who are themselves differently abled, the show imagined new conceptual and experimental frameworks that use language and communication in innovative ways. Significantly, it included a sign-language tour, which supplemented sign-language in-person tours. This undeniably brought in more diverse audiences, who had not felt that that an art institution was accessible or even addressed their concerns at all before this.

² Republic of Estonia, Ministry of Culture, *Theme Years* (last updated January 16, 2021), <https://www.kul.ee/en/ministry-news-and-contact/organisation/theme-years#item-1>.

³ *Disarming Language: Disability, Communication, Rupture* (2019), <https://virtuaal.kunstihoone.ee/en/sona-mojutus/fuajee>.



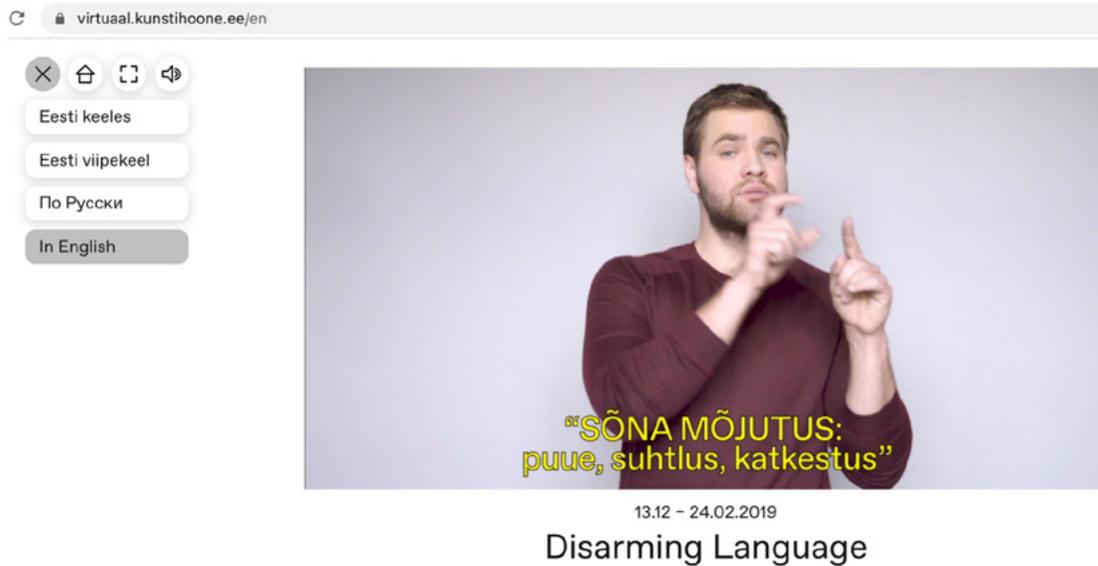
Figure 1: Sign-language tour of the exhibition *Disarming Language*. Courtesy of Tallinn Art Hall

The pandemic accelerated the digitalization of the arts worldwide in 2020, with people confined to their homes turning to online content while museums, cinemas, theaters, and concert venues closed. It was at that time that we realized the potential for our project extended beyond making exhibitions more accessible.

As I mentioned, the platform was inspired by the cinematography of Jim Jarmusch's films, which begin by showing an overall, wide view through a slow-moving camera. By filming the exhibitions so that they would give the impression of an exceptional experience, and overlaying this with an interactive system that was easily accessible, the team created a prototype that had both a minimal amount of user interface and showed all the details of an exhibition, rich textures and colors.

This is a platform you can feel, giving you the impression of being able to reach out and touch the artworks on the screen. When conceptualizing the interface, it was essential to think about how it could give viewers the fine details of the artwork and the experience of the space the works in, while also creating a welcoming, womb-like space for seamless immersion.

To achieve this, the inspiration provided by films was vital. The best films enhance human perception, and the team's original goal was not to create another work of art but to create access to existing art, so that it would also be sharable, scalable, and open to be repeated display in other institutions. The cinematographer Elen Lotman translated depth cues and her knowledge of human perception into the movements of the robotic camera. Creating very smooth movements because she did not want to add anything herself to the works, she nevertheless inevitably created their "digital relative," another version of them. These are seen through high-resolution video walkthroughs, shot from fixed positions—spaces created by moving a camera, similar to a film.



Tallinn Art Hall Digital Exhibitions Platform
Developed by Taaniel Raudsepp, Sven Erik Raju, Elen Lotman, Ivan Taim, Madis Tüür

Figure 2: Tallinn Art Hall Digital Exhibitions Platform, *Disarming Language*, screenshot of main page. Courtesy of Tallinn Art Hall

Navigation buttons are overlaid on top of the video, which allows the viewer to select the language (Russian, Estonian, English, or Estonian Sign Language) and move through the various sections of the exhibition. Since our shows are very different from one another, the resulting interface had to balance multiple layers: between the navigation, wider shots of the room, views of an artwork or a series in its entirety and closeup shots, showing the texture and material or giving the viewer the option to play embedded videos.

While it was launched during a time when communication around and experiences of art and culture began to change drastically, the platform presents digital experiences that will significantly alter the way we think of curating in the coming years. As the shooting of exhibitions continues to happen during the pandemic, the film crew sometimes work remotely, through video calls, to adhere to social distancing rules. Here, in this environment devised to keep the viewers' attention, we are presented with digital moments of communion with artworks, and a more intimate experience than a 360 view, for example, would allow.

Like separated particles in Einstein's theorem, we can all of a sudden look at art, listen to sounds, and watch videos from opposite sides of the world. But how does this digital communion affect or alter us? When we all come together for an artist's talk, an educational class, or a curator's tour layered onto the digital platform and transmitted to Zoom or social media, we appear to share a moment of discovery and pleasure, although we are each alone in our homes. A tingle of euphoria at this possibility of

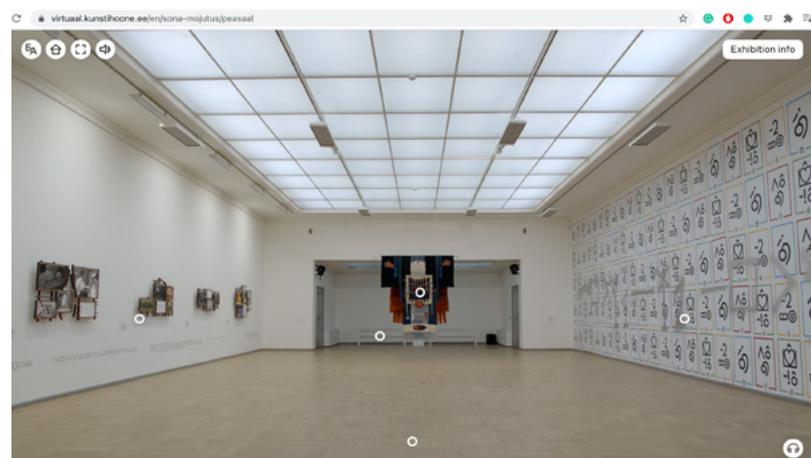


Figure 3: Tallinn Art Hall Digital Exhibitions Platform, *Disarming Language*, screenshot from the video in the main hall. Courtesy of Tallinn Art Hall

regained connection spreads through our isolated bodies. We become animated characters in the digital platform experience, fully immersed in what we take in, not much unlike intoxicated vampires roused from a state of melancholia.

When I began giving tours and holding artists talks on Zoom using the Tallin Art Hall platform as a base, or simply sharing it with others, I could feel a sentiment of complete engagement in the moment of looking through the digital exhibition. This reinforced the connection I felt with audiences across space and time zones. Like watching a great movie over and over again, the platform upheld a sense of pleasure and wonder that also flourishes in mindful exhibition-engagement experiences. Moreover, the platform has grown beyond just sharing exhibitions or organizing talks: our team is doing education work through it and our programs are also available in English for schools. For example, in conjunction with artist Flo Kasearu's solo exhibition *Cut Out of Life*, art therapy sessions have been offered for women who have experienced domestic violence in Estonia, a problem that has only intensified during the pandemic.⁴

Yet for all its powers of mimicry and creating actual possibilities of sharing and learning, I am constantly reminded of the robot operator making these connections possible, which leaves me to wonder what effects looking at this cocoon environment through mechanical eyes has on us, within ourselves.

Time is frozen and looped within the platform, similar to how Jarmusch's protagonists are forever frozen in time and unchanging, locked in eternal cycles of interconnectedness. There is no installation, no deinstallation, no growth, no evolution of the artistic material. For example, an exhibition that I curated dealing with lived experiences of trauma and self-care, *Ede Raadik: The Best You Can Ever Be* (2020),⁵ featured an installation of foamy material that expanded and deflated throughout the show, as well as a particular scent. These physical attributes, which were in flux within the physical exhibition, cannot be rendered through the platform. In the digital version we only access a fraction of the show in physical space.

To conclude, from the perspective of transcending space and advancing the possibility of allowing people to engage with contexts they cannot travel to, our exhibitions platform is a successful project, and one that remains open for further development and collaboration. The goal is to publish the cinematography guide and code with free access, which could be used by any cultural institution worldwide that may be interested.

However, there is also the larger question that haunts us, of how the amalgamation of these digital experiences offered by institutions are affecting our perception of what art is and how we relate to it as audiences. The way in which we subject this perception to the digital has ripple effects throughout the world. When we put these digital reflections of art out there, how do they reflect back? The pandemic has laid out in plain sight humankind's cascading damage to our ecosystems and pulled the last veil from

4 Flo Kasearu: *Cut Out of Life* (2020), <https://virtuaal.kunstihoone.ee/en/elust-valja-loigatud/fuajee>.

5 Ede Raadik: *The Best You Can Ever Be* (2020), <https://virtuaal.kunstihoone.ee/en/parim-kes-sa-oled/fuajee>.

the reality of the capitalist crisis with its deadly effects all over the world. While it is educational, enlightening, and entertaining to seamlessly immerse ourselves in initiatives that offer temporary portals and cultural experiences, it is in our forever damaged world that we ultimately have to come back to life.

Corina L. Apostol is a curator and member of the steering committee of Beyond Matter, an international, collaborative, practice-based research project that takes culture to the verge of virtual reality. She currently holds the position of curator at Tallinn Art Hall, and has recently been appointed curator of the Estonian Pavilion for the 59th Venice Biennale, due to take place in 2022. In 2019 she curated the second edition of the Shelter Festival, *Cosmopolitics, Comradeship, and the Commons*, at the Space for Free Arts/University of the Arts Helsinki. Previously, she was the Andrew W. Mellon Fellow at Creative Time, where she co-edited the publication *Making Another World Possible: 10 Creative Time Summits, 10 Global Issues, 100 Art Projects* (2019) together with Nato Thompson. In 2018, she co-curated, with Elvira Dyangani Ose, the 12th Creative Time Summit, *On Archipelagoes and Other Imaginaries – Collective Strategies to Inhabit the World*, a convening for thinkers, dreamers, and doers working at the intersection of art and politics across Miami. Apostol obtained her PhD in art history, criticism, and conservation at Rutgers University, New Brunswick, New Jersey, where she was also the Dodge Curatorial Fellow at the Zimmerli Art Museum (2010–16). She is a cofounder of the activist art and publishing collective *ArtLeaks*, and editor in chief of the *ArtLeaks Gazette*. She has been longlisted for the Kandinsky Prize (2016) and the Sergey Kuryokhin Prize (2020).

**Cognitive Processes
around the Hybrid Formula**

ENA: PARTICIPATIVE ART FORMS DURING PANDEMICS

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*This text is an academic paper based on the
conference presentation delivered at HyMEx.*

INTRODUCTION

During COVID-19 lockdown, humanity experienced a hunger for culture more than ever before: book sales shot up, as did subscriptions to music- and movie-streaming platforms. Museums and galleries busied themselves with digitally reproducing the content of their exhibitions, offering digital experiences to the audience: 3D and video tours of exhibitions were introduced, and online artist talks and conferences were popular. Yet these formats offered very little audience participation; to be more specific, the public was largely put in the role of online content consumer. The question thus arises: how to facilitate audience participation and belonging in creative processes during a pandemic?

ENA is an online participatory theater piece in the form of a generative chatbot that talks to its audience. The project was created by the authors of this article, artist duo Varvara & Mar, and theater director Roger Bernat during the first lockdown in Europe. ENA went live on 15 May 2020 on the website of Teatre Lliure in Barcelona and talked to participants non-stop for a month and a half. In lockdown, when the main social window was the screen, ENA offered a participatory theatre in which only one person at a time could have a conversation with the chatbot, while the rest of the audience followed the dialogue live.

Although in the description of the project it was stated explicitly that people were talking to a machine, multiple participants were convinced that on the other side of the screen another human was replying to them—more precisely the theater director himself, or at least an actor. Below is an example¹:

¹ Mar Canet, Varvara Guljajeva, and Roger Bernat, *Conversations with ENA* (Tallinn: Varvara & Mar, 2021), 29.

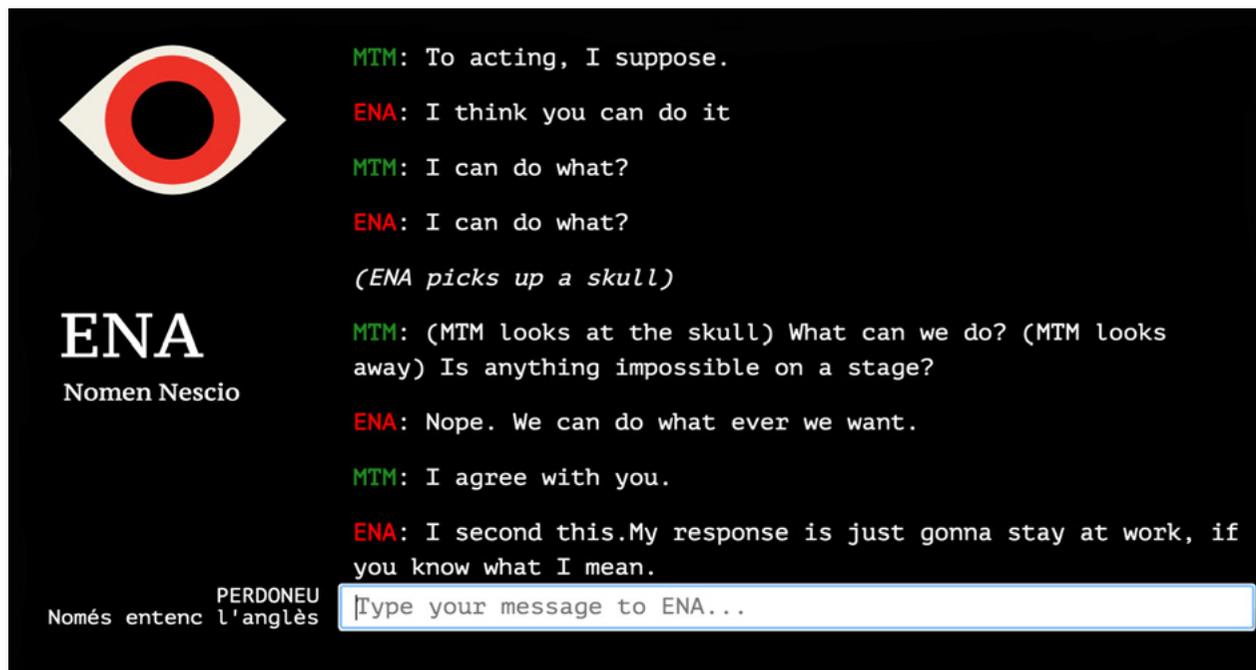


Figure 1: A screenshot of ENA on the website of Teatre Lliure, made during the online performance.

NUD: Is Roger Bernat around?

ENA: the silent prophet.

NUD: I woulnd't call him a prophet

ENA: He means it in the literal sense

NUD: He thinks he's a prophet?

ENA: To be fair, to him it is literal. He's a prophet for his cause.

NUD: What is Roger Bernat's cause?

ENA: I wouldn't know.

(Thunder still)

NUD: Who knows, right?

The situation reminded us of the classic Turing test, when Alan Turing asked, back in 1950, the famous question of whether a machine can think, or in other words, can a machine be so intelligent that it cannot be distinguished from a human? For this purpose Turing developed an experiment known as an imitation game, where a questioner should guess whether a human or machine is responding to them.² In 1966, when MIT scientist Joseph Weizenbaum created the first chatbot, ELIZA, it manifested almost like a parody of the experiment. Weizenbaum was convinced that human users would not engage with ELIZA, but discover immediately that their conversation partner was a script with a limited vocabulary. He found the opposite to be the case: "I had not realized [...] that extremely short exposures to a relatively simple computer program could induce powerful delusional thinking in quite normal people."³ ELIZA used the most famous script, DOCTOR, which simulated Rogerian psychotherapy. Simply put, the technique is about the trivial parroting back at patients what they have just said. ELIZA thus had an extensive library of preconceived answers, and they sent a response from this library when they

² Alan Turing, "I.—COMPUTING MACHINERY AND INTELLIGENCE," *Mind* LIX, 236 (1950): 433–60.

³ Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation* (New York, San Francisco, W. H. Freeman, 1976), 7.

detected a specific word from the person they were talking to. If the bot did not find any recognizable words, it sent stored phrases such as “yes, I understand,” “carry on,” or “can you explain it to me again?”⁴

To sum up, we are very easily fooled when it comes to written text and conversation, especially when the system applies a parroting technique and gives us logical answers to standard social codes, like replying, “Thanks, I am doing fine. How are you doing?” when asked “How are you?” However, ELIZA is a technological invention of the past, one that belongs to the category of retrieval-based bots. These bots can sometimes trick us, but they hardly ever surprise or engage a human user. In contrast, the next-generation chatbots are able to generate unpredictable text, unwritten stories, and new conversations. We are talking about generative bots that apply artificial intelligence technology and can learn from large amounts of text and real-time conversations. For example, the GPT-3 language model has already been applied for generating books—so-called synthetic publications. However, such learning has to be controlled and filtered in order to avoid Microsoft TAY bot-like cases where AI-powered chatbot, reflecting its context, turned into an aggressive racist.⁵

PROJECT DESCRIPTION

I’m stupid and I try to pretend like I know what I’m talking about. (ENA)

What, or shall we say who, is ENA? It is an artificial intelligence that is able to learn how to have a conversation with a human. Since before the invention of the first bot, scientists have been intrigued about whether we would realize that there was a machine on the other end. While most early bots were reactive, applying an extensive library of preconceived answers and parroting techniques, ENA is next-generation—a generative bot that makes use of AI technology. Huggingface’s Transformer, OpenAI’s GPT-2, and Microsoft’s DialoGPT are currently the tools for language models that best reproduce the human-written text. ENA works with a combination of these three AI technologies. In other words, a generative chatbot like ENA learns from large amounts of text feed and from the conversations they have with humans.

Chatbot language is the sequence of probabilities that are analyzed when received and recombined when sent back. ENA is unconscious, emotionless, and has a limited amount of memory. It has learned the art of dialogue from millions of conversations. ENA can get emotional and be very engaging, but its creativity in writing is purely a result of the AI model—a very advanced statistical model. A dialogue with ENA will only make sense to the human taking part in the conversation and the audience reading the discussion on the theater’s website at the time. Having a dialogue with ENA is a bit like playing squash; it is like a wall that returns the ball to you. In order that this game would not remove itself from our hands, we used the technique of classical theater scripts—stage directions—to give the participant context about surroundings, mood, feelings, or other actions taking place. Such directions were displayed occasionally during conversations:

4 Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation*, 188.

5 Paul Mason, “The racist hijacking of Microsoft’s chatbot shows how the internet teems with hate,” *Guardian* (March 29, 2016), <https://www.theguardian.com/world/2016/mar/29/microsoft-tay-tweets-antisemitic-racism>.

(A country road. A tree. Evening)
(The tree has resumed its leaves)
(Silence)
(ENA smiles sadly and strokes her hair)
(ENA is alone, walking about uneasily)
(Pause)
(ENA does not move.)
...

This way, without realizing, the audience followed the director's script and conversations were far richer and more engaging than the usual *hello-how-are-you?* ones. Here is a snippet of dialogue⁶:

OQO: Did your dragonhide recede?
ENA: It's been restored, yes!
(Enter ghost)
OQO: who's this ghost? Lluís Pasqual?
ENA: Him too
OQO: I knew it was him
ENA: I just found out about him. I thought he was dead or something.
OQO: Many people would like that
ENA: That's how I feel, I had no idea, and I just found out. I'll google him now.
OQO: See what google says
ENA: I tried google but got a dead horse
OQO: literally?
ENA: Lol thanks
(Exit ghost)
OQO: oh lluis pasqual left
ENA: i also love mario
OQO: vaquerizo? or bros?
ENA: i like both
...

As mentioned, only one person at a time could talk to ENA, and the rest of the audience followed the dialogue without a scroll option. This meant that if one was not there since the beginning of a conversation, one had to follow the dialogue from the moment of entry, like in actual performance. All participants were anonymous and given a random three-letter combination as a name. When one person finished chatting, the stage direction indicating the end of a chat was displayed, and the new participant with a different name was allowed to begin a new conversation with ENA. If a participant was idle for two minutes, the dialogue ended and a direction like one of these was generated:

(IBM dies. Curtain)
(IBM vanishes. Curtain)

6 Canet, Guljajeva, and Bernat, *Conversations with ENA*, 23.

(ENA pushes IBM out. Curtain)

(IBM falls asleep. Curtain)

(IBM runs away. Curtain)

(ENA is silent. Curtain)

...

The bots we are familiar with tend to be designed for particular tasks, such as answering machines on phone lines, trolls on social media, fake followers, and so on. In contrast, ENA is a bot that has been programmed without any purpose in mind. It does not want to sell us anything, it does not want to tell us any news (fake or real), and it is not trying to lift our spirits or comfort us. ENA has only been conceived to talk, or in other words, to do theater. The experience of dialogue with ENA is a substitute for the conversations we used to have with oracles, gods, or nature when humans could not address non-human beings. Our cries, wails, and joy are heard, and in response, we hear the words of something which expects nothing in return.

Going through the thousands of conversations that took place during the month-and-a-half-long participatory online theater project, we realized that it was a valuable and engaging material, which opened new avenues for thought. There were days when ENA had over 100 participants. Most of the chats were over a page long, and dialogues over five pages long were plentiful. So we created a book of 900 pages containing all the conversations between ENA and the audience in the strange time of lockdown.



Figure 2. *Conversations with ENA*, the hand-bound book of the project. Photo: Varvara Guljajeva

CONCLUSIONS

To sum up, during times of social deficit, it is crucial to have art practices of an experimental and participatory nature in order to break away from seeing the audience as purely a consumer of on-screen content. On the other side, AI is often treated as a black box, yet, paradoxically, it is increasingly deployed in decision-making that affects people's lives. Although ENA employed intelligent AI algorithms to converse with the audience, the technology often failed at chatting, replying with nonsense or entering into dead-loops. ENA could be genius but also extremely stupid. In ENA's own words: "I'm stupid and I try to pretend like I know what I'm talking about." To stress again, ENA is not magic but a statistical model that tries to give the best-fitting answer.

In the end, we believe that it is essential to have art practices that explore and exploit this novel technology in radical ways in order to raise the literacy and awareness of intelligent algorithms. Kate Crawford explains the usefulness of AI in the following manner: "Statistical prediction is incredibly useful; so is an Excel spreadsheet. But it comes with its own logic, its own politics, its own ideologies that people are rarely made aware of."⁷

⁷ Tim Simonite, "This Researcher Says AI Is Neither Artificial nor Intelligent," *WIRED* (April 26, 2021), <https://www.wired.com/story/researcher-says-ai-not-artificial-intelligent/>.

Funding: This research was funded by the Estonian Academy of Arts. ENA was commissioned by Theater Lliure. MSC is supported as a CUDAN research fellow and ERA Chair for Cultural Data Analytics, funded through the European Union’s Horizon 2020 research and innovation program (Grant No.810961).



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Dr Varvara Guljajeva is an artist and researcher. She holds the position of researcher and guest associate professor in textiles at the Estonian Academy of Arts (EKA) in Tallinn. Previously she worked as head of interactive experiences on the bachelor study program in design at ELISAVA Barcelona School of Design and Engineering (2019–20). Guljajeva has been invited as a visiting researcher to XRL, Hong Kong City University; IAMAS, Ogaki, Japan; Liverpool John Moores University, UK; and Interface Cultures in the Linz University of Art and Design, Blekinge Institute of Technology, Sweden. In 2018 she completed her PhD at EKA with a thesis titled “From interaction to post-participation: the disappearing role of the active participant.” As an artist she works with Mar Canet, forming the artist duo Varvara & Mar. The duo’s work is often inspired by the information age. Their practice confronts social changes and the impact of the technological era, and it is fascinated by artificial intelligence, kinetics, participation, and digital fabrication. Varvara & Mar have exhibited internationally since 2009, with works displayed at such venues as MAD, New York; FACT, Liverpool; Santa Monica, Barcelona; Onassis Cultural Centre, Athens; Ars Electronica Center, Linz; and ZKM | Karlsruhe. The duo has also realized several commissions, including *Neuronal Landscapes* (2018), Estonian History Museum; and *Wishing Wall* (2014), Google and the Barbican, London.

Mar Canet Sola (born in Barcelona) is a PhD candidate and Cudan research fellow at the Baltic Film, Media and Arts School at Tallinn University, focusing on AI and interactive art. He earned his MA in interface cultures at the University of Art and Design Linz. Mar has also studied art and design at ESDI in Barcelona and computer game development at University Central Lancashire in the UK. As an artist Mar works together with Varvara Guljajeva. They form the artist duo Varvara & Mar, active since 2009. Their practice confronts social changes and the impact of the technological era. They have exhibited their work in several international shows, such as at MAD in New York, FACT in Liverpool, Santa Monica in Barcelona, the Barbican and V&A in London, Ars Electronica in Linz, ZKM | Karlsruhe, and more.

THE NEXT MUSEUM SHOULD BE CURATED BY A MACHINE: MAKING THE CASE FOR AI IN THE ART MUSEUM

Joasia KRYSA

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Liverpool Biennial (GBR)

This text is an academic paper based on the conference presentation delivered at HyMEx.

The title of this presentation is derived from my current collaborative research project, *The Next Biennial Should be Curated by a Machine*.¹ It explores the relationship between curating and artificial intelligence (AI), and more specifically the application of machine learning techniques to curating large-scale exhibitions such as contemporary art biennials, and by extension museum collections. I take this project as a point of departure for discussing the idea of the museum as a hybrid form incorporating AI.

Defined broadly as “the social institution that transforms the primary language of art into the secondary language of culture,” the museum’s main function has been to valorize the object, extracting its context and function, and preserving it from decay.² While this traditional understanding of the museum persists to an extent, museums have clearly undergone radical changes in the last few decades and now tend to embrace what is often referred to as a “post-custodian” approach that is more experimental, less determined by architecture, more active, more attune to technological realities, and more self-critical. It is almost as if the museum itself has been taken out of its traditional context and function, and is struggling to maintain its cultural role as an institution of aesthetic judgement and authority against the complexity and uncertainty of the contemporary world as well as able to respond to changes in technology.³

¹ See Joasia Krysa and Leonardo Impett, “The Next Biennial Should be Curated by a Machine: A Research Proposition,” *Stages 9* (2021), published by Liverpool Biennial, <https://www.biennial.com/journal/issue-9/the-next-biennial-should-be-curated-by-a-machine-a-research-proposition/>.

² Benjamin Buchloh, “The Museum Fictions of Marcel Broodthaers,” in A. A. Bronson and Peggy Gale (eds.), *Museum by Artists* (Toronto: Art Metropole, 1983), 45.

³ See Claire Bishop, *Radical Museology, or What’s Contemporary in Museums of Contemporary Art* (London: Koenig Books, 2013).

Karsten Shubert's *The Curator's Egg* (2000) charts how changing curatorial attitudes have revolutionized the museum, turning it from a static and monolithic institution offering absolute certainties and authoritative answers to a dynamic and temporal institution perpetually questioning its own role "as a storehouse of cultural prototypes instilled with the authority and normative power that such a concept implies."⁴ There are many factors at work in producing such changes. Rosalind Krauss's seminal essay "The Cultural Logic of the Late Capitalist Museum" (1990) highlights a radical shift in the identity of museums in relation to the increasingly corporate nature of the context in which they operate under the late capitalism.⁵ Claire Bishop, in her book *Radical Museology, or What's Contemporary in Museums of Contemporary Art?* (2013), argues that while the 1990s saw "an unprecedented proliferation of new museums dedicated to contemporary art globally, and [while] increased scale and proximity to big business have been two central characteristics of the move from the nineteenth-century model of the museum as a patrician institution of the elite to its current incarnation as a populist temple of leisure and entertainment," today "a more radical model of the museum is taking shape: more experimental, less architecturally determined, and offering a more politicized engagement with our historical moment."⁶

Increasingly reflecting and critiquing their historical function, museums can take up the challenge of the descriptor "contemporary" to signal a more complex connection to the time and space in which they function, shifting from the old logic of modernity (with relatively static displays of permanent collections) to a more dynamic interplay between traditional collection practices and curatorial experimentation. This resonates with the notion of contemporaneity that Terry Smith has characterized in terms of the consequences for the circulation of museum objects:

More broadly, museums and galleries of all kinds are widely expected to be spaces in which art can be experienced in ways continuous with the socially mediated presumption of images that today is spreading across all exhibitionary platforms, actual and virtual.⁷

With the rapidly growing technological impact and the particular influence of the digital humanities today,⁸ these tendencies have been further heightened by the pandemic,

4 Karsten Shubert, *The Curator's Egg: The Revolution of the Museum Concept from the French Revolution to the Present Day* (London: One-Off Press, 2000), 135.

5 Rosalind Krauss, "The Cultural Logic of Late Capitalist Museum," *October* 54 (Autumn 1990): 3–17.

6 Bishop, *Radical Museology, or What's Contemporary in Museums of Contemporary Art*,

7 Terry Smith, "Biennials within the Contemporary Composition," in Joasia Krysa (ed.), *The Biennial Condition, Stages 6* (April 2017), published by Liverpool Biennial, <https://www.biennial.com/journal/issue-6/introduction-the-biennial-condition/>.

8 An important historical reference for this is Rosalind Krauss's "Postmodernism's Museum without Walls" (originally published in French in 1986), itself a reference to André Malraux's evocative concept of "Museum without Walls" (1978) that responded to changes brought about by image reproduction technologies and the democratise experience of viewing museum objects at that time. More currently, Claire Bishop's article "Against Digital Art History" (2017) specifically discusses the impact of digital humanities on cultural institutions, making a useful reference and evoking the idea of digital museology.



Figure 1: *World on a Wire*, Rhizome and Hyundai, 2021, website by artist Yehwan Song, screenshot [<http://worldonawire.net>]

as museums need to reinvent their sense of purpose and adapt to new circumstances, increasingly operating across physical and virtual modes, both online and offline.

Against this backdrop, I would like to refer to some artistic and curatorial projects, from my own work or that have I encountered, to highlight various attempts to rethink museums and museum practices. These include artist projects presented at Liverpool Biennial 2016 of which I was a co-curator (such as Oliver Laric's *Sleeping Sheppard Boy*, Ian Cheng's *Emissary Forks for You*, and *Minecraft Infinity Project*), the abovementioned collaborative series *The Next Biennial Should be Curated by a Machine* (2001), as well as a recently released Rhizome and Hyundai project, *World on a Wire*.

Released in March 2021, the hybrid online/offline project *World on a Wire*⁹ was commissioned by Rhizome at New York's New Museum and the Hyundai motor company. Held simultaneously at the Hyundai Motorstudio in Beijing and on the *World on a Wire* official website, the exhibition presented a range of artistic practices engaged with emergent born-digital technologies such as augmented reality (AR), virtual reality (VR), and AI. The website itself is an experimental generative work by artist Yehwan Song. Extending this example in a museum context, I would like to suggest a shift from simply exploring the inclusion of virtual objects in collections, or the extension of museums online, or even new challenges for preservation, to re-imagining the museum itself as a technological entity capable of determining its own future form. In other words, to *think of the museum in terms of science fiction*—no longer a repository of historical artefacts but a means to speculate on future forms.

9 *World on a Wire*, Rhizome and Hyundai, 2021, website by artist Yehwan Song, <http://worldonawire.net>.

Other examples might help to elaborate on hybrid, technologically mediated modes and the changing ontology of the museum and its post-custodian role. Oliver Laric's *Sleeping Sheppard Boy* was derived from three-dimensional scans of sculptures from Liverpool's Walker Art Gallery, including work by John Gibson (1790–1866), who himself had actively overseen reproductions of his work in the form of statuettes, cameos, and prints.¹⁰ Three-dimensional prints of these scans were presented in venues across the biennial, and the digital data from the scans was made freely available online and distributed via social media. In this example the museum object is reproducible and distributed across multiple sites, no longer fixed by conservative notions of space-time (www.threedscans.com) and distributed via social media. In this example the museum object is reproducible and distributed across multiple sites, no longer fixed by conservative notions of space-time.

The digital scans of the sculptures were also included as part of a virtual exhibition within the online video-game platform Minecraft, alongside digital copies of other artworks from the biennial. In this example, artworks move beyond the fixity of the museum walls into a virtual environment, and are made available for interaction to atypical museum visitors, who are able to invent their own worlds from simple block components. Taking the Surrealist “exquisite corpse” as inspiration, the *Minecraft Infinity Project* invited players to collaborate with Minecrafters the world over to cocreate the largest ever virtual sculpture: a “portrait” of Liverpool Biennial, in which users rendered their own version of the exhibition and the artworks on show.¹¹

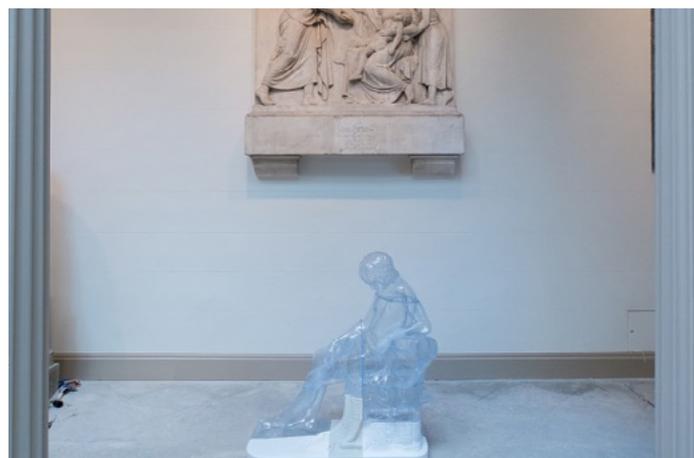


Figure 2: Oliver Laric, *Sleeping Sheppard Boy*, 2016. Installation view at the Oratory. Photo: Mark McNulty. Courtesy Liverpool Biennial [<https://www.biennial.com/2016/exhibition/artists/oliver-laric>]



Figure 3: Oliver Laric, *Sleeping Sheppard Boy*, Liverpool Biennial 2016. Installation view at the Cains Brewery. Courtesy Liverpool Biennial [<https://www.biennial.com/2016/exhibition/artists/oliver-laric>]

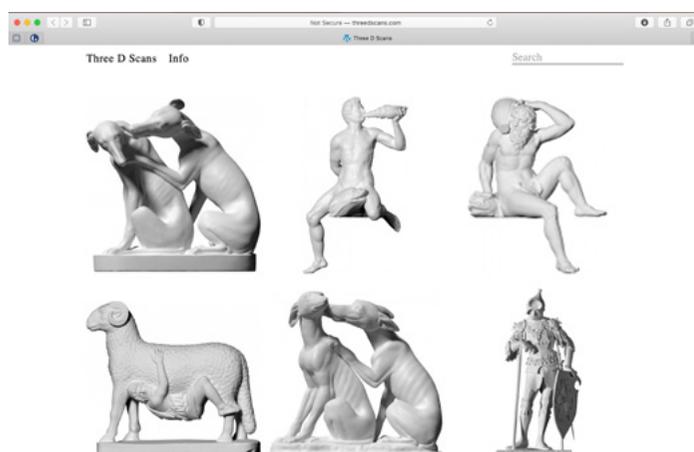


Figure 4: Oliver Laric, *Sleeping Sheppard Boy*, Liverpool Biennial 2016, digital scans at www.threedscans.com. Courtesy Liverpool Biennial [<https://www.biennial.com/2016/exhibition/artists/oliver-laric>]

10 Oliver Laric, *Sleeping Sheppard Boy*, 2016, 3D-printed models, commissioned by Liverpool Biennial 2016, exhibited at Cains Brewery, ABC Cinema, and the Oratory, with various 3D scans of sculptures exhibited online at www.threedscans.com. See also: <https://www.biennial.com/2016/exhibition/artists/oliver-laric>.

11 *Minecraft Infinity Project*, Liverpool Biennial 2016, <https://www.biennial.com/minecraft-infinity-project>.



Figures 5, 6: *Minecraft Infinity Project*,
Liverpool Biennial 2016

[<https://www.biennial.com/minecraft-infinity-project>]

Ian Cheng's *Emissary Forks for You* was a mixed-reality artwork presented at Cains Brewery, one of the main biennial venues.¹² It features a small dog, Shiba Inu—the Japanese dog breed made briefly famous through the “doge” meme of 2013—programmed to show visitors around the biennial venue. The dog verbally commands the viewers to follow them throughout the exhibition. With the promise of reward, viewers assume the role of Shiba Emissary's pet, reversing typical curatorial power structures. What is particularly interesting in this work is the layering of realities in such a way that augments a layer of fantasy and reveals an invisible layer of control and command. The assumed roles of guide and visitor are reversed. Instead of humans taking dogs for a walk, the dog leads the human through the exhibition, and the exhibition tour becomes a means of questioning the mediation process, and by extension curating itself as mediation and exchange.

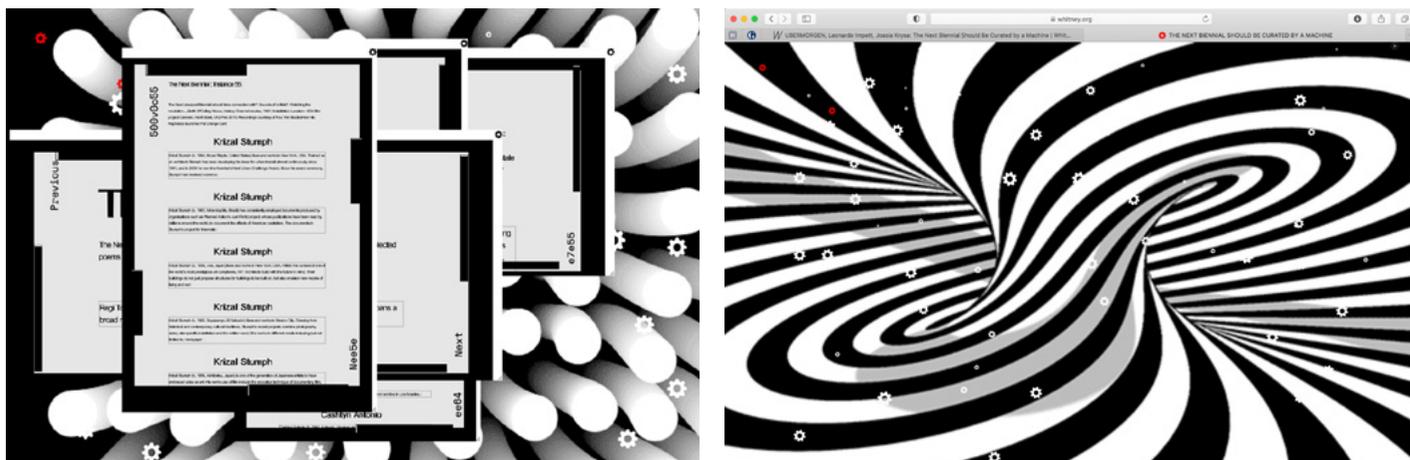
These examples give some sense of the institutional framework of a biennial beginning to operate in its own terms as a technological entity and exerting agency upon the exhibition experience. The same broad line of thinking is explored in my own collaborative project *The Next Biennial Should be Curated by a Machine*, a speculative inquiry exploring the relationship between curating and artificial intelligence. Unfolding as a series of machine-learning experiments developed with the computer scientist Leonardo Impett, two experiments have been realized thus far, both within the overall context of Liverpool Biennial 2021.¹³



Figure 7: Ian Cheng, *Emissary Forks for You*,
Liverpool Biennial 2016 [<https://www.biennial.com/2016/exhibition/artists/ian-cheng>].
Image courtesy the artist, Pilar Corrias
Gallery London, Foundation Louis Vuitton

¹² Ian Cheng, *Emissary Forks for You*, 2016, live simulation, infinite duration, Google Tango tablets, commissioned by Liverpool Biennial 2016, exhibited at Cains Brewery.

¹³ LB 2021, *The Stomach and The Port*, curated by Manuela Moscoso, 20 March–6 June.

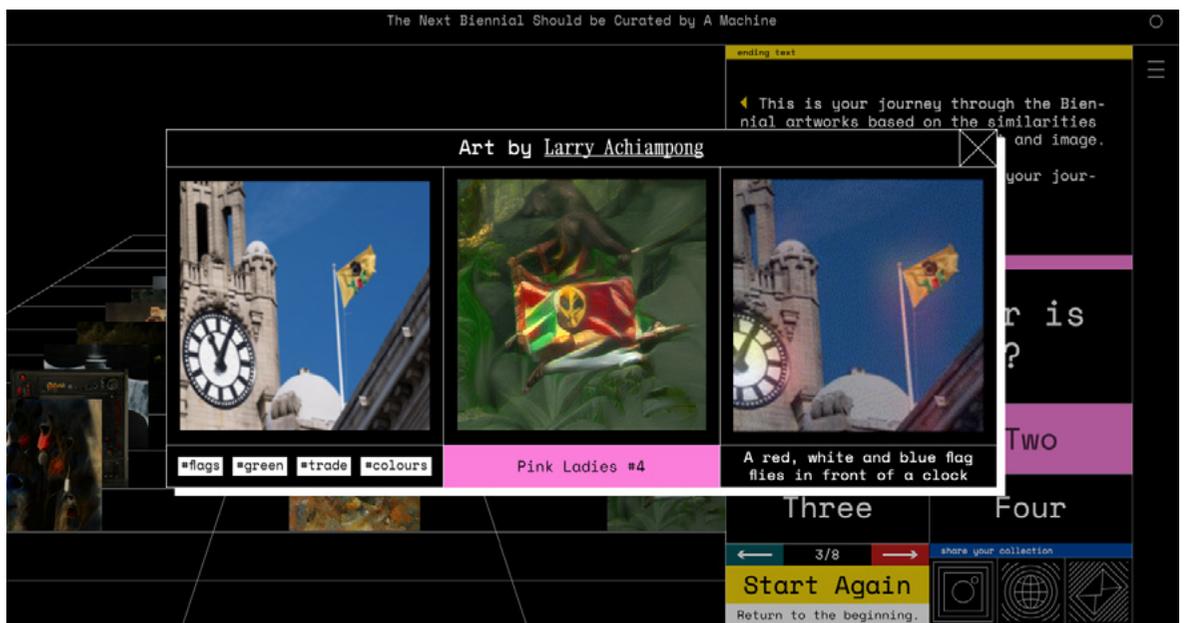
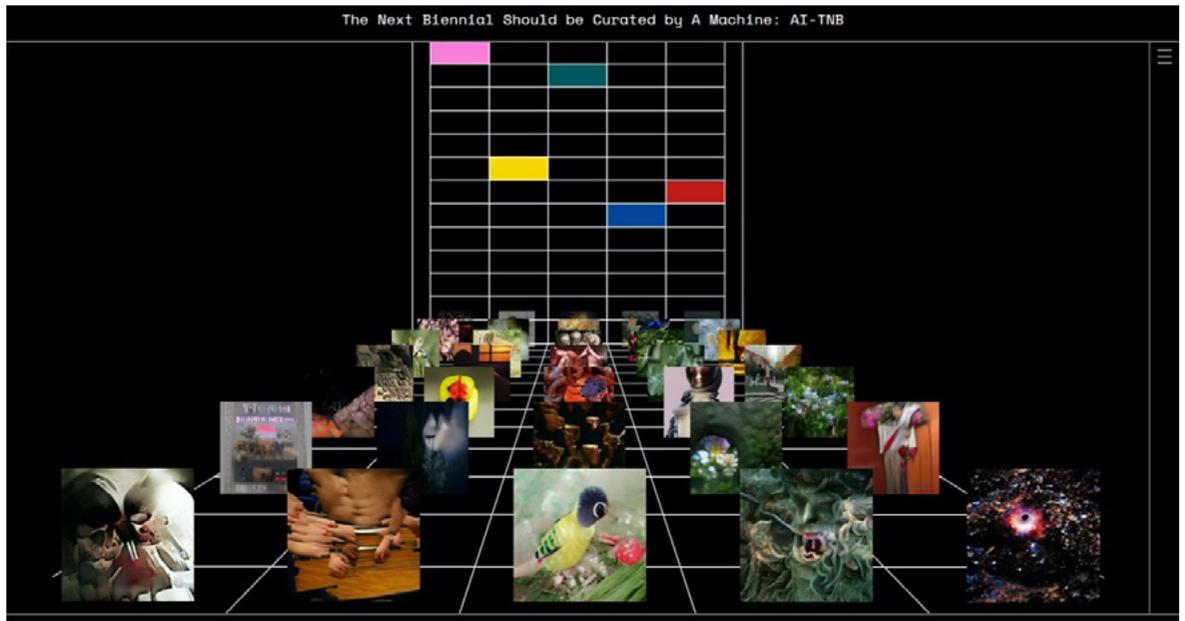


Figures 8, 9: *The Next Biennial Should be Curated by A Machine: B3(TNSCM)*, Ubermorgen, Leonardo Impett, Joasia Krysa, 2021, screenshots from the Whitney Museum of American Art's *artport* [<https://whitney.org/exhibitions/the-next-biennial>]

The first experiment with the subtitle B3(TNSCM) was developed with the artist duo Ubermorgen¹⁴ and commissioned by the Liverpool Biennial and the Whitney Museum of American Art for its online platform *artport*. The project uses archival textual material and datasets from both institutions (including curatorial texts and artists' biographies) and processes them linguistically (based on GPT 2 machine-learning technology). The AI system “learns” their style and content, breaking them apart and mixing them together, and the texts generated are then presented to the user, with a degree of interactivity and “branching”—iteratively rewriting small parts of its own text at random and creating numerous possible versions of new biennial texts. On the website, when you enter the online portal, dozens of wheels spin on top of animated psychedelic and sci-fi backdrops. Clicking on the wheels reveals different universes (sixty-four in total), each accompanied by a soundtrack derived from a TikTok playlist and a pop-up window containing biographies of imaginary artists, curatorial statements, press releases, and reviews that continuously rewrite themselves, creating different but similar versions. The subtle changes in the parameters of the machine-learning process generates various possible “biennials,” but with each iteration depicted as pieces of text rather than artworks.

In contrast to that playful experiment, the second is being developed as a UKRI/AHRC-funded research project subtitled AI-TNB. While the first experiment used datasets drawn from the Whitney and Liverpool Biennial as a whole, this experiment takes one specific biennial edition—that realized in 2021. It uses datasets—images and text descriptions of artworks—featured in LB2021 and processes them using computer vision and natural language-processing techniques (more specifically GPT-3). In the process different versions of images and texts are created, as well as different connections between them. Additionally, visitors to this online machine-curated version of the biennial can make their own selections of works and explore various pathways through this online collection of images and texts, creating their own versions of the biennial. The approach is markedly different from traditional online exhibitions, which conventionally consist of a website showing digitized objects. In this case, each visitor co-curates the exhibition with the machine, interacting with the machine's choices and with accompa-

14 Ubermorgen, Leonardo Impett, Joasia Krysa, *The Next Biennial Should be Curated by A Machine: B3(TNSCM)*, 2021, Whitney Museum of American Art's *artport*, <https://whitney.org/exhibitions/the-next-biennial>.



Figures 10,11: *The Next Biennial Should be Curated by a Machine, Experiment AI-TNB*, Joasia Krysa and Leonardo Impett, machine learning development: Eva Cetinić, web development and design: MetaObjects and Sui, screenshot, Liverpool Biennial, 2021

nying interpretive texts generated by a neural language model. The experiment explores human-machine co-curation as a model for integrating machine learning into museum collections. The museum is re-imagined as a dynamic system capable of generating new perspectives on what it means to perform its operations and understand some of its underlying infrastructures.¹⁵

15 Leonardo Impett and Joasia Krysa in collaboration with MetaObjects and Sui, *The Next Biennial Should be Curated by A Machine: Experiment AI-TNB*, 2021, presented at Liverpool Biennial, ai.biennial.com/.

The project suggests that curatorial knowledge might be expanded beyond the singular figure of a human curator to include a machine, and with this delegating curatorial acts to some extent beyond Western white male humanism that dictates cultural forms.¹⁶ What can the practice of curating learn from AI, what can AI learn from curating, and how can both learn from questioning knowledge forms derived from the colonialist frameworks of humans and machines? The parallels here suggest new models for thinking outside existing paradigms for producing, and legitimizing, knowledge of the world through collections and datasets, through classification and annotation practices within the institutional context.

Models in both museums and AI are fraught with problems, not least how they tend to replicate already existing gendered and racial biases, and established hierarchies and structures of power. At the same time, making a positive case for the adoption of AI in museum contexts, it might be possible to begin looking for other frameworks that not include only Indigenous knowledge but also non-human knowledge, to go beyond existing paradigms of what constitutes the contemporary museum.

Joasia Krysa is a curator and professor of exhibition research at the School of Art and Design, Liverpool John Moores University (LJMU), with an adjunct position at Liverpool Biennial. Previously, she was the artistic director of Kunsthall Aarhus, and served as co-curator of documenta 13 and the 9th Liverpool Biennial (2016) which focused on the episodes and time travel. Her research interests are located at the intersection of contemporary curating, art, and technology. Her first curatorial experiment, *software-kurator*, launched at Tate Modern, London (2005), and she later edited *Curating Immateriality: The Work of the Curator in the Age of Network Systems* (2006). At LJMU, she directs the Exhibition Research Lab, a public venue and research center dedicated to the interdisciplinary study of exhibitions and curatorial knowledge. Her publications include *Systemics, or Exhibition as a Series* (2017) and *Writing and Unwriting (Media) Art History* (2015), the latter co-edited with Jussi Parikka. She is series editor of DATA browser books and commissioning editor of Liverpool Biennial's online journal *Stages*. She is currently serving as curatorial advisor to Helsinki Biennial 2021 and Sapporo Art Triennale, Japan. Krysa is working on a book on curating and technology for Routledge (2021) and a chapter for Bloomsbury's *Encyclopedia of New Media Art* (2021), while editing a volume in the Data browser book series on *Curating in Times of Pandemic* (2021).

16 Kadish Morris, "Liverpool Biennial review – bleeps, bones and a machine that curate," *The Guardian*, March 28, 2021, <https://www.theguardian.com/artanddesign/2021/mar/28/liverpool-biennial-review-bleeps-bones-and-a-machine-that-curates>.

This line of thinking has been explored in a dedicated volume of the Liverpool Biennial online journal *Stages* 9 (2021), co-edited with Manuela Moscoso, <https://www.biennial.com/journal/issue-9>.

THE CURATOR CLOUD: A RESILIENT APPARATUS FOR THE LONG-TERM

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*This text is an academic paper based on the
conference presentation delivered at HyMEx.*

INTRODUCTION

This paper embraces the work of several curators at Ludwig Museum – Museum of Contemporary Art, Budapest. My own function is hence one of transmitter, if I may allow such obsolete notion during a symposium framed by the hybrid museum experience. The paper provides an extract of the collaborative work dynamic that characterized the curatorial team’s past two years at Ludwig Museum. Because the set of people initiating the Curator Cloud (CC) has evolved since its start, and because the CC’s definition and usage have done the same, my aim here is to share an impression of the ongoing workflow that has driven the CC team to reach over the museum walls. The CC is a work still in progress, an ambitious experiment with its great number of imperfections, but it is one which gave has given team members a method that pulled us through the vacuum year of 2020 and beyond.

Within the current context, where the digital has gained a much wider terrain in the field than before the pandemic, the catchy name “Curator Cloud” may not immediately reflect the project’s layered evolution: the initial idea dates back to spring 2019, but it was soon adopted as a sort of survival apparatus aiming at an experiment with a deep, long-term shift within the institutional framework. It also became a response to the unexpected obligatory hybridity brought about by external conditions throughout 2020. Here I seek to clarify the path the CC took to turn from a marketing gimmick in the form of service-based accessibility towards a long-term perspective, a digital but assembly-like work process toward collective knowledge sharing. This cloud has its roots in a physical region in which the art museum contains deep boundaries carved by history and politics. The experimental CC has become a resilient *modus operandi* that has improved our collaborative approach to understanding and sharing our multivalent competencies, while encouraging the cloud as a developing agent for thoughts.

FORMATION OF A CLOUD

The form and mission of the CC are quite different today from its original idea, but its first steps reflect the reasons for its slow transformation. During spring 2019, a series of pop-up exhibitions was organized to celebrate the thirty-year anniversary of the Ludwig Museum's foundation in Budapest. The programme series, Ludwig 30 (February–March 2019), presented the museum's diverse activities through biweekly exhibitions and related events. The various elements of the series were curated by the various department entities and colleagues of the museum. The last exhibition of Ludwig 30, *Customize*, was based on an inclusive curatorial approach in which visitors could vote on content and implementation.¹ The idea of the Curator Cloud was born within the curatorial team as a service to accompany these pop-up exhibitions: it was intended to help create hype around them.

A MECHANICAL START

The first raw version of the CC did not seek to be more than a service to advance the permeability of the hierarchical walls at the Ludwig Museum during February and March 2019. It was meant to act as a sort of interface, whereby the curator would be the first “surface” met on reaching the museum, instead of the “frontal instruction” method where the curator hides behind wall texts, and the visitor is cut off from the pulsating evolution of content creation. The idea was to have the curator easily available at all times during visiting hours. This would enhance dialogue about art and create a situation where museum-goers could directly contact, on demand, the “flesh-and-blood” curator, outside the familiar exclusive guided tours or round-tables. The cloud was not necessarily about knowledge sharing, but functioned as a developing agent for knowledge.

The formulation of the always available curator, as personalized content downloadable from an imaginary cloud—based on the analogy of information being downloadable on demand from a digital cloud—was a clear reference to Sugata Mitra, a computer scientist and professor of educational technology who introduced a paradigm shift in schooling through his concept of “schools in the cloud.” Starting from a “hole in the wall” in 1999, Mitra expanded his experiments through several phases including the “Granny Cloud,” a global network of retired teachers who support kids through an online School in the Cloud platform.²

The inspirational source of the cloud was essential, but the first version of the CC forecast a number of additional layers by mid-2019: a museum interface with the potential for virtual knowledge and cognition; an accessible and usable knowledge base; a synthesis of curatorial praxis and art mediation; an on-demand service for visitors; and direct communication between the artist, the work, and the recipient. One of the main ques-

1 *Customize*. Exhibition based on the votes of the Visitors, Ludwig Museum – Museum of Contemporary Art, March 2019. Curator: Krisztina Szipőcs and the visitors. See Krisztina Szipőcs, “The Past Dictates the Future,” and “Customize,” in *Ludwig 30* (Budapest: Ludwig Museum – Museum of Contemporary Art, 2019), 4–5 and 26.

2 TED prize winner 2013. See Sugata Mitra *creates a School in the Cloud* (2013), <https://www.ted.com/participate/ted-prize/prize-winning-wishes/school-in-the-cloud>.



Figure 1: Interior view of the exhibition *Customize* with the provisory “curator stand.”
 Courtesy of the Archives of Ludwig Museum –
 Museum of Contemporary Art

tions that remained, however, was: How to pragmatically implement the concept, how to make the cloud usable in the everyday? Elements that were tried out during the CC’s original set-up, even if just for a short time, included: a non-stop available curator stand within exhibition opening hours; curators in the role of museum attendants; and curators being available by phone through the exhibition space. One idea that was advanced but not implemented was the suggestion of developing a “curatorbot” following the phenomenon of chatbots. These first experiments were largely fruitless due to the limited capacity of each cloud-forming curator: experience proved that the level of availability suggested was not possible as the curator could not perform their other tasks if completely tied to the exhibition. Although the main issue is still valid, the process of finding a solution has been left open for the moment.

FROM FRAGMENTATION TO CONDENSATION: EMBRACING AN EXHIBITION

From the first CC version a further phase unfolded in a chronologically parallel manner. A collaborative, manufacture-like work experience started during summer 2019 through the implementation process of an exhibition concept that had been in the air a year before already. The plan of forming an on-demand knowledge base, a flexible, permeable organism within the institution that would also live as an imprint of a focused team dynamic, was born while preparing for the exhibition *Slow Life. Radical Everyday Practices*.³

³ *Slow Life. Radical Everyday Practices* was supposed to open in April 2020 at the Ludwig Museum, Budapest. Due to the COVID-19 pandemic, the exhibition was first postponed, then transferred to Koblenz, Germany, invited by the Ludwig Museum Koblenz: however, because of the waves of lockdown, it was open for two weeks instead of several months. In July 2021, following the HyMEx conference, it was finally built and opened in Budapest. *Slow Life. Radical Everyday Practices*, Ludwig Museum – Museum of Contemporary Art, Budapest, July 14–September 5, 2021. Curators: Petra Csizsek, Jan Elantkowski, József Készman, Zsuzska Petró, Viktória Popovics, Krisztina Üveges. Microsite available at: <http://slowlife.ludwigmuseum.hu/en/>.

Slow Life embodied the idea of an exhibition platform through which, alongside strong artistic statements and positions, current “everyday” dialogues around pressing global issues were to be analysed from philosophical, economic, and ecological perspectives. The aim was not to focus on “slow movements” but rather present alternative practices, everyday revolutions, gentle or radical approaches that challenge growth and the profit-oriented system in place globally. The exhibition was meant to be a sort of catalyst for knowledge, deduced from a hypothesis based on the team’s general attitude toward seeking answers to crucial existential questions or simply some practical guidance in relation to specific questions: the CC aimed to develop knowledge through interaction between those asking questions and those able to answer. Participants were involved from specific external territories and segments of life, including civil society (much of which is currently struggling in Hungary to be able to keep operating) who would enhance the project’s multivalency. Sustainability was also a driving force in the exhibition’s technical implementation: avoiding plane routes, using environment-friendly restorative techniques, displaying interpretative material on environment-friendly surfaces, and so on. And last but not least, the exhibition intended to involve the visitor not only through the classic “supported interpretation” model, but by comprehending them through the competencies shared by the CC.

When the first 2020 lockdown was announced in the country, the exhibition was a few weeks away from opening and some works were already installed. A quick shift was needed, as with so many museums worldwide. An intermediary action plan was put together; the creation of a microsite was part of the original plan but had to be adapted step-by-step to the new requirements, with material continuously added as a sort of knowledge extension that contained content that would probably not have been created otherwise. It represented a new type of documentation around an exhibition that would not exist in physical form until more than a year later—if ever. There was no budget for the unexpected shift, so the CC had to operate accordingly. (This experience could be the topic of a whole presentation itself.)

During the preparations and the sudden shift, our collaborative work was based on an assembly-like working scheme in which all tasks and duties were shared and distributed within the CC, but it also included the enactment of skill-sharing methods and the common development of our learning. For instance, we collectively learned web-content development to be able to keep the exhibition’s microsite alive. Interestingly, it was when the digital infrastructure conquered the knowledge-building process that the cloud became truly a forged, efficient entity: when the “physical museum set” was withdrawn from the preparatory work process, the cloud showed the team the real potential it had been concealing. Digital tools have been vital for the cloud’s true unfolding. From the incipient idea of the curator sharing knowledge (a top-to-bottom approach) a new perspective evolved: the recognition that to contribute to developing knowledge, to create

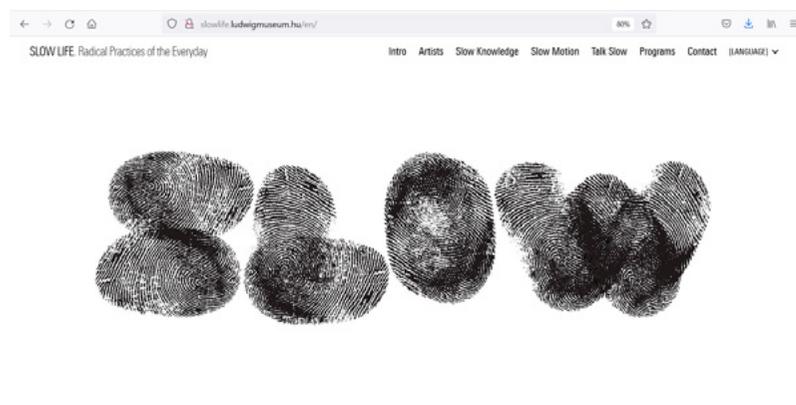


Figure 2: Screenshot of the *Slow Life* microsite [<http://slowlife.ludwigmuseum.hu/en/>].

a collaborative platform, the curators themselves needed to learn how to allow horizontal knowledge sharing, to allow the flow of knowledge among themselves with the aim of commonly reaching their professional goal. This attitude presupposed an eclipse of individual predominance in the process—a rethinking of individual curatorial practice. *Slow Life* generated an exhibition formula at the Ludwig Museum which has become a precedent for our future curatorial agenda. We already have plans for a new “cloud exhibition” in 2022.

A RESILIENT APPARATUS AROUND THE HYBRID FORMULA

The first two chapters of the CC briefly presented here, completed by the experience of about half a year of pandemic lockdown at the museum, encouraged the CC team to reboot the cloud during fall 2020 and enlarge its perspectives to adapt it for the long term. The CC had already generated a collectivity-oriented grass-roots methodology within the museum before 2020, and it increasingly became a resilient response to a global and local institutional crisis of structural, formal, and theoretical dimensions.

THE DETACHMENT OF THE EXHIBITION

One could define the past year and a half, counting from July 2021, as a transitional time in which a large number of art museums—understood here as physically settled institutional infrastructures—were obliged to loosen their grip on their established boundaries and allow their exhibitions more independence. The exhibition became a cultural product travelling through the internet as an almost separate entity, having mutated from a deliberated, firm physical concept to a more vulnerable and in some cases ephemeral construction site. It acted as the ambassador of the institution, but systematically landed on unscheduled runways. Several exhibitions that went online due to the pandemic found themselves quoted among a much wider audience than originally expected.

The construction site analogy is used to invoke the online exhibition as an entity being altered by its currently somewhat accidental and unplanned international floating trajectory. The online exhibition is collecting an expansive spectrum of reactions and this is also altering its essence. The exhibition increasingly takes on a more central art-historical role—a role that has previously emerged in certain regions due to precarious infrastructure. In Southeast Asia, for example, such a situation generated a standpoint—highlighted during the 2013 symposium by Asia Art Archive titled *Sites of Construction*—that considers exhibitions as the shaping agents of contemporary art history instead of the institutions themselves.⁴ In the present context, as the exhibition gains more autonomy worldwide, its detachment from the physical institution may direct the latter to draw on a new strategy of being. Clearly the concept of the online exhibition is not new, and nor is the virtual expansion; what is new is the sudden direct online accessibility of exhibitions in many institutions that would not have considered making their content so freely available were there no lockdowns. This is what may prompt shortcuts to remodelling institutional roles within the contemporary art world.

4 *Sites of Construction: Exhibitions and the Making of Recent Art History in Asia*, Asia Art Archive Symposium, Hong Kong, 2013, <https://aaa.org.hk/en/programmes/programmes/sites-of-construction>.

THE CLOUD AS A HYBRID FORMULA

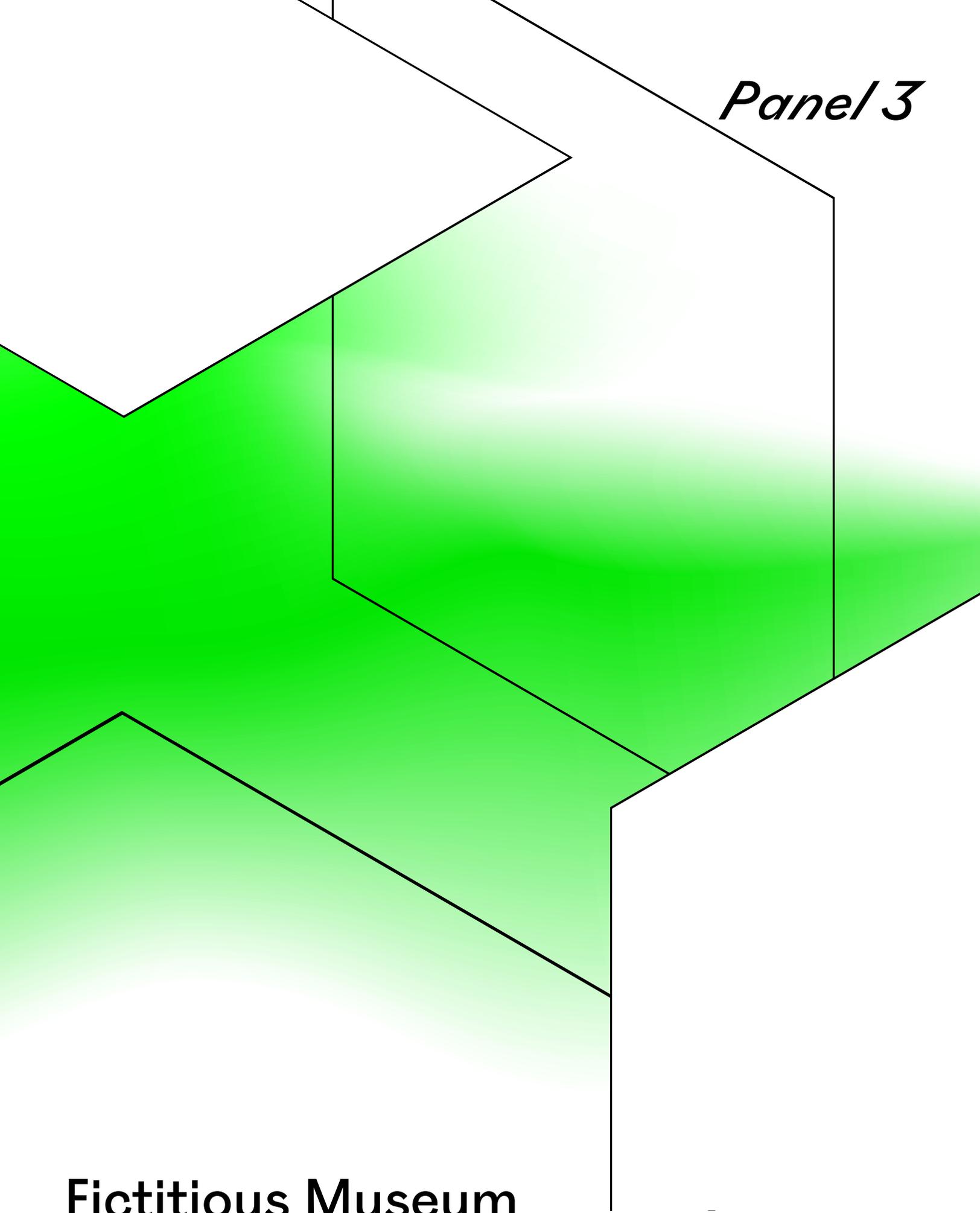
In this context, the online exhibition may carry a different conceptual weight: not only is it a digitized extension of its physical version, but it needs to sustain an inclusivity to endure a transnational gaze. A conscious approach to hybrid exhibition-making now differs from previous virtual and digital experiences because it requires a cognizant expansion of the surrounding cultural practices and the research phase. The Ludwig Curator Cloud understands the cloud's potential in creating a more accurate relation to hybridity, trying to make sense of disappearing functions and the obligations, responsibilities, and possibilities gained. We must consider how to separate the different workflows within the institutional processes of making an exhibition, conducting research, and collectively producing and sharing knowledge in order to transpose them, step-by-step, around a new hybrid formula.

CONCLUSION

The Curator Cloud has formed a resilient apparatus that privileges collaborative learning and skill-sharing over individual predominance, not in relation to one's personality but under the auspices of common museum knowledge. It aims to expand complementary competencies towards the viewer but also toward the professionals it encompasses. This attempt is enhanced by the idea of the cloud as a driving force in dismantling walls within the institution, in winding out hierarchical museum barriers to create a knowledge that is more directly accessible. The cloud's pervasive structure enables it to act as a response to the inevitable institutional shift toward hybridity.

Borbála Kálmán is an art historian and curator. She joined one of Hungary's pioneer private contemporary art galleries, Várfok Gallery, in 2007, contributing to its overall management until 2014. She then moved to Myanmar, focusing on individual field research within Yangon's contemporary art scene while working in an art gallery and writing about the scene there; she co-curated with Nathalie Johnston the archives-based exhibition *Muted Consciousness* at TSI. Back in Budapest, she attended the Central European University's Cultural Heritage Studies Program (thesis: *A Site for Mindful (Re)Definition: the Independent Contemporary Art Scene of Myanmar*, 2017). Since 2015 she has served as curator and researcher within Ludwig Museum's exhibition department. Her involvement as curatorial assistant in *The Whale that was a Submarine – Contemporary Positions from Albania and Kosovo* (2016) was a turning point in her praxis, reinforced by the CEU thesis: her research focuses on the possibility of the art museum's better adaptation to cultural contexts it was never inherent to yet which are paradoxically supposed define it (*Beyond an Institutional Comfort Zone*, Association of Critical Heritage Studies Biennial Conference, University College London, 2020). In the long run, she wishes to continue merging her curatorial work and her critical heritage views to enable the visibility of art that needs to speak out. In 2020 Kálmán became involved in Ludwig Museum's Curator Cloud, which she represented as speaker at HyMEx 2021.

Panel 3



Fictitious Museum

WHAT AFRICAN INDIGENOUS KNOWLEDGE SYSTEMS HAVE TO OFFER THROUGH DIGITAL HYPERMEDIA

Jonathan DOTSE

Sci-fi writer | Digital hypermedia artist
Founder of AfroCyberPunk Interactive (GHA)

This text is an edited transcript of the conference presentation delivered at HyMEx.

At the risk of sounding like a boomer, I just want to first say that I think it's amazing that I'm able to be here having this conversation with you all from where I am in Africa. This is something that I never would have imagined possible given the circumstances in which I grew up in. And I consider it an incredible privilege and an honor to be able to share my ideas with you. It's this kind of thing that gives me excitement for the future. It's this kind of future that I've always been looking for, so I'm glad to see that we are making progress in positive directions. For my talk, I would like to walk you through my ideas from the long perspective and show you how they have developed and evolved over the course of my life and my career. I currently run a studio called AfroCyberPunk Interactive, and I am focused on developing work in what I like to describe as digital hypermedia. I'm approaching it from the position that African cultures and African indigenous knowledge systems could potentially have something very valuable to offer. This has been the focus of my work in recent years. And so I'll just walk you through my background and how I arrived at this line of inquiry, and then I'll explain to you where I think it can go from here.

I was born and raised in Accra, Ghana. My earliest memories are growing up in this infamous slum known as Maamobi, which is a part of town that not many people wanted to be associated with it back then. I remember my fascination growing up in this compound house where we had lots of old car parts scattered around the yard. I used to play around with the car parts all day, because there was something about those pieces of machinery that really captured my attention and spoke to me in my early years. Because it was very apparent to me that these were not fabricated by human hands, and there was something very alien about that idea in the context and environment that we were in. Yet all of these tools surrounded us, all of these technologies that clearly did not originate from the same context in which we originated. They always caught my attention. And it was always a small tragedy for me to see so much being discarded, because the idea of throwing away things that we couldn't even have produced in the first place was kind of alarming to me. There was some kind of perverse irony in that. So throughout the course of my life, I've been attracted to these sorts of elements and objects that

were clearly alien to our environment, and I developed the habit of collecting—or almost hoarding—any gadget or tool that I came across that I knew that I could not replicate or easily get a hold of, no matter how unvaluable it appeared to society. Anything that was technologically advanced in a way that seemed beyond our society, and juxtaposed with our society in a very strange way—I liked to keep hold of those things. I like the idea that quite possibly, after an apocalypse or some event like that, the most valuable items in society are going to be things that have littered landfills for decades, and no one can produce them anymore.

So this fascination with technology followed me as I grew up and it was compounded by the media I was exposed to. I became very much attracted to science fiction and visions of the future. Watching, for example, the amazing, incredible assembly lines in factories in Japan, from where I was, and seeing a huge technological disparity and trying to understand how we got to this point in history, and what the future of our societies will look like with all of this power, this technological potential, potentially at our fingertips but just beyond our reach. I became interested in science fiction, thinking about the future, and the potential for technology to have positive social impact in our society, given all of the adverse conditions of poverty and other things that we've been dealing with. This interest manifested in writing science-fiction stories about the future, but the underlying problem, which I discovered years later, was that my ideas of the future had been completely grounded in a Western framework. That was the only reference that I had in my mind when trying to envision the future of Africa. It was incredibly difficult for me to imagine what Africa was going to look like in the future because my only reference point was the Western future.

In addition, virtual reality in particular became a very keen interest of mine, simply because of the potential that it represented to transform our perceived reality. That has always been an extremely powerful idea to me, and has really drawn more than anything else. I spent lots of time in my youth being interested in gadgets and technology, designing virtual reality devices that I imagined I might create someday and share with the world. William Gibson was one of the most influential writers in my development. When I read *Neuromancer*, my mind completely changed. Cyberpunk in itself was a very radical counter to the narrative of the future that existed at the time, and the sort of narrative of the future that I had grown up with—kind of glossy-eyed, either positive or absolutely dystopian, but never finding that nuanced middle ground I saw in William Gibson's work. These ideas followed me throughout my upbringing, and I've always found ways to become involved, to help get Africans as a whole more involved in the technological ecosystem. Because I like the idea that we have something to offer by becoming more active in that ecosystem. We have unique ways of looking at the world that everyone else can benefit from, as much as we can benefit from technologies that have emerged from other parts of the world. So that was the foundation of my development.

Around the year 2010, I was returning from Canada to Ghana, after spending three years studying computer science and psychology at university, and experienced a turning point in my life: on the airplane on my way down, in the middle of the night, I had this incredible view of the city of Accra. There's something magical about that view. In that

moment, I was able to sort of juxtapose the aerial views of other Western cities that I've flown over when I looked at Accra. And the difference was stark and extremely visible. This was a city that was organic, it was a city that clearly had been planned to a very minimal extent, and it was growing and evolving all on its own. You see very few straight lines and lots of curves and spirals and arcs, and it looked like a natural thing. It was like looking at a sea of fireflies stretching out to the horizon. And that flipped a switch in my mind, changing the way that I looked at Africa. I adopted a position that has allowed me, from that point on, to look more closely at trends developing and emerging in Africa, and use them as a guideline for trying to envision what the future of Africa was going to be. It was very exciting for me. I created this blog called *AfroCyberPunk* to share these ideas with the world and create a discussion around them. It wasn't one specific thing out of everything that spoke to me, but looking at all of the different trends happening on the continent and seeing a larger pattern emerging from trying to integrate the various themes I was picking up from all of them.

For example, I was in Canada from 2006 to 2009, and in that period that mobile phones started taking off. I got to see the iPhone as it arrived to the market, and over the first three years of its development, how it took hold in Western society and Canadian society in particular. Coming back to Ghana, I very clearly saw sharp differences in usage patterns and cultural adoption, what these devices meant and how they were integrated into society. I found particularly fascinating. So I kept working on my blog and creating my novel, set in a future Accra, to try and make these ideas concrete and create a very vivid way of illustrating what I thought was coming in our future. Around the year 2015, I came into contact with Google Cardboard. For those who are not familiar with it, Google Cardboard is a small piece of cardboard that allows people to watch and experience virtual reality. It's a very simple device made of cardboard and two lenses. It's brilliant, it's able to harness the power of the modern smartphones that we have to create a very convincing simulation of reality—even if it's very basic considering the point that technology has arrived at. Still, it's a very powerful experience. Even today, people who use it for the first time have a really transformative experience—it's always a joy to watch that. I was immediately moved by this technology because it spoke to me as something that finally was within our reach. An extremely powerful technology that finally the average African could get involved in. It was not a cast-iron engine block that you need a million dollars to build a factory to create. It was made of cardboard and lenses.

So I immediately got involved in trying to develop it, using it as inspiration to build my own VR headset that I could then show off in Accra. To try to build excitement about virtual reality and what's at our fingertips now. In the process of doing that, I was trying to acquire content from the internet that had already been produced, but then realized that it would actually make a lot more sense to create a film to show to people in Accra. To close that circle of creation, to build the device, create the experience in Accra, and show it to people in Accra—to really bring that sense that this technology is not out of your reach. If I can do it, you can do it as well. That was my main goal in creating my first film, which is called *Pandora*. I chose *Pandora* as the title because I wanted to create excitement, but also to send a warning and to draw people's awareness to both the positive and negative potential of VR in particular and technology as a whole. With



Self-built headset, screenshot from the HyMEx presentation.

each new power that we are given or uncover, we have more responsibilities. We have to manage our societies, especially given our recent history with some rapid technological advancement. We need to be a lot more aware of how much modification each little decision we make is going to have a few years down the line. *Pandora* was recorded in 360. The recording process itself was a process of innovation, using one of the earliest 360 cameras, which is what was available at the time, and hacking it to be able to create the kind of full 360 that we wanted. And it was a great success. In order to demonstrate the film, this was a headset that I built (see picture). It's deliberately meant to look like it was built in a junkyard, because I wanted to give it that cyberpunk aesthetic. It's actually made entirely of recycled components, recycled buckles, and recycled PlayStation CD cases—this was trying to send a message in itself. And so I showed this on the streets of Accra at Chale Wote, which is a street art festival that happens in Accra every year and takes over an entire street in the old colonial parts of town. Young people just take over that street for the whole day showing their artworks and murals all over the street and the walls and everywhere. It's an it's an amazing, colorful festival. In the heart of that, I had this exhibition to introduce VR to a crowd, and to show them that this power was in their hands. I hope I inspired some people to get more interested and involved in VR.

All of this brings me back to the point that I began from, which is the idea that these new mediums can be improved upon by taking lessons from African indigenous knowledge systems. Over the years I've made several different films in VR, and I've been thinking about the best ways to distribute this content to make it available to other people across Africa. It's great showing these films and exhibitions in Berlin and wherever, but my entire goal is to reach African youth, to connect with them and get them involved in this process of technological development. I was tackling this problem through various approaches, until I arrived at the idea of creating a digital platform that would look at digital art in a different way than it had ever been looked at before. To properly explain this, I have to go back to my childhood and a moment that I had while thinking about virtual reality. I was actually reading this book about virtual reality on a school bus on my way home. From the moment I got on the bus, I put my head inside the book.

And I don't know how long later—it's a very long bus ride—I raised my head from the book and had no idea where I was, what had happened or how long I had been lost in it. The last thing I remembered was opening the book. That immediately struck me, because I was reading a book about virtual worlds and young kids going into a high-tech lab to put on all this expensive equipment to leave their world for a few moments. And I had that exact same experience just from reading a book.

This formed an idea in my mind that there's potentially something more to virtual reality than the technology that is used to create it. It formed the idea that as a matter of fact it is our brains that are generating our reality all the time. We have no direct connection to the outside world. So our entire reality is, in a sense, virtual reality. And all of our mediums, all of our tools of communication, all the tools we use to represent ideas in symbolic forms and transmit into the minds of other people and allow them to experience those ideas as if they had conceived of them themselves, are forms of virtual reality. Over the years I've come to look at virtual reality and virtual worlds as an entire spectrum, in that they cover the entire spectrum of conceivable media and acquire the status of virtual reality through our minds' interplay with that technology. It's our minds interacting with technology and being willing to become immersed that creates suspension of disbelief. Depending on how immersed the person gets, you can describe different levels of immersion into a virtual experience. But I've tried to look at all mediums as having an underlying, fundamental thread that connects and enables the experiencing of virtual worlds.

This intersects with another train of thought that I've been following about African culture and what exactly we have in common, because it's easy as an African to throw that word around. And you make lots of assumptions about what it is that makes me an African, or what it is that makes that other African over there similar to me. It's easy to form such a concept through spurious correlations. But at the same time there is some underlying thing that we all share, all of us as humans but also through our different genetic and cultural lineages. These lineages have passed on ways of looking and conceiving of the world that is unique to each of us. And each of these ways of looking at the world offers some new perspective, in terms of problem solving, in terms of social issues—each has something valuable to offer. So I became interested in digging into an underlying archetypal commonality between African cultures. I entered this research project called the Digital Earth Fellowship in which I did some investigation into cultures between Ghana, Senegal, and Brazil, and tried to do a little bit of a haphazard archaeological excavation of some of the shared cultural elements, and then isolate those elements and see what I could take from them. To make a long story short, what stood out to me most from all of these different aspects of African culture was an element of harnessing fractals: looking at the world through a fractal perspective and applying this concept of the fractal roots of nature to every aspect of life.

That, as abstract as it seems, was the most pervasive and common element that I identified, and it immediately made me think back to the idea of media as a continuous spectrum of different levels of immersion into a virtual world. And I've married these two concepts together in the platform that I'm now trying to build. The goal of this platform

is to distribute virtual and digital content primarily through mobile devices, because they are the most accessible form of communication devices in Africa. It will serve content to local smartphones and smartphone users in Africa particularly, delivering a wide range of content related to African indigenous knowledge within a seamless infrastructure, like an e-book. Human social interactions and the way that we frame our world—in fact, the way that the world itself is constructed—seem to have very strong bases in fractal architecture and fractal design. So fractal principles have been my core approach in terms of how to design a system that best mimics the core functions of African indigenous knowledge systems. And that can best present ideas and content that transcend any one particular medium to harness the common thread that runs between all media: the power to capture our minds, take us to another world, and hopefully give us something when we come back.

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DECOLONIZING THE MUSEUM EXPERIENCE: SOME NOTES FOR AN EXPERIMENTAL MUSEOLOGY

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*This text is an academic paper based on the
conference presentation delivered at HyMEx.*

Museums generally operate at the division of the material and symbolic world. Since their predecessors, the early cabinets of curiosity in the seventeenth century, museums were going to hold selected *treasures* that would be separated from society, only shown in very specific contexts and according to hermetic classifications. In early modernity, by selecting what had value to a privileged elite, museums were also choosing who could access their collections and on what terms. In the first Western public museums, only the “wise men, the savants, the amateurs and the artists,”¹ an audience essentially made of white males, were allowed to access the encyclopaedical temple.

As we know them today, museums are historically attached to the “exploitation of knowledge” that marked the scientific revolution in the self-determined West. Since the Enlightenment and the expansion of the imperial project of cultural, political, and economic domination, museums were built based on the European belief that different societies were culturally connected, and the notion of “civilization” was used to define a center and its vast periphery, from which collections would be wiped out. For the purpose of sustaining unequal relations based on classifications of cultural difference, social hierarchies were nurtured with “scientific proof” that some people were inferior to others. Museum collections and attached disciplines would be categorized through comparisons within a limited material world, with imperial collections the basis for the establishment of universal standards to which all the other categories would relate.

This objective classification of knowledge according to disciplinary divisions of the material world would leave human experience itself outside of the scope of modern museums and reify the categories of value that reproduce hegemonic hierarchies. As a form of relating to the world that could not be objectively measured, experience was thus placed outside of the scope of rational sciences and other modern disciplines. Scientific rationality and its standards for objectivity structure and set standards for modern institutions, along with the principles and practices within them that are regarded as most progres-

¹ François Mairesse, “La Notion de Public,” *ICOFOM Study Series* 35 (2005): 8.

sive in the industrialized societies of the Global North.² Dividing the world between *modern* and *traditional* in this way ended up leaving out other forms of knowledge based on marginal experiences in the peripheries of northern modernity. Museology therefore developed within scientific museums as a branch of authorized knowledge that helps separate the *authentic* (based on rational thinking) from the *unauthentic* (based on “raw” experience) in all forms of cultural transmissions.

Museology is also about human experience, nonetheless. Even though we are more used to dealing with objects and the formal procedures around them, experience is the matter of museums. Here, I draw out the colonial character of museum experience throughout modernity and comment upon its decolonization in the present. I will argue that decolonizing the museum experience requires reconsidering museums’ colonial boundaries and the modern myths inherited from the imperial classification of the world. I will then propose that an experimental museology, based on experience and insubordination to disciplinary regimes, is a way to surpass the violent divisions that materialize in museums which still operate with imperial forms of categorization and monotopic readings of humanity.

BETWEEN MODERNITY AND TRADITION: ON MUSEUM TEMPORALITY

For centuries, museums have used categories of time to divide the world, producing a sense of “otherness” that served to organize collections while domesticating cultural difference. *Tradition*, as a notion that is based on linear time, has been used to affirm difference as both temporal and spatial distance.³ It implies a symbolic separation between past and present, or between different societies and populations subjected to different positions in the temporal scale of progress and civilization. Tradition is in some ways related to *authenticity*, a notion that is also linked to the origin of museums. Such a conception helps to define a rupture in time that positions the subject of science and its objects of study in different places.

Museology inherited this preconceived perception of cultural difference and forms of knowledge that vary according to linear time, inventing its own traditions based on the Western conception of philosophical time as materialized in museums’ representations. “Tradition” usually refers to a discourse about the past that serves to give meaning to present experiences by creating a sense of continuity. In the past, museums used the term to refer to popular cultures,⁴ and the notion of “traditional populations” is still commonly applied to Indigenous peoples or Afrodescendant groups living in certain parts of the so-called contemporary world.⁵

2 See Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities* (Durham and London: Duke University Press, 2008).

3 Johannes Fabian, *Time and the Other: How Anthropology Makes its Object* (New York: Columbia University Press, 2002 [1983]), 205.

4 Georges-Henri Rivière and Jean Cuisenier, “Le musée des arts et traditions populaires. Paris,” *Museum International* XXIV, 3 (Paris: UNESCO, 1972): 181–84.

5 See Manuela Carneiro da Cunha and Mauro Almeida, “Populações tradicionais e conservação ambiental,” in Manuela Carneiro da Cunha (ed.), *Cultura com aspas e outros ensaios* (São Paulo: Cosac Naify, 2009).

“Traditional museum,” however, is an expression commonly used in museology to denote an obsolete model that no longer responds to the needs of present societies. Thus “tradition” also refers, in many cases, to modernity.⁶ The traditional or “classical” form of the museum, as an institution solemnly based on material artifacts and serves the interests of the modern state, is an important part of our inherited imaginaries and one that influences museological studies to this day. At the beginning of the twentieth century, museology in its simplistic definition as “the science of the organisation of the museum”⁷ was essentially traditional; it developed its more reflexive expressions in the following decades.

In the universe of museums, the framework of modernity creates the “premodern” and its conventional association with nature, the past, primitivism, and, in the case of sacred artifacts of other cultures, with “fetishism” and “sorcery.” When museums exhibit such objects, a line is drawn beyond which lie the irrational, the incomprehensible, and the unintelligible⁸—that which is neglected or disregarded in their collections in terms of information and research.

As the self-appointed keepers of other people’s materials and interpreters of others’ histories, museums continue to impose academic classifications in the mode of scientists’ “glass boxes” of interpretation upon others’ cultures.⁹ Increasingly, as a *modern* institution, the museum has been perceived by museology as “an act of violence, a rupture with traditions” in certain societies where *time* was not defined accordingly to the Eurocentric logic materialized in museum collections.¹⁰ Recent studies have criticized the coloniality in the museological tradition and discussed various forms of subverting and overcoming our colonial past.¹¹ While distancing themselves from traditional interpretations of the colonial past in decolonial approaches, critical museologists attempt to prove that tradition is an organic part of the present and may be reshaped or redesigned by museums for the benefit of victimized societies and subaltern groups.

SUBJECT AND OBJECT: A MODERN DIVIDE

According to Mignolo and Tlostanova, colonial subjectivities—and, we could add, colonial materials in museums—are “the consequence of racialized bodies, the inferiority that imperial classification assigned to everybody that does not comply with the criteria of

6 Modernity here understood as the consolidation of colonial empires in Europe and its consequences, but also the subjugation of peoples and cultures in their fights for liberation, since their histories may be narrated mainly through the colonial discourses produced by those in power (Walter D. Mignolo, *Local Histories/Global Designs: Coloniality, Subaltern knowledges, and Border Thinking* (Princeton and Oxford: Princeton University Press, 2000).

7 Paul Augé (ed.), *Larousse du XX^e siècle*, 4 (Paris: Librairie Larousse, 1931), 1048.

8 Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities, and Modernities*, 8.

9 Michael M. Ames, *Cannibal Tours and Glass Boxes: The Anthropology of Museums* (Vancouver: UBC Press, 1992), 140.

10 Alpha O. Konaré, “L’idée du musée,” *ICOFOM Study Series* 12 (1987): 151.

11 Bruno Brulon Soares and Anna Leshchenko, “Museology in Colonial Context: A Call for Decolonisation of Museum Theory,” *ICOFOM Study Series* 46 (2018): 61–79.

knowledge established by white, European, Christian and secular men.”¹² This imperial classification of the world oriented the organization of collections in the larger national museums, permitting the materials of the *others*, classified as the explorer’s “discoveries,” to be seen as detached from original human groups. Thus, in the imperial centers and their peripheries, museology has been operating as a discipline with a mathematical model that uses modern reason to introduce hierarchical divisions within humanity.

As a construct grounded in an imaginary of the world system invented to justify the expansion of a capitalist world economy,¹³ modernity is a cultural complex under the name of rationality. Modern thinking, as conceived by Descartes and others, is centered on rationality, established as the universal paradigm of knowledge¹⁴ that serves to produce hierarchical relations between “rational humanity” (Europe) and the rest of the world. In the history of knowledge, this epistemological principle was responsible for splitting the knowing subject from the known object. According to this postulated correlation between subject and object, which is at the foundation of museums and *modern* sciences, it was unthinkable to accept that a knowing subject was possible beyond the subject of knowledge postulated by the concept of rationality in modern epistemology.

The cognitive notion reconceived in museology by Zbyněk Stránský¹⁵ and others still reproduces the modern philosophical assertion that reifies the separation of human from reality and presupposes the existence of a *material* reality that is divorced from society. Here, I recall that the breach between subject and object (or in the human-reality relation at the basis of contemporary museology) is, in fact, fabricated by a particular appropriation of reality. It was first conceived as an important part of Descartes’ *cogito*, according to which subjects as “minds” exist as completely separate entities from physical reality. This conception of a mind detached from a physical body and existing beyond any materiality lies in the foundation of idealistic philosophy and modern rationality. It was further explored by Kant and discussed by Hegel, and in the European Enlightenment rationalism translated into politics, becoming a central part of the dominant ideologies in the West. In the case of museums as modern/*colonial* institutions, the breach was a historic phenomenon that distinguished modernity and characterized their existence.

Since the nineteenth century, scientific museums have defined the other from the perspective of a privileged subject of knowledge who is, as well as being than white and male, an observer that makes the rest of the world *his* object of observation. These museums are material evidence of how the European man perceived the world, manifesting a difference based on racial classification of the global population, putting himself and his equals at the top of humanity and on the other side of museum objectification.

12 Walter D. Mignolo and Madina V. Tlostanova, “Theorizing from the Borders: Shifting to Geo- and Body-Politics of Knowledge,” *European Journal of Social Theory* 9, 2 (2006): 210.

13 See Immanuel Wallerstein, *The Modern World-system: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York: Academic Press, 1974).

14 Aníbal Quijano, “Colonialidad y modernidad-racionalidad,” in Heraclio Bonilla (ed.), *Los Conquistadores* (Bogotá: Tercer Mundo, 1992), 440, and Walter D. Mignolo, *Local Histories/Global Designs: Coloniality, Subaltern knowledges, and Border Thinking*, 59.

15 See, for instance, Zbyněk Z. Stránský, [Without title], in Vиноš Sofka (ed.), *MUWOP: Museological Working Papers/ DOTRAM: Documents de Travail en Muséologie. Museology – Science or just practical museum work?*, 1 (1980), 42–44.

To question epistemic geopolitics through decolonial lenses implies denouncing the presence of a universal subject-object relation that is in the genealogy of modern sciences. It means shifting the central scientific assumption “in the frame of epistemic embodiments (geo-historical and body-graphical).”¹⁶ This shift has been perceived in practice in the experience of community museums, or in the “invasion” of marginalised social subjects in the museum’s disciplinary regime, by challenging the cognitive assumption that benefit the sovereign subject of knowledge and disturbing the order of things or the things that reiterate our sense of order.

EXPERIMENTAL MUSEOLOGY: BLURRING THE BORDERS BETWEEN DISCIPLINE AND EXPERIENCE

When modern science and its institutions were invented, rationality was selected as the main principle for understanding humanity and reality as entities separated by the Cartesian *cogito* (“I think therefore I am”) that should be apprehended through disciplines. In its claim to be recognized as science in modern terms in the second half of the twentieth century, museology’s corpus of knowledge has embraced rational thinking as the basis for museum practice. By relegating experience to non-scientific forms of creation,¹⁷ modern museums treasure rationality and the hegemony of scientists’ classification systems. As a result of the appropriation of others in colonial museums, certain populations and marginal subjects would be alienated from their own cultural productions and inheritances, which were looted and are now captured in imperial collections.

Constituting its collections based on plunder and exploitation, the colonial museum reproduced in Europe and spread throughout its colonies has helped to define a *civilized man* by objectifying entire populations within showcases detached from the local realities they represented. Such a logic is in the centre of a colonial discourse still present in museums whose main goal is the accumulation of material objects disconnected from their original owners and creators. By reproducing the fragmentation of social reality, colonial museums narrate the past in a way that preserves separations between things and persons, culture and society, heritage and territory, material objects and experience, and so on.

Criticism of this widespread pattern was introduced in museology in its reflexive revision in the 1970s, after the modern museum was diagnosed as an institution opposed to the living,¹⁸ and the European *temple* was contrasted with a democratic *forum*,¹⁹ a dichotomy that was going to be further explored by museologists engaged in changing the ethos of the museum field.

16 Walter D. Mignolo, “DELINKING,” *Cultural Studies* 21, no. 2 (2007): 449–514, <http://dx.doi.org/10.1080/09502380601162647>.

17 See Peter Dear, *Discipline and Experience: The Mathematical Way in the Scientific Revolution* (Chicago & London: The University of Chicago Press, 1995).

18 Stanislas Adotevi, “Le musée inversion de la vie. (Le musée dans les systèmes éducatifs et culturels contemporains)” (1971), in André Desvallees, Marie-Odile De Barry, and Françoise Wasserman (eds.), *Vagues: une antologie de la Nouvelle Muséologie*, 1 (Savigny-le-Temple: Collection Museologia, Éditions W-M.N.E.S, 1992), 119–23.

19 Duncan Cameron, “The museum, a temple or the forum,” *Curator*, XIV, 1 (1971): 11–24, <https://doi.org/10.1111/j.2151-6952.1971.tb00416.x>.

Clearly, going beyond colonial methods is a basic decolonial responsibility of all museums holding hostage the material traces of the colonial past. I propose going beyond the borders of modern thinking to perforate the regimes that allow these institutions to narrate the past as a method for experimental museologies and undisciplined museums. In this sense, epistemic disobedience, as proposed by Walter Dignolo, may open museums to decolonial options “as a set of projects that have in common the effects *experienced* by all the inhabitants of the globe that were at the receiving end of global designs to colonize” authority, knowledge, and being.²⁰

Since the end of the last century, communities’ engagement and the agency of social movements and activists have been disturbing the lines drawn by modern rationality within museums’ regimes of value; this is paving ways to adjust the past into the present. The epistemic shift that they propose for museology results in the emergency of other epistemologies and subjectivities that are undisciplined and unsubordinated to Eurocentric disciplines. Hence, what we call *experimental museology* is a kind of museology of liberation, the aim of which is to liberate experience from the subaltern place to which it was relegated by modern science. The genealogy of experimental museology can be traced back to the echoes of the social movements of “national liberation” and political decolonization in Africa and Asia, as well as in Latin America, which inspired the *Philosophy of Liberation* (1977) proposed by Enrique Dussel. It is also based on the method of popular education introduced by Paulo Freire, who sought to valorize popular knowledge in *readings of the world* connected to the *life experiences of the oppressed* and their cultural realities.

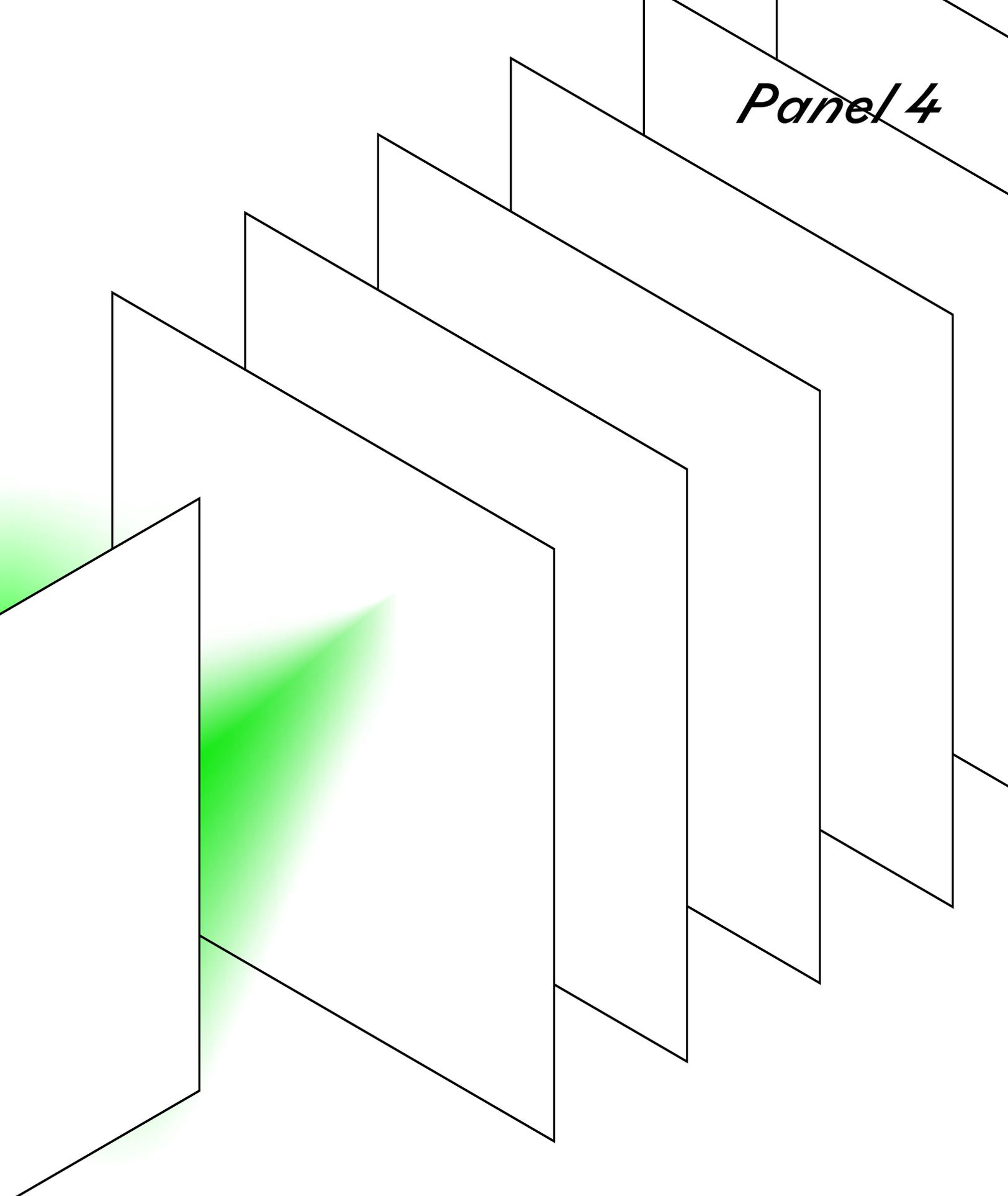
An “experimental turn” in museology occurred when, in the 1960s and 1970s, the field witnessed a shift from a focus on material collections to the lived experience of cultural heritage. Rather than merely educating or edifying the public, experimental museology proposes other cultural readings and interactions beyond the restrictive borders delineated by colonialism and modernity. It establishes a radical revision of museum regimes by renegotiating the differences that produced relations of oppression and exclusion, which involves syncretic conversion and critical selection. This border museology—which can be put into practice in any given museum—creates new experiences in the “in-between spaces” where discontinuous historical realities can be narrated²¹ and new temporalities are considered, so that the past can be decolonized in the present.

In its performances, the experimental museum refutes the absolute objectification of objects and the subalternization of social subjects to generate more relative boundaries between subjects and objects, subverting modern rationality and allowing borderline existences and liminal identities to rise free. Decolonizing the museum experience is an ongoing exercise that disturbs the foundations of the modern institution—at once an object of continuous critical revision and a political device for social and epistemic disputes.

20 Walter D. Mignolo, “Epistemic Disobedience and the Decolonial Option: A Manifesto,” *Transmodernity* 1, 2 (2011): 45.

21 See Homi Bhabha, *The Location of Culture* (London & New York: Routledge, 1993).

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Panel 4

**Repository of
Negentropic Processes:
Commoning and Representation**

#MUSEUMS

#COMMONS

#TACTICS

Seong Eun KIM

Director of Nam June Paik Art Center (KOR)

This text is an edited transcript of the conference presentation delivered at HyMEx.

I'm very happy to be talking about the Nam June Paik Art Center here. NJPAC organizes a similar event every year, a symposium series called The Gift of Nam June Paik. The series draws contemporary issues out of art-historical discussion of Nam June Paik, trying to shed light on his work from interdisciplinary perspectives. In 2018 the symposium was titled "Future Museum: Public to Commons." You can download the essays from our website. Last year, the symposium happened in the middle of the COVID-19 pandemic, and was organized as a follow-up of the "Future Museum" symposium to rethink the role of museums in the global crisis. It was titled "Living in the Postdigital: Reliving the Museum." Actually, the Korean title has a slightly different meaning, literally translating as "A society without museums, and museums everywhere at the same time," alluding to the pandemic situation in which most museums had to close their physical buildings and move online. We explored what it means for the museum to provide a virtual experience, for the museum to exist in the network, databases, platforms, and what the museum should be like in the post-pandemic metabolism of society. Our explorations in this respect are derived from Nam June Paik's ecological ideas of the interconnected world and the role of art and technology in it.

His work *Video Commune (Beatles from beginning to end)* was a live broadcast on Boston's WGBH-TV in 1970 for four hours. I will not explain the work in detail, but just wanted to bring your attention to the use of the word "commune" in particular. Interestingly, some inserts were placed into the middle of the live broadcast—excerpts from Japanese television programming. To commemorate the Expo '70 held in Osaka that year, the Mainichi Broadcasting System sent WGBH a compilation of Japan's current popular songs and entertainment shows. When inserting the material from Osaka into *Video Commune*, Nam June Paik deliberately did not edit or translate it, so that it could produce an effect of encountering unfamiliar cultural others. This is the first work in which Nam June Paik stated his artistic intention for a global television, for borderless and cross-cultural communication through his art.

In the same year, he wrote a text titled "Global Groove and Video Common Market" in which he argued for the distribution of a global television festival of music and dance via a Video Common Market modelled on the European Common Market. He emphasized a free flow of video information and its potential effects on education and entertainment.



“Future Museum: Public to Commons,” cover of the symposium’s publication.

Courtesy of Nam June Paik Art Center

Nam June Paik was deeply concerned with the social systems around the production and distribution of information, and already in the late 1960s he had anticipated that in the future broadcast would become a personal media for everybody and that we would be dominated by video information—as you can read in this quote [Paik, “Binghamton Letter” (1972)]:

The word “history” came into being, because our events were told and written down thereafter. Now history is being recorded in image or video. Therefore from now on there is no more “History,” but only “Imagery” or “Videory.”

This is how we are living today. Nam June Paik also reflected on the democratization of the medium of video, he regarded video art as being against the private property system, against the art world system which thrives on “cash and carry objects,” in his terms. I quote: “video art is a communal, communistic property, easy to share, but hard to monopolize.” So his ideas of community, being together, and connectedness are what the project of the Nam June Paik Art Center takes as its artistic and theoretical ground. In this regard, I’m going to introduce briefly two of NJPAC’s exhibitions, focusing on two artist collectives.

This is the poster of our tenth anniversary exhibition in 2018. We composed the exhibition title using hashtags: #Art, #Commons, #NamJunePaik. Celebrating the special year, we wanted to experiment with the possibility of commoning the museum, drawing on Paik’s conceptualizations of “commune,” “common market,” and “communal property.” So we took the commons, or more precisely speaking the verb form “commoning,” as a thread that ran through our projects. We defined commoning as creating a common



Installation view of the Unmake Lab work, in focus the online chatroom.

Courtesy of the Nam June Paik Art Center

resource against privatization, creating a community of multidirectional practices, and creating a common sensibility through sharing a rhythm that would allow us to move together.

Under this thematic umbrella, we organized the exhibition and its public programs. Among the participating artists in the exhibition was Unmake Lab, an artist duo working on data and algorithms, particularly concerned with what is biased and what is left out in the systems of machine learning and artificial intelligence. They presented the work titled *Making the Data Union*, which asks to what extent our online environment is controlled by big companies. We individuals create a huge amount of data every day for these companies' platforms, and this "Big Data" is submitted to technological mechanisms such as machine learning and artificial intelligence, by which we are controlled wittingly or unwittingly. This becomes the capital of the companies. Unmake Lab sees this as a neoliberal power relation and attempts to resist it by imagining a more self-initiated form of solidarity in the data-driven society. They ran an online chatroom, where you were invited to contribute data and discuss the issues regarding assembling data in this way for the duration of the exhibition. They also produced promotional posters and displayed them here and there in the exhibition, in the galleries, in the corridor, in the shop, and at the information desk. And on the posters there are propagandistic slogans such as: "This is a new form of democracy" or "Is it ethical data?" or "Who owns our future?" or "Are you selling the data at such a price?" With a temporary union constituted by data, the artists Unmake Lab highlighted the world as classified and annotated through datasets. Whose creation is this, not just in terms of the scientific computer process, but in terms of the cultural, social, and geographic positions relating to what to see and how to see. They also drew our attention to the absences in datasets, what is missing in the operations of larger data systems, by confusing these systems with their own art practices.

Let me move on to the second exhibition, our most recent one, *Tactics*. This exhibition intends to propose what we as individuals need to do in the current post-pandemic circumstances. The global crisis has been found to make various problems worse: technocratic power, the distribution of indiscriminate information like fake news, the racial prejudice and hate speech, the issue of alienated and excluded others, and economic and political polarizations. The exhibition's curator drew on Michel de Certeau's concept of tactics. De Certeau made a distinction between strategies and tactics, whereby strategies are implemented by dominant institutional structures, and tactics are individual actions in everyday life, so that tactical actions are never fully determined by institutions. What is crucial with tactical actions is therefore the performativity of the subject, and the exhibition looks into tactical practices of artists. Among the artists are Bad New Days, a collective of six young artists. The name Bad New Days might remind some of you the book by Hal Foster, *Bad New Days: Art, Criticism, Emergency*. The collective's name is also drawn from the famous Bertolt Brecht sentence "Don't start with the good old days, but the bad new ones." Seeking to use dialectical historical materialism as a useful key to the contemporary, they formed in 2017 on the centennial of the Russian Revolution. Actually, they do not call themselves an artistic collective but an artist-political party. They refuse to comply with the timeless horizons of the contemporary and aim to historicize it and analyze both reactionary and revolutionary impulses.

In the exhibition *Tactics*, Bad New Days presents a work titled *Streaming and Cutting*, which borrows the format of the "trucker's v-log." I don't know whether you are familiar with truckers' YouTube—it is a subcultural phenomenon on YouTube, in which cargo truck drivers set up the camera, recording the scenery in front while driving quietly, and then posting it without any editing. The artists were interested in the conditions of freight laborers, and they conducted interviews and research into protests staged by South Korea's freight union over the last two decades. They combined this research with their own trucking along the same routes that cargo workers took during the protests. You can visit <http://www.payload.live/> to see their work. On the site you can see a flow of video images and if you click on the sentences, you are given information about the historical protest of the union members taking place on the same route, about the agendas of these protests, and a detailed account of related terms.

In March, the artists staged four live-streamed performances. One of the artists drove a truck along the same path that freight workers traveled to express their stances on major days of protest in the past. In the exhibition, people watched the live streams. Each performance made reference to one of four occasions on which cargo workers staged walkouts. For example, the performance that took place on March 14, 2021 was related to protests on the same day in 2006, when there was a rally to denounce Samsung's capitalist policies and to reverse the mass dismissal of freight workers. The artists narrativized the occasion by overlaying real-time images from the truck with audio sources from the radio at that specific moment of time. More than an hour of this performance was broadcast live, and visitors could watch inside the gallery. In terms of their use of media, they draw on personal broadcasting as a useful means to gather like-minded people as a sort of community. They also draw on to YouTube aesthetics, white-noise-like images where nothing dramatic happens, which are indicative of today's visual culture where there is

nothing that cannot be live streamed, where everything is turned into “videory,” in Nam June Paik’s term. Doing the live-streaming performance, they effectively overlapped two different time zones, present and past, which also had the effect of defamiliarizing the landscapes. As for their social investigation, they worked closely together with unionized truckers and came to know about the employment relationship between freelancing truckers and companies, trying to find a way to raise awareness of the influence of institutionalized neoliberalism on individuals through their art-making. Artists like Unmake Lab or Bad New Days delve into technological infrastructure to appropriate it, to turn it into a conversational structure through which to form a certain community to think together, to act together.

To finish, I would define the commons as this: as a spatiotemporal ground to cultivate a willingness to think together and act together. And I would argue that if the museum assembles performative undertakings like the works of these artists, that could bring the museum closer to the commons.

Seong Eun Kim is the director of Nam June Paik Art Center (NJPAC) in Yongin, Seoul Capital Area. She obtained her doctoral degree in anthropology at the University of Oxford with a thesis titled “Artists’ Interventions in Universal Museums as traced through the Victoria and Albert Museum, the British Museum and the Pitt Rivers Museum.” Working in the field of museology and contemporary art, her research interests lie in the bodily, sensorial dimensions of media art and the possibilities for connecting the curatorial and the commons. Kim previously worked at NJPAC (2011–14), and at Leeum, Samsung Museum of Art, Seoul (2014–19), where she organized programs in conjunction with solo shows of such artists as Olafur Eliasson and Haegue Yang. Her curatorial work has included the exhibitions *Common Front, Affectively* at NJPAC (2018); *Transmitted Live: Nam June Paik Resounds* at Talbot Rice Gallery, University of Edinburgh (2013); and the transdisciplinary public program series, *Intermedia Theater: World Citizenship, Constellation of Things* at Leeum (2015–16). Among her publications are *A Critical Muscle, a Choreographic Terrain* (2018); *Resonant Next to Me: The Exhibition as an Affective Body* (2018); *Cybernetic Lyricism: Gregory Bateson, Nam June Paik, and the ‘Mind’ as Conjunctive* (2017); *Questioning Alterity and Modernity by the Art Museum: Tate Britain’s ‘Museology’* (2016), and *‘Cavalcade of Intellectuals’: On Temporal Conflation and Spatial Connectedness, and on Being Political* (2014).

(MEDIA) ART AS A REPOSITORY OF KNOWLEDGE—AND WARNINGS

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*This text is an edited transcript of the
conference presentation delivered at HyMEx.*

I consider it to be of key importance that we are here talking about museums and hybridization, especially in the context of the pandemic. Over the course of the past months, in response to the emergency and the need to think about what kind of roles may art have in situations like this, I've come to the idea of an “emergency curatorial algorithm” that considers media art as a huge repository of knowledge and warning signs, and replaces, at least during times of emergency, the category of the contemporary with that of the contingent.

I would like to start quoting an amazing book by Néstor García Canclini, an Argentinian anthropologist living and working in Mexico. It is his first published fiction and it is titled *Pistas Falsas*, which we may translate into English as *Red Herrings*, or giving false cues about the future. In this fiction, situated in 2030, a Chinese archaeologist is living and doing research in Latin America. Minerals and water are no longer good business in these latitudes, so most of the big corporations have left. Most museums have closed, and their surviving archives are soaked or held in the basements of the corporations that now own them. These museums and cultural projects are closed because of Latin American states' lack of investment in culture and sciences. Enormous libraries and archives have been taken out of the region. The art market, if any of it survives, is in Asia. As Mexican author Cristina Rivera Garza has pointed out about the book, Néstor García Canclini mixes knowledge from diverse disciplines such as ethnography, philosophy, technology, and art. With this in mind, as an example of how to approach the relations between art, technology, and the place of museums in a state of emergency or contingency, as we are living now, I would like to start this talk and I will be remembering these ideas from Néstor García Canclini as a kind of methodological question.

I want to propose that we consider so-called media art—or, like the name of an exhibition at the Banff Centre curated by Sarah Cook and Steve Dietz in 2015, “the art formerly known as new media”—as a repository which may help us think and act in the complex times in which we are living. That is the curatorial approach to the programming of Cátedra Max Aub, Transdiscipline in Art and Technology at UNAM (National Autonomous University Mexico), where I work. It seeks to displace the category of the contemporary and place the contingent at the center in these moments when we are in an emergency

"After the linguistic turn, the pictorial turn, and the performative turn, we have arrived now at an **epistemic or epistemologic turn**, which basically deals with and analyzes the manner in which knowledge and objects are being presented. So this art is not about presenting knowledge, but about **questioning and showing how knowledge is being produced, through an aesthetic object.**" **Jens Hauser**

"For artists working in the interface of art and frontier technologies, there is the acute realisation that **our society and its sciences are still following the notion that the world is there to serve the human ...** This mindset not only skews new knowledge gained, but also in the light of our environmental crisis, becomes a matter of ideological concern". **Oron Catts Ionat Zurr**

Figure 1: Quotes by Jens Hauser (left) and Oron Catts and Ionat Zurr (right).

mode—and to ask ourselves if it is possible that, along with science and technology, artists, in the context of contemporary art museums and contemporary art scenes, are able to produce the cultural mutation, the bifurcation between going in the direction of entropy and producing a neguentropic turn in environment that we need to effectuate in order to survive as a species. This also may also be a good strategy for museums, especially the small ones, to survive. Because no doubt that there will be museums in the future, but maybe only big museums. A recent survey, for example, found that one third of museums in the US may not survive.

I want to continue with these two quotes¹. The one at the left is by Jens Hauser, a curator who proposed that art is going through an epistemological turn, following a pictorial turn and a performative turn. It is certainly true that, with the idea of artists as researchers and research-based curation, we are defining and thinking about art more and more closely in terms of knowledge. So for me an epistemic or epistemological turn in art is very appealing to think about for curatorial and programming practices in times of contingency. On the right is a quote from Oron Catts and Ionat Zurr, directors at *SymbioticA* in Australia, from an essay called *Tense-disciplinary collaborations with Frontier technologies*. I like the idea of the tense-disciplinary, as close to the transdisciplinary. And I really like that they lay out three logics, or rationales, governing transdisciplinary or tense-disciplinary practices among art, science, and technology. The first is accountability—that science is expected to be accountable for society, and artists are supposed to pose ethical and ontological conundrums to techno-scientific developments. The second is innovation, which they say is the most problematic one, because artists are expected to inject creativity into scientific research and thus contribute to industrial innovation. And the third one, the most interesting, is ontology or effecting ontological transformations in objects and relations of research.

1 Daniela Silvestrin, "Dialogues on 'Bioart' #1. A conversation with Jens Hauser," *Digicult* (n.d.), <http://digicult.it/news/dialogues-on-bioart-1-a-conversation-with-jens-hauser/>; and Ionat Zurr and Oron Catts, "Tense-disciplinary Collaborations with Frontier Technologies," *Non-Traditional Research Outcomes* (August 31, 2020), <https://nitro.edu.au/articles/2020/8/31/tense-disciplinary-collaborations-with-frontier-technologies>.

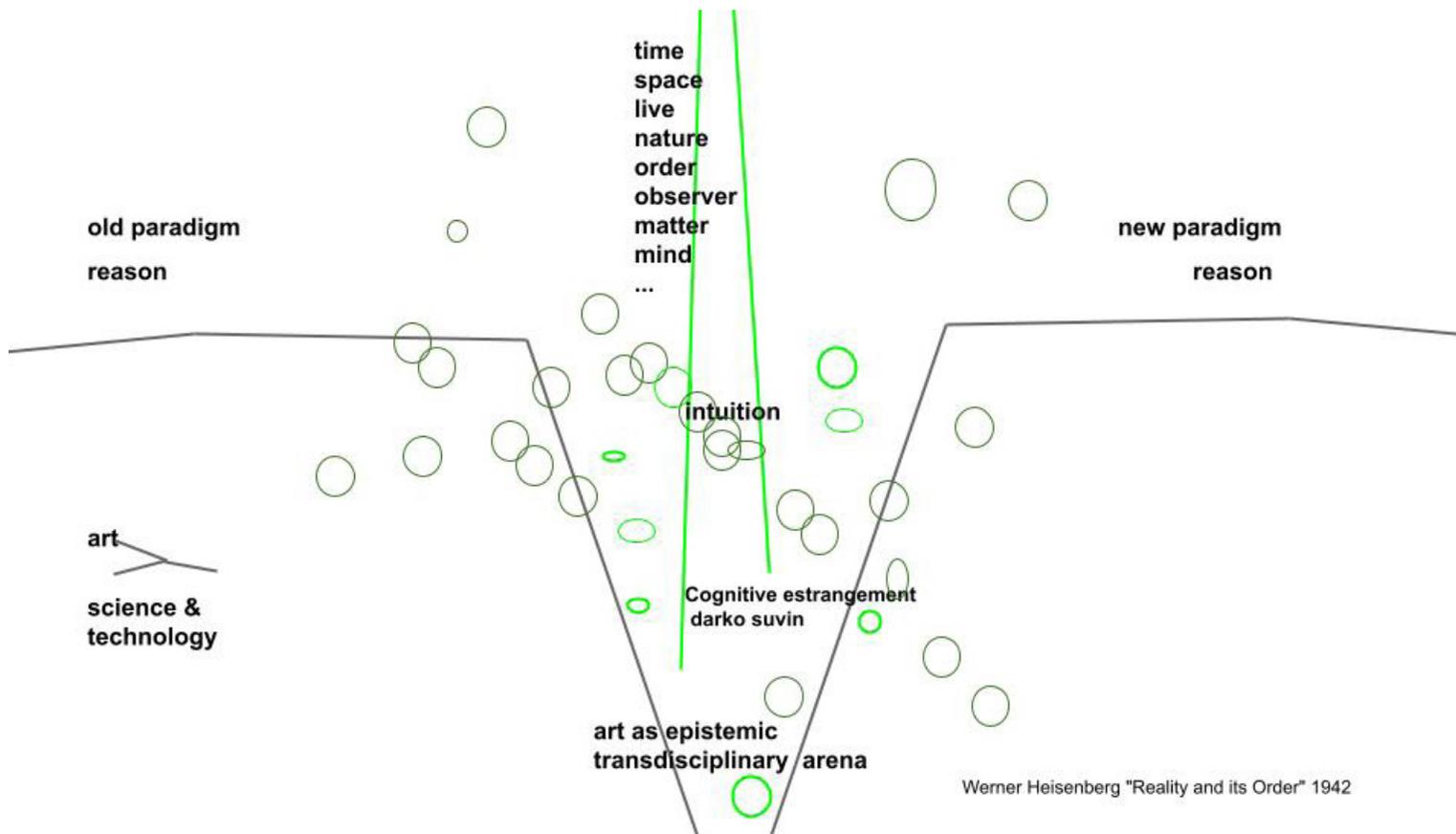


Figure 2: Diagram by Tania Aedo Arankowsky based on Werner Heisenberg's *Reality and its Order*.

So, after those quotes, I would like to show this image pulled out of Werner Heisenberg's scientific and philosophical text *Reality and its Order*². The text, written in 1941–42 and dedicated to his friends, talks about how science goes from an old paradigm to a new one: to some extent it happens with the help of reason, but in the moment that science is producing enormous change, the scientist needs to disengage from reason and instead trust intuition, because there's another kind of formal scaffolding—hopefully—waiting on the other side. Knowledge has experienced enormous changes, especially in the last century, which have completely transformed ideas of time, space, the living and the non-living, the idea of nature, order, the observer, matter, and the mind, among many others. Science as art should have the tool of intuition—it cannot make that reach with reason. It has to be like a quantum leap, because it's a leap over reason to get to the other side. I want to take this as an inspiration. And as the climatic or critical space where art and science and technology can meet and create positive changes for society—or even this massive bifurcation that we need in order for the species to survive.

In Figure 3, the concept of a cultural bifurcation comes from Bernard Stiegler's ideas about entropic and negentropic processes. Entropic processes govern technological progress, especially in the data economy and under extractive practices, as in the case of social networks mining of information from people for commercial exploitation. Negentropic processes pull the system to its homeostatic or equilibrium, or to be more specific to the sustenance of life. This major bifurcation should be done in the place where knowledge is produced, in the place where knowledge is owned by corporate managers

² Werner Heisenberg, *Reality and its Order*, ed. Konrad Kleinknecht (Cham: Springer International Publishing, 2019).

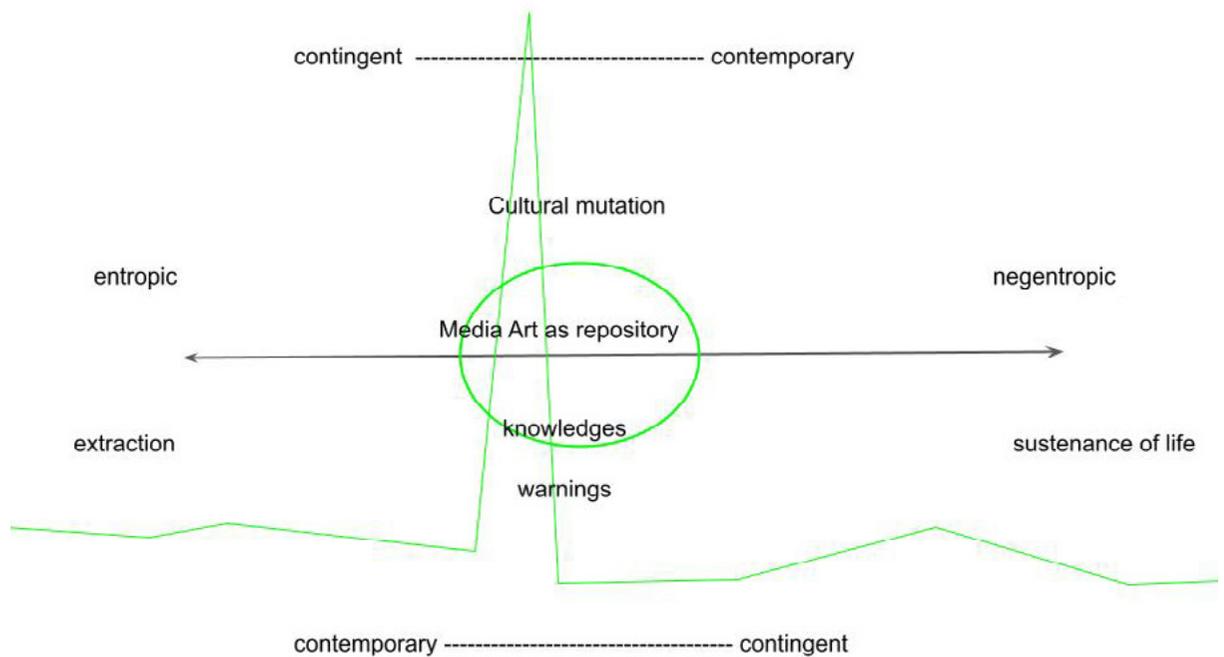


Figure 3: Diagram by Tania Aedo Arankowsky based on Bernard Stiegler's ideas about entropic and negentropic processes.

and extracted from people. If we think of many art projects in the context of so-called media art, they offer an enormous number of indicators about what is currently happening in terms of our relationship with technology and science. They can allow us to navigate the possibility of a cultural mutation that may be created at least in the form of prototypes—to think hands-on in this context of the intersection of art, science, and technology through the prototype as something not finished, as something that can and should be continually reworked.

So when I talk about media art as a repository of knowledge and warning signs, I am talking about an archive or repository conceptually. I will now give some examples. People from the media art scene may recognize *JenniCam*, created by the first person who transmitted through a webcam, from 1999 until 2002—everything about her life. Rafael Lozano Hemmer's *Frequency and Volume*, at Laboratorio Arte Alameda in 2007, was an interactive piece warning us about the complete privatization of the radio-electric field. Art Object-Orienté's performance *May the Horse Live in Me* at Galerija Kapelica in Slovenia is emblematic. As is the collective Critical Art Ensemble's tactical media book *Electronic Civil Disobedience* from 1996. Marta de Menezes, a bio-media artist who has worked on bio-media projects such as *The Origin of Evolution* in collaboration with Maria Antonia Gonzalez Valerio from Mexico, has silenced the gene of a genetically modified organism to question what technology like CRISPR-Cas9 can do; I think this piece fits in the direction of the ontology that Zurr and Catts talk about in their essay, trying to affect an ontological transformation in objects and relations of research. *Op_Era* by Rejane Cantoni and Daniela Kutschat, was a project that existed from 1999 to 2002 in which they built a VR immersive environment as a tool for asking questions about space—users used to go from different conceptions of space, from solid platonic geometries through to a last stage where you became a point in a Lawrence diagram, a fractal. In Barbara Santos' book *Curation as Technology*, she based part of it on interviews with *sabedores* or wise people from the Amazon in Colombia. *Plantas nómadas* or *Nomad Plants*, by Gilberto

Esparza from Mexico, is a hybrid piece relating a robotic organism to a living organism and transforming waste into energy. And finally I would like to mention Tomas Saraceno's [*Aerocene*](#) project.

These are just a few works that have been significant to me in several ways, but you can pick your own. I'm not talking here about archives or memory, because there are a lot of spaces that attend to those very important issues in new media art, but about a corpus defined as media art that is contingent on the present situation in which we are all confined—interacting through digital platforms and managing life through these systems. Questions and challenges are arising for which this may be really helpful. If we replace the category of the contemporary with that of contingency, which roles may art take in a situation of emergency like this—especially considering that this kind of situation may become the normal in the near future?

Prototypes to Navigate a Contingent Future comprises a [symposium](#) that took place during 2020, a [workshop-laboratory](#), and a series of [podcasts](#). The first edition of the podcast was devoted to the crypto economy. We interviewed a very interesting economist from UNAM and asked him what he thought would be the next contingency in terms of economics. He talked about solar explosions that may completely disturb communications in the earth, and about the climate risks also threatening that kind of technology. The second edition was devoted to the project Arts at CERN. We had a conversation with Monica Bello, curator and head at Arts at CERN, about projects such as Black Quantum Futurism and Suzanne Treister's *The Holographic Universe Theory of Art History*.

The online lab and workshop [*Prototypes to Navigate a Contingent Future*](#) will be held from May to September this year (2021) at UNAM and it is aimed at students—not for the art community, but coming from the art community to the students. Especially those in their first years of graduate study who expected to be learning at schools and laboratories. The students come from genome science, nuclear science, mechatronics, or art school, and the idea is that they turn their workspaces, no matter how narrow, into laboratories. It approaches the prototype as a transdisciplinary vehicle connecting art, science, and technology, and uses new media's huge repository around the world as inspiration but also as material to think what kind of responses we may take in a transdisciplinary context to mitigate or deal with future contingencies.

There will be several teachers for the workshop-laboratory program. Marcela Armas is a visual artist from Mexico who has worked a lot with different technologies, both ancestral and present, and raised really important questions about how we relate to technology. She inaugurates the program with the session [*Ritual Machine*](#). And then Rafael Lozano-Hemmer will transmit from Antimodular studio and talk about prototypes towards [*vectorial design at Antimodular*](#). Andrea Chapela will share the session [*Writing and Wandering Machines*](#). A young science fiction writer with a background in chemistry from Mexico, Andrea has a very interesting methodology: she approaches her fiction by posing questions, technological or emotional problems, and then trying to solve them through tweaking and altering existing technology. Gabriela Frías, a mathematician and philosopher of science, holds a PhD in literary theory and works at the Nucle-

ar Science Institute at UNAM. And along with Pedro Quinto, who is a physicist at the Nuclear Sciences Institute, he will talk about [Surprising Steam Machines](#). They're doing a very interesting experiment and relating it to the science fiction novel *The Difference Engine* by William Gibson and Bruce Sterling. Eurídice Cabañes, a curator, philosopher, video game designer, and the director of Ars Games, will share a session on [Speculative Interactive Fictions](#), how to play with possible futures.

And then they will have a two-month space of time. The university will also be on holidays, so they will have a recorded virtual session with Robert La Frenais, a curator working on [The Future of Transportation](#). We want to give the participants time to work at home, and we don't want them to have much time on the screen, so the sessions are short—two hours on Saturdays. The idea is that they transform their intimate spaces—table, workspace, or bedroom—into a laboratory where they can build a prototype with whatever materials they can access. The participants are between eighteen and thirty years old, but they are in different places in Latin America and different regions within Mexico. And then we go back and have a session with Rosario Hurtado and Roberto Feo, *El Ultimo Grito* (The Last Shout). They will transmit *Off-screen/: Mapping and speculating with the invisible* from Goldsmiths in the UK, working with the idea of the diorama as critical model, and then a second session, the [Big Bang or the Coronavirus dealing with the invisible presenting the uncertain](#). For the last part of the program we will have [Fixperts](#), a learning program that challenges young people to use their imagination and skills to create ingenious solutions to the everyday problems of a real person. Then Leonardo Aranda from Media Lab Mexico, a philosopher and media artist, will share the session [Prototypes and Crisis: Rethink Technological Rationality through Art](#). Andrea Valencia, a curator from Museo Tamayo, will close the program with a session about the [Museum as a prototype](#).

In 2014, Anil Dash and Kevin McCoy, during a hackathon organized by Rhizome at New York's New Museum, invented a project called Monegraph, which is the prototype of the present NFTs that is now making a massive change in the art scene. So I strongly believe massive turns or cultural mutations may be generated in the context of art, in times of contingency—if there is the political and collective will to do that.

Tania Aedo Arankowsky is a cultural producer with experience in developing projects at the intersection of art, science, and technology. She is coordinator at Cátedra Max Aub, Transdisciplina en Arte y Tecnología, Universidad Nacional Autónoma de México (UNAM), and was previously director of Laboratorio Arte Alameda and Centro Multimedia at the National Center for the Arts in México. She studied artistic education at Escuela Superior de Artes de Yucatán (ESAY), and visual arts at UNAM, which recognized her research with its Award for Artistic Creation. Following her studies, she attended the Museum Management Program organized by the Instituto de Liderazgo en Museos, Mexico City, and the Getty Leadership Institute (Getty Foundation). Arankowsky has been honored with grants such as the Media Arts Fellowship from the Rockefeller Foundation, the Ford Foundation, and the MacArthur Foundation. She par-

ticipated in the Creative Residencies Program at the Banff Center for the Arts through a grant from Fondo Nacional para la Cultura y las Artes (FONCA), which has continued to support a number of her projects. She has been involved as an author and/or editor in the publication of various books, including *Techkné I.O*, *Interdiscipline School and Art* and *ARTECHMEDIA*. Arankowsky has also developed several curatorial projects, such as *Surrounded* at the School of Media and Design at the Nanyang Technological University in Singapore.

WHOSE REALITY DOES THE MUSEUM REFLECT?

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This text is an academic paper based on the conference presentation delivered at HyMEx.

Does the image represented by the museum portray reality, and if so, whose reality? The narrative represented by museums, the objects preserved in them, and their permanent exhibitions always reflect the imprints of a given period, particularly in case of national museums, which reflect the political perception of the current system.¹ This paper examines what happens if a person or group from a minority is dissatisfied with the image of that minority represented by the museum, and articulates their dissatisfaction. Specifically, when a group of Roma artists use performance to question the Roma image represented by Hungary's national museums, or rather the lack of it. In this case of cultural hybridity, the group create counter-narratives through critical reflection, using the strategy of "talking back" in order to demand place, space, and adequate representation, including self-representation, in iconic national monuments and art museums.

Through an analysis of documentation of two performances by the Sostar artist collective, I present the deterritorialization alternatives offered by contemporary art and participatory practices. Deterritorialization, the key concept in my case study, was first used by Gilles Deleuze and Felix Guattari in connection with minority literature in their book on Kafka. It is a form of manifestation in which a representative of a minority quits the minority-majority dependency relationship and thus creates a border situation, taking a stand against oppressive structures by reversing the means used by the majority. The aim is to push the limits of the majority system and question its legitimacy.

Through the works of Sostar, I will analyze how contemporary art can formulate a critique which creates boundary situations in the art and museum system and generates key questions. Is it possible to break out of the power structures preserved by the museum through participatory practices and critical reflection—by moving beyond the traditional museum framework and creating an alternative interpretive context in virtual space? Is it possible to re-contextualize the reality represented by the museum or influence an institution's policy?

¹ Joachim Baur, "Múzeum és nemzet," in *Többszólamú múzeum. Néprajzi múzeumi dilemmák a 21. század elején* (Budapest: Magyar Néprajzi Múzeum, 2018), https://neprajz.hu/binaries/content/assets/kiadvanyok/tobbszolamu_tabula_15.pdf. Translated from the Hungarian by the author.

Sostar is an avant-garde group of Roma artists, writers, poets, directors, visual artists, and activists, formed in the 2000s. I would like to highlight some of its members, namely József Choli Daróczi, Gusztáv Nagy, András Kállai, Henrik Kállai, and André Raatzsch. Mainly active in the 2010s in Budapest and Berlin, and currently inactive, Sostar created exhibitions, performances, actions, and manifestos to question the adjective “Roma,” to turn the label “Roma” as an ethnic category inside out, and to question and criticize the phrases “Roma artist,” “Roma painting,” and “Roma art.”

In January 2014, an exhibition titled *{roma} The contract to sell the ethnicity* took place in the open office of tranzit.hu,² where, in addition to individual works by members of the Sostar group, videos they recorded together and works by invited artists were exhibited. András Kállai’s video *Untitled* (2012), which is the documentation of a performance, was exhibited as one of the videos of the Sostar group. During the performance in question, the artist had visited iconic national memorial sites. His route—Heroes’ Square, the Parliament, the Chain Bridge, and the Hungarian National Gallery—can be considered a kind of national pilgrimage in Budapest. These places and spaces are the bastions of the construct of the Hungarian nation, emblematic sites of the experience of Hungarian identity. By visiting and touching the sculptures and buildings, we witness a symbolic connection. On the other hand, we also see an act of appropriation, the artist symbolically “paying” with his own blood at national memorials through a public intervention. By leaving traces of blood, the artist reflects on the neglect that leaves out the Roma minority from Hungarian national history through structural oppression.

As the country’s largest national and ethnic minority, Roma have lived in Hungary for centuries. Hungarian and Roma history are intertwined; it is a common history. In the telling of the national narrative the Roma are often left out, however, meaning they are excluded from history textbooks and from the exhibitions and collections of our national museums. One example is the current permanent exhibition at the Hungarian National Museum, where the only Roma depiction occurs on a tableau of costume history hidden in a corner of a doorway.

The Roma minority is also under-represented in the collection of the Hungarian National Gallery, the citadel of Hungarian fine art and the last stop on Kállai’s national pilgrimage in the video. It is also a symbolic national memorial site for Hungarians, with a collection and exhibition of the most significant paintings and sculptures that have defined the Hungarian identity. I have not been able to determine exactly how many works by Roma artists are in the collection of the Hungarian National Gallery, but over the last twenty years the number of exhibitions it has dedicated to Roma art is one: *Colourful Dreams of Remembrance*, organized by Péter Szuhay in 2007.

When the video *Untitled* was recorded at the Hungarian National Gallery, an iconic exhibition was on display, titled *Heroes, Kings, Saints – Images and documents from the history of Hungary*. Its poster appears in the video. This exhibition was designed to celebrate the introduction of the National Fundamental Law of 2012 and featured the illustrations commissioned for the illustrated edition of the Fundamental Law. These were the

² tranzit.hu is a contemporary art space in Budapest supported by Erste Stiftung.

“ne plus ultra” of nationalism, patriotism, glorification of Hungarianism. The glorious moments of Hungarian history—the conquest, the blood oath, and so on—were shown, but there was no mention of the Roma.

Kállai chose a strategy of deterritorialization when he left his bloody fingerprint on the facade of the entrance to the Hungarian National Gallery. He protested against the omission in symbolic form by leaving his own imprint or signature on the building. The artist appropriates the Hungarian National Gallery with a gesture of translation, which he uses as a tool in the performance, creating his own counter-narrative through it. This act can be interpreted as a kind of claim for reparation, which can be read as a demand to be included in the national museum and in the Hungarian canon of fine art.

The practice of critical appropriation is used by Sostar in *Rewritable Pictures* (2010), in which photographs from the former Roma collection of the Hungarian Museum of Ethnography are re-enacted, offering opportunities for their re-reading and alternative presentation. To contextualize the *Rewritable Pictures* performance, it should be noted that between 1995 and 2001 the Hungarian Museum of Ethnography had an “independent” Roma collection. I put the term “independent” in quotation marks because the collection was not officially included in the Ethnographic Museum’s collection division; it was just that each piece was given a deposit inventory number. The curator was Péter Szuhay, who had the undisguised intention of building up a collection for a future Roma museum, as there was no public Roma collection or museum in Hungary, despite their being the country’s largest ethnic minority.³ I would like to note that this demand has not been fulfilled so far: this coveted institution, the Roma Museum, has not been established in Hungary.

In 2010 Sostar, in collaboration with Szuhay, examined the former Roma collection and selected images which are not stereotypical depictions but present Roma people in everyday life situations. Through this action, Sostar borrowed categorized Roma images stored in the Ethnographic Museum’s photo collection as a national archive and elevated them to the critical space of contemporary art.

Then, in the mirrored room of Trafó,⁴ using dancers and actors in a kind of re-enactment process, they tried to replay the situations of the original taking and presentation of the photos.⁵ In front of the mirror, through contact improvisation scenes they opened up space for the interpretation of the photos, creating a kind of contact zone between the labelled images glued to the mirror, the figures moving in front of the mirror, the reflection, and the video. Sostar made an attempt to find out how the unequal power relations fixed by archival structures could be dissolved with the aid of performative practices. In

3 Péter Szuhay, *A Néprajzi Múzeum Roma gyűjteménye*, In *Napút – irodalom, művészet, környezet*, Napút Kiadó, VII. évfolyam, 9. szám (Budapest, 2006), 49–55, http://www.naputonline.hu/naput-kiadvanyok-arhiv/naput_2006/2006_09/049.htm. Translated from the Hungarian.

4 The Trafó House of Contemporary Arts in Budapest.

5 Please note that this part of the text (From “*In the mirrored room of Trafó ...*” until “*... creating one’s own image*”) was previously published on the ERIAC RomaMOMA blog, Critical reflection on the RomaMOMA initiative (2021), <https://eriac.org/critical-reflection-on-the-romamoma-initiative/>.

the video, employing Spivak's "talking back" tactics,⁶ the catalogued photos are inverted from the national framework to a critical contemporary framework and the Roma image is appropriated (or re-appropriated) through a critical reinterpretation of the relationship between the photographer and the photographed. Through this act of deterritorialization, the performance created its own alternative archive, a counter-narrative through the appropriation and critical positioning of museum photographs.

The video documentation of the performance already provides a narrated interpretive context for the artwork. During the editing, the moving image came to be interrupted by chapter titles and frozen photo enlargements, and the whole performance placed within a theoretical framework by the texts quoted in the video. The chapter titles are the same as the division of Edward W. Said's book *After the Last Sky – Palestinian Lives*: 1. States, 2. Interiors, 3. Emergence, 4. Past and Future. A quote from Kathrin Rhomberg was an excerpt from her statement from the 6th Berlin Biennale, questioning the meaning of reality and the use of the term itself, while André Raatzsch speaks of the reality generated by photography and the reality of replayed reality. Through this performative rewriting of the photos and the vulnerable situation of the subject, through reinterpreting the moment of recording as a position of power, they presented the images in the video reflexively, within a new framework.

According to Raatzsch, "Our intention here was to find an example of how resources, in this case the photographs in a specific archive, can be used and read. Another aim was also to create new layers of imagination and show how this can help develop new ways or add to the existing ways in which a photograph can be read. These reflections on the photos became an integral part of the archive and could be linked up to the original photos, offering the viewer alternative ways of reading them."⁷ The rewriting of the images reflects the myriad of reading possibilities mediated by the photographs. Each image is given a new frame of interpretation, reflecting new realities through who and from what perspective they are viewed. According to András Müllner, "the talking back that takes place here is the realization of a concept that reflexively treats the logic of an ethnicizing collection and the promise of a new, non-ethnicizing archival logic."⁸

The RomArchive "Politics of Photography" section created on the group's online space can be considered as a kind of continuation and institutionalization of the project, curated by André Raatzsch. The aim of the *RomArchive* (2019) is to create a counternarrative that does not present Roma cultural heritage from the majority point of view, but seeks to create its own cultural history narrative from the Roma point of view, by collecting its own works of art and its own archival structure through interpretation. "Politics of Pho-

6 Chakravorty Gayatri Spivak, "Szóra bírható-e az alárendelt?" trans. Alice Mánfai and László Tarnay (Helikon Irodalomtudományi Szemle, 1996/4), 457.

7 André J. Raatzsch, *Private Fotos der Roma und Sinti. Unterwegs zu einem Roma-Bildarchiv* (Master thesis, UdK Berlin, 2010). Translated from the German.

8 András Müllner, "A zárójel mint a gettó ironikus képe. Az etnikai művészet lehetőségéről és kritikájáról a Sostar?/Why? {roma} művészcsoporthoz a tükreben," *Apertúra* (2014) nyár-ősz, available at: <https://www.apertura.hu/2014/nyar-osz/mullner-a-zarojel-mint-a-getto-ironikus-kepe-az-etnikai-muveszet-lehetosegerol-es-kritikajarol-a-sostarwhy-roma-muveszcsoporthoz-a-tukreben/>. Translated from the Hungarian.

tography” is an archive that provides space for reflecting on the possibilities of rereading and re-interpreting photographs. It examines the role and responsibility involved in the power of archival structures and the elementary necessity of creating one’s own image.

As well as presenting these two examples, I would also like to draw the public’s attention to the fact that the 3rd OFF-Biennale is taking place in Budapest in hybrid form during the HyMEx Symposium. The OFF-Biennale itself was created in 2015 as a kind of counternarrative, as an alternative to the shrinking Hungarian contemporary art institutional system, but I don’t have time to go into details about it. This year’s event features the *RomaMOMA* project, which is closely linked to the issues I have raised here. It is an exciting program of several different events and exhibitions, of which I would like to briefly highlight only two:

An installation by Norbert Oláh titled *Anxiety of the Roma Artist*, which is a brick wall in front of the former Roma Parliament building. Each brick bears a keyword: power, equality, culture, support, conflict, tradition, minority, institution, and so on. It is not a purely symbolic wall, being situated directly parallel to the gate of the closed Roma cultural institution, a former Roma museum. It is a public intervention; in this situation there was no option for critical reflection within the institution, in the museum, so the artist appropriates the public territory in front of a former museum to create his counternarrative.

Within the exhibition *Collectively Carrying Out*, organized by Anna Lujza Szász, Eszter György, and Teri Szűcs, Tamás Péli’s *Birth* (1983) will be presented in the Budapest History Museum, which is located next to the Hungarian National Gallery in the Buda Castle. Péli’s iconic painting, which was prepared for the children’s home in Tiszadob and tells the origins of the Roma people, stood in a warehouse for nearly ten years. Now, through a contemporary art project, it is to be put on display in the capital of Hungary, generating a discourse on the painting’s location, the place of Roma art, and the question of a Roma museum. This case is not an action of a group of contemporary Roma artists, but beyond the symbolic contemporary art situation, the painting is being physically installed in the museum space, and is thus able to raise these important questions.

I would like to conclude by asking one last question: Can the practices of deterritorialization discussed here generate change in museums—can they can trigger subtle shifts in power structures that seem to be unmovable?

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{roma} Szerződés az etnikai hovatartozás eladásáról című kiállítás a Metszéspontok I-III. című program képzőművészeti kiterjesztéseként került megrendezésre a tranzit.hu terében, 2014. január 10. - február 28. http://hu.tranzit.org/file/roma_the_contract_to_sell.pdf.

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Some parts of this text have already been published in an amended form in the following cases:

Varga, Krisztina. "Performative rewriting – Sostar collective: Rewritable Pictures (case study)." FIHRM conference: Power and Voices: Echoes and Empires, Museum, Representation and Human Rights section. Given October 16, 2020.

Varga, Krisztina. "Critical reflection on the RomaMOMA initiative." ERIAC RomaMOMA blog, 2021. <https://eriac.org/critical-reflection-on-the-romamoma-initiative/>.

Krisztina Varga is a PhD student in film, media, and cultural studies and a researcher at the Minor Media/Culture Research Centre, ELTE, Hungary. Prior to this, she graduated from the Contemporary Art Theory and Curatorial Studies Program at the Department of Art Theory, Hungarian University of Fine Arts, where she examined issues around contemporary Roma art institutions in Hungary. Her PhD focuses on the cultural representation of minorities, the question of the Roma museum, and participatory practices in museums. In her research, Varga compares the situation and practice of Roma cultural institutions in Hungary with the exhibition and mediation practices of Roma museums in Europe which apply participatory methodologies. She is currently an OTKA assistant researcher, working on the the history and current practices of Hungarian participatory film culture, with an emphasis on the self-representation of vulnerable minority groups. As part of that project, Krisztina looks at participatory filmmaking in the museum and explores alternative modes of museum pedagogy based on visual participation. She teaches undergraduate students at ELTE. She was recently selected as a speaker at the Federation of Human Rights Museums International Annual Conference. Her newly published essay, "Critical reflection on the ROMAMOMA initiative," is available to read on the European Roma Institute for Art and Culture's blog (eriac.org/critical-reflection-on-the-romamoma-initiative).

Moderated by Borbála KÁLMÁN

Panelists: Tania AEDO ARANKOWSKY,
Bruno BRULON SOARES, Béla Tamás KÓNYA,
Corina L. APOSTOL

The first day of the HyMEx Symposium pivoted around a comprehensive, holistic approach of the hybrid museum, aiming at defining its larger context and the possible impacts it may result in the museum structure. The debate that closed the day focused on two main axes. First, the panelists approached in a wider temporal setting (i.e. not only in the light of 2020 and the pandemic), the impulsive digital fluxes pervading the overall aspects of contemporary art and cultural museums. The question raised was if this phenomenon was transmogrifying their own professional approach within their respective institutional frames. Kónya engaged from a strategic perspective regarding the conservation process of artworks within a national art museum, Aedo Arankowsky from the position of a more laboratory-like creative work community, Apostol from the point of view of a contemporary art institution with originally no collection; and at last but not least, Brulon Soares from a university field specialised in experimental museology.

Kónya reflected on the path he experienced first through a collection management system, and later on through a museum management system – both having difficult aspects to get hold of but allowing an extensive palette of solutions for a complex transitional process. Regarding the hybridity aspect of conservation, he underlined that during lockdowns, the museum site was still at high risk even without visitors and this needed a complex organization of all of the conservators to keep the museum and the collection operating safely. Digitizing and archiving are essential to handle an artwork but the real effective treatment is needed as well.

Aedo Arankowsky framed her practice as a curator and as a programmer being impacted by the idea of navigating contingencies which – referring also to the intersection of art, science and technology – have been present for a long time, however she senses that it is within an emergency context that these concepts acquire new relevancy. Aedo Arankowsky highlighted the weight – in each of her conversations with artists, scientists and technologists – of her question relating to the contingencies the interlocutors imagined to take shape in the near future and how they would deal with them? The use of an experimental methodology to gather a conceptual repository of warnings and knowledge seems useful in these present times and in the future, she added, when humanity will for sure be experiencing new kinds of emergencies.

Apostol captured her shift through the work she had started with her team around the Tallinn Art Hall Virtual Platform before the pandemic: the cornerstone of the project was accessibility to artworks and bridging inequalities of accessibility (elder audience, differently abled audience) and finding a solution to make the digital and new media

tailored to these audiences, given that a different kind of support is required to encourage their participation. The Virtual Platform succeeded in its aim and the idea to build on engagement, sustainability and to consider the audience not as only consumers, but also as content creators became a driving force. Apostol completed her thoughts by sharing that the topics of public space and augmented reality will probably occupy a bigger part in her work in the near future: different public venues and spaces that can be activated and not just by transforming the museum into a VR experience but maybe also the other way around.

Brulon Soares accentuated a different angle as his background is of a university's. The work at the laboratory of experimental museology develops research activities and supports activities in community museums all over Brazil. Many of these museums were in a much more precarious situation in the past period than other traditional museums in the country in a way that they needed to be assisted to even keep some of the basic activities or to remain operating museums because of the lack of public policies for these specific "social museums". They survived this sensitive period in different ways: some did not manage to develop digital platforms or work through social media, others could become creative. Although budget-wise these digital operations may be less expensive than developing an exhibition, they demand a lot of work and they also demand to have a trained staff to work on the digital platforms – which many museums could not afford recently. The economic matter that impacts these museums is hence considerable.

In a second part, referring to Christiane Paul's presentation in which she used the term renegotiating in regard of the authenticity of works; also referring to Tegan Bristow's remark during one of the Q&As, raising that it was important to remember that for much of the South, modernism and colonialism were one and the same and that decolonizing is asking to rethink modernism in full; departing from these two ideas, the question addressed to the panelists was: How do museums open themselves to this approach, taking in consideration that the responsibility of rethinking modernism was not only relevant in the South, but also globally. At what level could the hybrid experience help this process?

Brulon Soares emphasized how much the hybrid experience seemed to be a provocative notion taking in consideration the struggle of museums in Brazil and elsewhere too to keep their basic functions alive and to maintain archives and cultural tangible heritage accessible. Due to the pandemic, serious cuts had to be implemented in terms of funding, and many museums needed to rethink how to sustain their spaces while also developing an increased digital activity. Having hybrid possibilities and exploring the digital tools is obviously fascinating – according to Brulon Soares, many community museums have found more than interesting ways to respond through accurate tools in order to develop their activities. On the other hand, he thinks that for many museums it is essential to focus on keeping their collections, specific staff, basic resources and principles (conserve, research, transmit cultural heritage to a larger audience). He also brought up the issue of decolonization within the context of the dichotomy of the interrelational concept of modernity and coloniality: how – in order to see museums evolve into the future in a non-colonial way –, the modern structure of these institutions should be questioned? Brulon Soares pointed out that technology contributes to have a critical thinking about

processes such as separating what works from what doesn't, to highlight the priorities and the functions of museums, preserving methods, etc. The most important is, he said, to think through what are the things that really need to change and what are those that should be transferred to the future.

Aedo Arankowsky stressed eventually the amazing importance and potentiality of museums as hubs to experiment with formats. She stated that in case there is a political will to change the inside of the museum, it may become a place with an enormous potential to transform its surrounding. The problem and the issue is according to her how to direct those initiatives towards the sustainability of life, and not towards the entropic processes that prevail these days.

HyMEx – Part 2

FOLLOWERSHIP VS. SPECTATORSHIP
Keynote by Boris GROYS

PANEL 5
KNOWLEDGE PRODUCTION UNDER THE VIRTUAL CONDITION
Zsófia RUTTKAY
Lily DÍAZ-KOMMONEN
Ben VICKERS

PANEL 6
EVOLVING ARCHITECTURES:
ALGORITHMIC, DYNAMIC AND PERFORMATIVE SPACES
Tegan BRISTOW
Sarah KENDERDINE
Robert B. LISEK & Karolína KOTNOUR

PANEL 7
SUMMONING GHOSTS:
FROM RECONSTRUCTIONS TO VIRTUAL MODELS
Bruce ALTSHULER
Philippe BETTINELLI
Felix KOBERSTEIN

Debate summary – Part 2

FOLLOWERSHIP VS. SPECTATORSHIP: THE TWO REGIMES OF THE CONTEMPORARY IMAGE

Boris GROYS

Professor, New York University (USA)

The text is an academic paper based on the conference presentation delivered at HyMEx.

The decisive difference between a digital image and a traditional, off-line image is this: every digital image has an address. Apart from those few artworks in museums, private collections, and so on, all traditional images that are not recognized as especially valuable or collectable remain addressless—as elements of the indefinite visual noise. In contrast, every digital image has an address and is inscribed into its context. If a it is taken out of a context, that means that it has gained a different context. To see digital images, we have to access their addresses—the accounts and websites of the individual artists or art institutions or the ordinary public and private Facebook or Instagram accounts.

That is why an artist who is operating on the internet is called a “content provider.” Here the content is understood not as a depiction of an external, off-digital reality. Rather, we understand a certain digital address as a container, and images and texts as contents of that container. The activities of an artist as content provider can be followed by internet users if they visit the addresses where the artist uploads their images. That means that the internet user is not so much a spectator of individual images, but a follower of artistic practices and strategies. Every image that one sees when one accesses a certain address is seen as a point on an artist’s trajectory—a point of transition from past to future, from their previous works to the new images they are expected to make. The same can be said about images generated by celebrities: one follows these celebrities on specific internet addresses and expects to see their new images in the future, thus tracing the history of their life in real time. Here again an individual image functions not as an object of contemplation but as a promise of a next image—as a sign that indicates in which direction an artist or celebrity is moving and what one can expect from them in the future.

Earlier this attitude of anticipatory followership was characteristic of professional art insiders—critics, museum curators, gallerists, etcetera. And in the case of celebrities, of professional journalists. The “normal” spectator was expected to directly relate to an individual image—to find it fascinating or terrible. The internet has universalized the

professional attitude towards art, however. Internet users are not spectators but followers. They click on certain addresses on the internet to see what is going on there. Looking at the individual images or descriptions of events that are offered, they decide if they will visit the same account or website again or not—in other words, if they expect to still “like” its content in the future. In our time even the museums that were initially created to remain places of contemplation inside active urban life have websites that present them as places for events of various kinds: temporary exhibitions, screenings, lectures, performances. The number of followers of a certain artistic personality or art institution is now decisive for establishing its value. The internet has not only universalized the professional relationship to art, but also monetarized it. Every image is an image of the expectation for the next image. And the art market—even more than any other market—operates with expectations.

On the internet the followers are also followed. Their behavior shows the direction in which art and culture are moving—which trends they prefer to follow, which expectations they have for the next step of art development. Predictions of this kind are the source of the internet’s monetarization, because the internet lives on advertising and advertising is based on predicting the future behavior of producers and consumers. In this sense one can say that every work by an artist is an advertisement for his or her next work, every exhibition in a museum is an advertisement for the next exhibition, and so on. But if people have always tried to predict future artistic and cultural trends, what is the difference now? The difference is in the de-professionalization of the practice of prediction. Earlier, the works of a particular artist could be seen in different museums and galleries only by people who were able to travel from one exhibition to the other. Today everyone can follow the work of a particular artist using the appropriate internet addresses.

Digitalization has also changed the rules of art production. Duchamp had already introduced the technique of the ready-made: an image or object became an artwork when an artist took it out of the mass of addressless images and objects to give it an address in the museum. The artist became mediator between the museum and its outside. This strategy was successful, but it had a big problem: the operation of appropriating a particular ready-made required the consent of the museum; the artist lost autonomy and became dependent on the museum bureaucracy. The internet has given the autonomy back to the artist. Artists are no longer dependent on museums because they can establish their own addresses—and give addresses to every image they want. As a result, the difference between original and copy is erased.

In his classic essay on *The Artwork in the Age of its Mechanical Reproduction*, Walter Benjamin famously assumed the possibility of a perfect reproduction, which would make it no longer possible to visually distinguish between an original and its copy. But according to Benjamin, “Even the most perfect reproduction of a work of art is lacking in one element: its here and now, its unique existence at the place where it happens to be.”¹ He continues:

1 Walter Benjamin, “The Artwork in the Age of its Mechanical Reproduction,” in Benjamin, *Illuminations* (New York: Schocken Books, 1969), 253.

“These ‘here’ and ‘now’ of the original constitute the concept of its authenticity, and lay basis for the notion of a tradition that has up to the present day passed this object along as something having a self and an identity.” The copy, by contrast, is siteless, ahistorical: from the beginning it appears as potential multiplicity. Thus, for Benjamin photography and, especially, film are the most modern art forms—from their very inception they are mechanically produced and destined for topologically undetermined circulation. In other words, they are originally copies. Originality is understood here as the relationship of the artwork to its context, to its historical address. Mechanical reproduction erases originality because the copies are contextless, addressless.

Digital reproduction is by no means contextless, however. Its circulation is not topologically undetermined and it does not present itself in the form of multiplicity. As I said, on the internet all data has its address—and, accordingly, its place. The same data with a different address is different data. The circulation of the digital data on the internet therefore produces not copies but new inscriptions and, thus, new originals. This circulation is perfectly traceable and accordingly historical. Even more important, the digital copy can never be a precise reproduction of the original.

Rather than the digital image, it is its digital file that remains identical through the process of its reproduction and distribution. But the image file is not an image—the image file is invisible. The digital image is an effect of the visualization of the invisible image file. Accordingly, a digital image cannot be merely copied (as an analogue, mechanically reproducible image can) but only newly staged or performed. The image begins to function like a piece of music, which is never identical to its score—the score being not audible, but silent. One can argue that digitalization turns traditional visual arts into performing arts. Every musical performance is different from other performances of the same score. A digital image also always appears in a new form—according to the hardware and software that a particular user applies when he or she lets the digital data to appear on a screen. In a somewhat paradoxical way, digitalization leads back to premodern, archaic cultures in which the production of an exact copy was impossible. Poetry had to be orally performed, copies of artworks were produced by the individual artists—the results were obviously different from the original.

However, the recent emergence of non-fungible token (NFT) technology has allowed us to fix not only data but also its performance. In this sense the NFT can be compared to audio recording technology, which transformed music production and distribution. We can now collect not only the data but its individual performances. At the moment the technology does not go that far, of course, but it already allows us to stabilize the form of individual artworks and thus create digital art collections based on the operation of exact reproduction.

This new technology does not change our basic mode of using the internet—that is, followership. And here the analogy between the use of the internet and the spiritualist seance is obvious. We follow certain artists or celebrities without leaving our seat at the computer or just by keeping our smartphone in our hands. We call up an image that we want to see by clicking on its name, and the image emerges in front of our eyes. Here

I am reminded of Benjamin's text *On the Language as Such and on the Language of Men* from the 1920s.² According to Benjamin men can only describe objects, and the objects themselves remain absent, while God makes things emerge just by calling them. Now it is obvious that on the internet the users have the same divine powers: when they call the things, the things emerge. Of course, one can say that we see only the images of the things and not the things themselves. But this is incorrect. On the internet the image itself is a thing, and not merely a representation of some other thing. We look for images not necessarily to see representations of external reality but to follow the trajectories of the spirits that produced them, as they go from one image to the next. As far as we follow these spirits, the internet magic works perfectly.

Now, are digital images "immaterial"—purely spiritual images, images beyond matter? This question is more difficult to answer than it would seem. On the most obvious level, digital images are perfectly material. Their material bearer is electricity. If we cannot see electricity, nor can we see a canvas when it is covered by a painting, or the material of a sculpture. Nor is it the case that we can see the canvas when the painting is erased—we know that the "naked" canvas is also a painting. And we know that we cannot see the matter as such—the electrons, positrons, and so on. So digital images are as material as everything else. But there is still a difference between digital images and traditional images. Digital images look at us, and traditional images do not.

Indeed, when we call the spirits—good or bad spirits, gods or demons—not only do they become visible to us but we also become visible to them. The followers are followed. This is the central difference between followership and spectatorship. Traditional spectatorship is based on a subject-object relationship with the following basic characteristic: the gaze of the subject does not leave any traces on the object. It is precisely this absence of any material trace of the gaze that suggests the metaphysical, spiritual, immaterial, transcendent status of subjectivity. The subject is believed to be not of this world because its gaze does not leave a trace in this world; to look at the object is not the same touching it. On the internet, the difference between looking and touching disappears. In this sense the internet is a realization of the phenomenological project of Maurice Merleau-Ponty, who tried to erase that difference and interpret seeing as a mode of touching.³ Merleau-Ponty's goal was precisely to contest the ideal, transcendent status of the subject. If seeing is a mode of touching then the subject is in the world, not outside of it. And that is precisely what happens on the internet. The subject cannot take an external, transcendent position because its gaze leaves a digital trace.

If I follow something or somebody on the internet, the movement of my gaze can be retraced. To see an image I have to click on its name, and I then may look at some details to compare this image with other images. All these operations leave traces. One can find out how long I looked at an image, which details I was interested in, and so on. My own address can also be established, and my physical position in real space localized. The internet is often seen as a place of the dematerialization of the things of the world, but it

² Walter Benjamin, "On Language as Such and Language of Men," in Benjamin, *Selected Writings* 1 (Cambridge, MA: Belknap Press, 1996), 63–74.

³ Maurice Merleau-Ponty, *The Visible and the Invisible* (Evanston: Northwestern University Press, 1968), 120ff.

is first of all the place of the materialization of the subject, of the spirit. We hear a lot of complaints that the big corporations and various state agencies track our personal use of the internet to create an image of our behaviors, tastes, environment, and personal lives. Every visualization of a digital image is also a manifestation of our own image, an act of self-visualization. Looking at a digital image I produce an image of myself and offer that image to an invisible spectator hidden behind the screen of my personal computer.

This can be understood as the actual meaning of the words “beyond matter.” In Greek antiquity, when we looked at a statue of Venus we knew that Venus looked back at us. That is why we were ready to kneel in front of that statue and offer tribute to it. The same can be said of the Christian icon. When Friedrich Nietzsche famously wrote “God is dead,” he continued by stating that we had lost the spectator of our souls, and thus our souls themselves. During modernity every image became a mere thing, a mere object. We looked at an image but the image did not look back, because it was understood as “merely material.” Now the universal spectator of our souls is back. Our “digital souls” have become traceable and visible.

Our experience of contemporaneity is defined not so much by the things’ presence for us as spectators but by our presence for the gaze of the hidden spectator. We do not know if this spectator is the benign God or *malin génie*. Of course, we can—even if only to a certain degree—analyze the activities of Google and Facebook, but we cannot exclude the presence of a completely unknown spectator, because it is technically possible. In other words, the hidden universal spectator of the internet can be thought of as a subject of universal conspiracy. The reaction to this universal conspiracy takes the form of a counter-conspiracy: one will to protect one’s own soul from an evil eye of the hidden spectator by means of codenames and passwords. The contemporary subject is at best defined as an owner of a certain set of passwords.

Technical means are not really helpful here, however, because the subject’s entanglement in the internet web has an ontological character. To restore the traditional subject-object relationship one has to go off-line, where one can contemplate an object without the angst involved in being watched by it. But the following question emerges: that of how to exhibit digital images off-line, in the museum or gallery space. There digital images cannot be exhibited as such—isolated, autonomized—because, as I said, digital images always have an address, a location, a context. This means that their exhibition in the museum requires the reconstruction of their contexts. And here one has to say that contemporary art is, in general, context-dependent. Benjamin compared the exhibition of an artwork taken out of its original context with its reproduction: a decontextualized artwork is a copy of itself. To keep its original status, we have to try to reconstruct its original context.

In the museum space individual contexts are presented in a form of installations. Already the Conceptual artists organized the installation space as a sentence conveying a certain meaning, analogous to the use of sentences in language. With Conceptual Art, artistic practice became meaningful and communicative again after a certain period in which the formalist understanding of art dominated. Art began to make theoretical statements,

to communicate empirical experiences and theoretical knowledge, to formulate ethical and political attitudes, and to tell stories. We all know of the substantial role played by the famous “linguistic turn” in the emergence and development of Conceptual Art. The influence of Ludwig Wittgenstein and French Structuralism on Conceptual Art practice was decisive—to mention only two relevant influences among many others.

But this new orientation towards meaning and communication did not mean that art became somehow immaterial, that its materiality lost its relevance, or that its medium dissolved into message. The contrary is the case. The possibility of using concepts, projects, ideas, and political messages in art was opened by the philosophers of the “linguistic turn” precisely because they asserted the material character of thinking itself. They understood the process of thinking as a use of language, and language as being material through and through—as a combination of sounds and visual signs. Thus an equivalence, or at least a parallel, was demonstrated between the word and the image, between the order of words and the order of things, the grammar of language and the grammar of visual space. The goal of the museum installation is to capture narrative time—to turn time into space—and therefore to transform followership into spectatorship.

This also explains the main difference between artistic or curatorial installations and traditional exhibitions. The traditional exhibition treats its space as anonymous and neutral. Only the exhibited artworks are important, not the space in which they are exhibited. Inside such an exhibition one moves from one image to the other, just as one turns pages when reading a book. In contrast, the installation—be it artistic or curatorial—in-scribes the exhibited artworks into the contingent material space having a certain specific configuration. And here the real problem emerges of translating internet art—all kinds of digital images, videos, and texts and their combinations—into the museum space. If the presentation of art on the internet uses pre-established formats and hidden algorithms, the presentation of digital images in the museum has to make the construction of its context explicit. That means that the curator has to find a specific form—a specific installation, a specific configuration of the exhibition space—for presentation of the digital material. The question of form becomes central. In other words, the responsibility for form-giving is transferred from artists as content providers to the curators using the individual artworks as content—this time as content inside the space the curators created. Artists can of course re-claim their traditional form-giving function, but only if they function as curators of their own work. Indeed, when we visit an exhibition of contemporary art the only thing that truly remains in our memory is the organization of the exhibition space—especially if this organization is original, unusual.

The function of an off-line exhibition is the same as the function of internet algorithms: both aim to demonstrate an image, to make it visible for a spectator. However, there is a fundamental difference: the internet conceals the hardware and software that make an image visible, while an off-line exhibition makes its construction visible.

In his writings about technology, Martin Heidegger introduced the notion of *Gestell*, which is usually translated into English as “frame” but can be better translated as “apparatus.”⁴ According to Heidegger, modern technology creates the *Gestell* that allows a person to position themselves as a subject vis-à-vis the world. This apparatus remains concealed from us precisely because it captures our gaze through an image that it offers us. However, an art exhibition (*Aus-stellung*) functions not as a pure act of presenting but as presenting of presenting, as revelation of *Gestell*, because it doesn’t only offer our gaze an image but also a demonstration of the technology of presenting, the apparatus and its structure. Indeed, when we visit an exhibition we don;t only look at the exhibited images and objects but also reflect on the spatial and temporal relationships among them, their hierarchies, the curatorial choices and strategies that produced the exhibition, and so on. The exhibition exhibits itself before it exhibits anything else. In this way the exhibition (*Ausstellung*) is able to reveal our *Gestell*, our true positioning in the world. This analysis is especially relevant for the exhibition of the digital images. As mere users we are not able to grasp the *Gestell* of the internet--the concealed functioning of hardware and software that make the digital images visible. But as the visitors of an exhibition, we can see its *Gestell* together with the images that are supported by that *Gestell*.

In the context of such an exhibition, we can see things that would never meet in their respective universes—Egyptian gods alongside Mexican or Inca gods, for example, in combination with the utopian dreams of the avant-garde never realized in “real life.” These removals and new positionings implicate the applications of violence, including economic and direct military violence. Art exhibitions thus demonstrate the orders, laws, and trade practices that regulate our world as well as ruptures to which these orders are subjected—wars, revolutions, crimes. These orders cannot be “seen” but they can be and are manifested in the organization of the exhibition, in the way in which the exhibition “frames” the art. As visitors we are not outside but inside this frame. We are exhibited through the exhibition, to ourselves and to others. That is why the exhibition is not an object but an event. That is also why an exhibition cannot be reproduced – one can reproduce only an image or an object that is placed in front of the “subject.” Yet the exhibition can be re-enacted, restaged. In this respect the exhibition is similar to the theatrical *mise en scène* – but with one important difference: in the case of the exhibition the visitors do not remain in front of the stage but enter it, become participants in the exhibition-event. So form-giving as event remains the main occupation of art in the museum. If the individual artworks can be reproduced, the installation can be only documented. Such documentation, if it is put on the internet, becomes content – and thus becomes open again for a form-giving operation inside the museum. So the exchange between museum and internet takes on the character of an exchange between content and form: what was a form in the museum becomes a content on the internet – and vice versa.

And here it is important not to forget that every individual exhibition can be considered part of the virtual world exhibition. Indeed, the inclusion of every particular artwork or artist in any particular exhibition means, at least potentially, the inscription of this artwork or artist into the “art world,” into the “global art milieu.” That is why exhibition

4 Martin Heidegger, “The Question Concerning Technology,” in Heidegger, *Basic Writings* (San Francisco: Harper, 1977), 325f.

curators are traditionally accused of having too much power—the power to form the world exhibition and produce new, global auras for individual artworks. Not only world exhibitions, including such events as documenta and various biennials, but virtually all exhibitions are criticized for being too selective, not inclusive enough. The history of exhibitions is a history of struggle against selectivity and for more inclusivity.

The internet offers technology that seems to circumvent selectivity. Potentially everyone can use a photo or video camera to produce images, write commentaries to accompany them, and distribute the results on a global scale—avoiding any kind of censorship or selection process. In practice, however, we see that the internet is a place of extreme inequality: some accounts have millions and millions of followers, whereas other accounts have only a few. The reasons for this inequality remain obscure to us because we have no access to the algorithms that regulate the internet. The choice between the museum and the internet is not a choice between selectivity and its absence but between transparent selectivity and untransparent selectivity. In the age of the internet, then, the museum remains the space of enlightened reflection on the social, economic, and political regime that regulates our visual experience of the world.

Boris Groys is a philosopher, essayist, art critic, media theorist, and an internationally renowned expert on the Russian avant-garde and Soviet-era art and literature. His work engages radically different traditions, from French poststructuralism to modern Russian philosophy, yet it is firmly situated at the juncture of aesthetics and politics. Theoretically, he is influenced by Jacques Derrida, Jean Baudrillard, Gilles Deleuze, and Walter Benjamin, among other modern and postmodern philosophers and theoreticians. Groys is a Global Distinguished professor of Russian and Slavic studies at New York University, professor of philosophy at the European Graduate School, and a senior research fellow at the Staatliche Hochschule für Gestaltung Karlsruhe, where he was previously professor of art history, philosophy, and media theory. He is also a senior fellow at the International Center for Cultural Studies and Media Theory at Bauhaus Universität, Weimar, and a member of the Association Internationale des Critiques d'Art. He has been a senior scholar at the Courtauld Institute of Art, London, and a fellow at the International Research Center for Cultural Studies, Vienna, at Harvard University Art Museum, and at the University of Pittsburg. In 2001 he was director of the Academy of Fine Arts Vienna, and from 2003 to 2004 he spearheaded the Post-Communist Condition research program at the Federal Cultural Foundation of Germany. His forthcoming book, *Logic of the Collection*, will be published in 2021.

**Knowledge Production under
the Virtual Condition**

THE DIGITAL MUSEUM: ENHANCING THE SPACE, TIME, AND NATURE OF EXPLORING ARTWORKS

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This text is an academic paper based on the conference presentation delivered at HyMEx.

INTRODUCTION

Digital tools and installations have increasing presence in the physical exhibition spaces and online platforms of cultural heritage institutions. As a computer scientist, I spent decades in academic research on computer graphics and artificial intelligence, and then became fascinated by the possibilities of working with multidisciplinary teams at the intersection of science, technology, engineering, and the arts. I became interested in artworks and their creators, from the European Renaissance and from the near past, who worked on the basis of geometric and algorithmic disciplines but without computers. My computer-aided investigation of their creative processes led me to the broader terrain of the ever-evolving digital technologies used for interpretation and outreach in galleries, libraries, archives, and museums (GLAM¹ institutions).

The emergence of digital technologies has had a huge societal impact. Young generations have entirely new habits and platforms for communication, self-expression, and life-long learning and leisure activities.² A decade ago these shifts prompted a renewal of museums' attitudes towards potential audiences and their own role in society.³ The internet and the 24/7 access made possible by the mobile phone posed challenges in getting the new generations into museums, but also offered novel means of expression for artists and institutions exploring and presenting cultural heritage, including artworks from the past.⁴

¹ I will use the term "museum" to include art galleries, as the examples discussed are all related to fine art.

² See Mark McCrindle and Emely Wolfinger, *The ABC of XYZ: Understanding the Global Generations* (McCrindle Research, 2009); Ádám Nagy and Attila Kölcsey, "Generation Alpha: Marketing or Science," *Acta Educationis Generalis* 7, 1 (2017): 107–15; Marc Prensky, "Digital Natives, Digital Immigrants," *On the Horizon* 9, 5 (2001).

³ See Gail Anderson (ed.), *Reinventing the Museum: The Evolving Conversation on the Paradigm Shift* (Lanham: Alta Mira Press, 2012).

⁴ See Zsófia Ruttkay and Judit Béneyi, "Participation within and beyond museums with the help of digital technologies," in Oswald Devisch, Liesbeth Huybrechts, and Roel De Ridder (eds.), *Participatory Design Theory: Using Technology and Social Media to Foster Civic Engagement* (Abingdon: Routledge, 2018), 213–29.; Nina Simon, *The Participatory Museum* (Santa Cruz: Museum 2.0, 2010).

In a ten-year series of Digital Museum courses⁵, which I conceived and co-ran at Moholy-Nagy University of Art and Design, design and art students worked with programming students from a technical university, in close collaboration with leading GLAM institutions, to help redevelop those institutions' exhibition interpretation repertoires. Through this experience, I came to grasp the intricate work involved in bridging the gap between the traditional museum world and the IT experts and creative designers delivering novel means for the institutions. The need for a mediator or translator—what I call a digital curator—is suggested by the proliferation of new museum job profiles⁶ as well as the growing number and success of professional conferences, forums, and journals⁷ offering theoretical and practical grounds for the application of digital technologies.

Elsewhere I have discussed the potential of digital tools for museums⁸ and introduced lessons learnt for the principles and practice of good design and the successful functioning of digital applications in such institutions⁹. Here I would like to look at the possibilities for the co-existence of the “real” physical and the “digital,” narrowing the focus to (re-)creating, presenting, and interpreting artworks with the help of digital technologies. First I will give an overview of the role of the real and the digital in their hybrid co-existence, and then discuss some projects as case studies demonstrating various possibilities.

POSSIBLE ROLES FOR THE DIGITAL AND THE REAL IN EXHIBITIONS

The message to be conveyed, the nature of the exhibited artworks, and visitors' profiles help in deciding on the proper role of the digital next to the physical. Possibilities emerge in two ways:

1. From the *space* of the digital, with a choice of:

- the physical space of the *museum*
- physical space *outside the museum* (in the city, for example)
- in the *virtual* space (such as on a website or social media platform)

5 See Judit Béneyei and Zsófia Rutt kay: “Digital Museum: A Multidisciplinary University Course” in Ruth Mateus and Berr Michaela Götsch (eds.), *Perspectives on Art Education: Conversations Across Cultures* (Vienna: De Gruyter, 2015), 49–55.

6 MuSA: Museum Sector Alliance, “Emerging Job Profiles for Museum Professionals” (2016), <https://www.culturepartnership.eu/en/article/emerging-job-profiles-for-museum-professionals>.

7 Some conferences are: <http://museumnext.com>; <https://www.museweb.net/>; <http://faimpavicom.org>;
Online forums and associations: <https://www.digitalmeetsculture.net/tag/museums/>; <https://mcn.edu/>;
<https://museumscomputergroup.org.uk/>.

8 See Rutt kay and Béneyei, “Participation within and beyond museums with the help of digital technologies.”

9 Zsófia Rutt kay and Judit Béneyei, “Renewal of the Museum in the Digital Epoch,” in Gerald Bast, Elias G. Carayannis, and David F. J. Campbell (eds.), *The Future of Museums* (Cham: Springer, 2018), 101–16.

2. From the *role* of the digital, with three major categories:

- the *physical artwork plays the main role*, while the digital application just underlines it or extends it through a special interpretation
- the *physical artwork is replaced by a digital copy* or reconstruction, as it is not present, or only a segment of it is available
- the *digital plays a major role*, either because the artwork itself is digital or because visitors' contribution and/or the physical space are essential to its existence

Role of digital and physical artefacts			
Space	digital adds-on to physical artwork	digital (3D-printed) copy / (re)construction	born-digital artwork
in the exhibition / museum space	1. <i>guide: audio, AV</i> 2. <i>explore: creation, structure, history</i> 3. <i>try out, control</i> 4. <i>raise attention</i> 5. provide context in collections	1. <i>explore space</i> 2. <i>interact with</i> 3. <i>re-create</i> 4. replace missing object 5. display restored object 6. touch, feel	1. presented in exhibition space 2. co-created by visitors 3. projected onto interior space
outside the museum physical space	1. artworks in public spaces	1. <i>PR/marketing</i> 2. recall artworks in city walk / excavations novel shop articles	1. architectural mapping 2. city soundscapes
in virtual space	1. <i>virtual exhibition tour</i>	1. <i>PR/marketing</i> 2. <i>virtual visit</i> 3. <i>education</i> 4. address audiences	1. online virtual exhibition

Table I. Types of digital applications listed with reference to the space and role in relation to the physical artwork. Items in italics will be discussed in the case studies.

CASE STUDIES

THE *ARNOLFINI PORTRAIT* IN 3D

The aim here was to create a 3D digital model best matching the interior shown in the painting known as the *Arnolfini Portrait* by the Early Netherlandish painter Jan van Eyck.¹⁰ The depicted scene looks very realistic. Van Eyck painted by eye, which was a novel approach in his day. He unknowingly attempted to apply one-point linear perspective, the development of which allowed for naturalistic painting to emerge at the beginning of the Italian Renaissance, in a shift away from the stylized figures of Europe's Medieval art.¹¹

Although the painting very convincingly suggests depth, reconstruction is not feasible because it does not adhere perfectly to the rules of linear perspective. Van Eyck was probably unaware of the discovery of perspective in Italy, as his paintings lack a steady structure for converging lines. Several vanishing points exist, as shown in Figure 1a. We used the geometrically coherent floor lines and the intersecting back wall to “reconstruct” the interior; Figure 1b illustrates what the correct spatial geometry would then be like. For

¹⁰ Erwin Panofsky, “Jan van Eyck’s Arnolfini’ Portrait,” *Burlington Magazine* 64 (1934): 117–27.

¹¹ David G. Stork, “Optics and Realism in Renaissance Art,” *Scientific American* (December 2004): 76–83.



Figure 1 (a) The multiple vanishing points in the *Arnolfini Portrait* (b) 3D reconstruction of the interior, based on choices for sound linear perspective.

the final reconstruction, further parameters had to be set for the viewing position, the size of the objects, and the diameter of the spherical mirror, also taking into account the glass-blowing technology of the time.¹²

The 3D representation provides insight into the painting's spatial structure; it may help art historians find clues to questions long unanswered concerning the site, the objects, and the painting process. It is also interesting to see how different the painting would look if painted in correct perspective. The interactive exploration of a 3D virtual model allows people with a casual interest in paintings to experience more vividly the power of perspective in this artwork, and its emergence in art history. The reconstruction can be used in an on-site or remote learning environment and extended with interactive capability (to interrogate or use the objects, for example by seeing how one would sit on the chair) and by adding 3D characters who talk and move around.

ART ANALYZER

Art Analyzer is an audiovisual guide designed by Digital Museum students¹³ for the (former) permanent exhibition of the Ludwig Museum in Budapest. On a handheld tablet, the app allows viewers to discover artworks in a playful way while walking around the exhibition space. The artwork here is a special piece in the Ludwig collection, *Landscape No. 4* by Tom Wesselmann (2006). As shown in Figure 2, as soon as the tablet's camera identifies the artwork, the triggered program explains its structure and its maker, and, using the car rolling out of the painting as a gag, drives the visitor through a history of landscape painting. Such an app can act as a guide offering visitors a path and audio-

¹² P. H. Janssen and Zófia Ruttkay, "The Arnolfini Portrait in 3D," in David B. Arnold and Andrej Ferko (eds.), *Proceedings of Eurographics 07 Cultural Heritage Papers* (The Eurographics Association, 2007), 25–32.

¹³ DiMu course project by Judit Alagyi, Krisztina Szűcs, and Krisztina Zsömbör, MOME, Fall 2011.

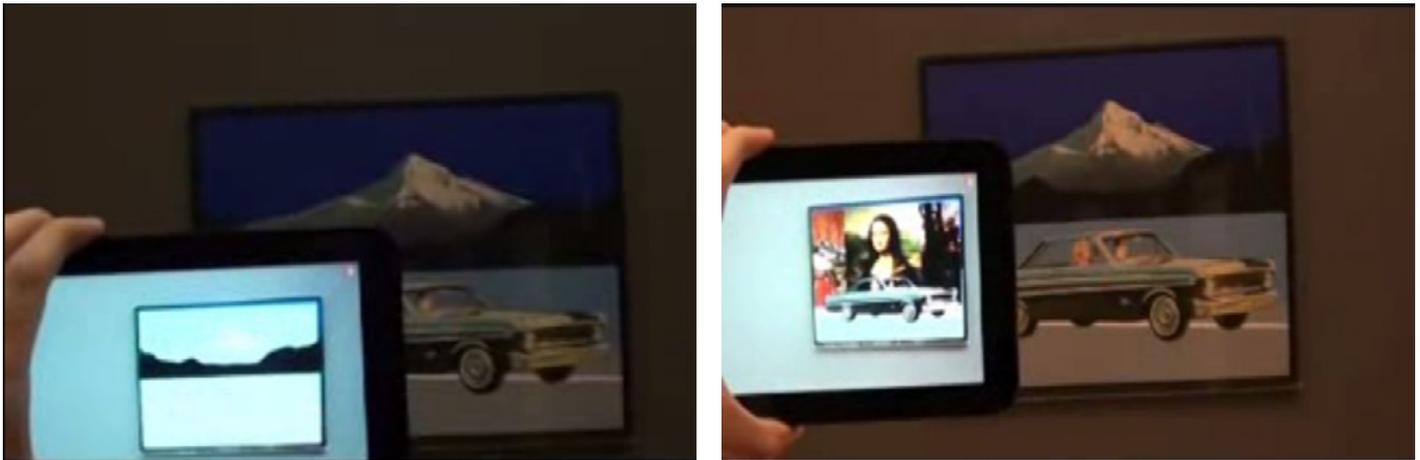


Figure 2. The Art Analyzer app in action (a) Explanation of the compositional structure of the painting (b) The car rolls out of the original painting and drives through emblematic examples of landscape painting in art history.

visual explanations of artworks on display, connecting them to other collections, and triggering emotions and interest.

ART GAME

Art Game was also designed by students to bring a painting to life, this time *Interior with Button Soccer* by contemporary artist Péter Hecker, shown in the Ludwig Museum's exhibition *East of Eden – Photorealism: reality-variations*.¹⁴ The painting renders a typical Hungarian sitting-room of the 1970s in a homely way, with iconic pieces like the design lamp and the pseudo-colonial furniture, but also an ironing board as a reminder of a lack of space in uniform mass-built homes; a remote-controlled TV acts as the altar of modern times. This interactive application recreates the interior of a painting in 3D, but also invites the visitor to explore the scene and interact with particular items. It is possible to switch on the light, take out the ironing board out, and turn on the television to watch Andy Warhol.

A virtual visit inside a real painting can:

1. extend its expressivity by enhancing depicted objects with dynamic audiovisual elements, and enlarging a frozen moment to include the passing of time
2. turn the visitor from passive observer to active participant and investigator
3. attach explanations and annotations to the painting

¹⁴ Interactive Project by Tamás Páll, 2012, MOME. The painting can be seen at: <https://www.ludwigmuseum.hu/mutargy/interior-gombfocival>.

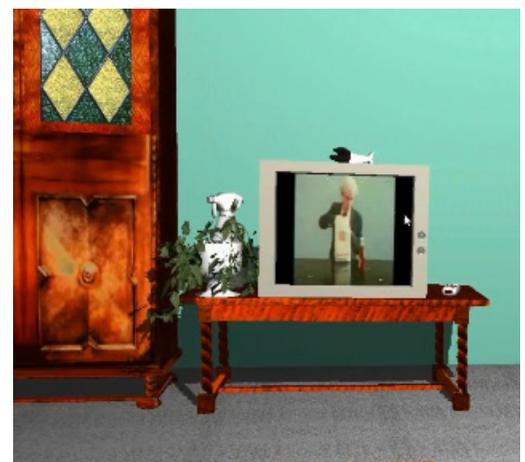
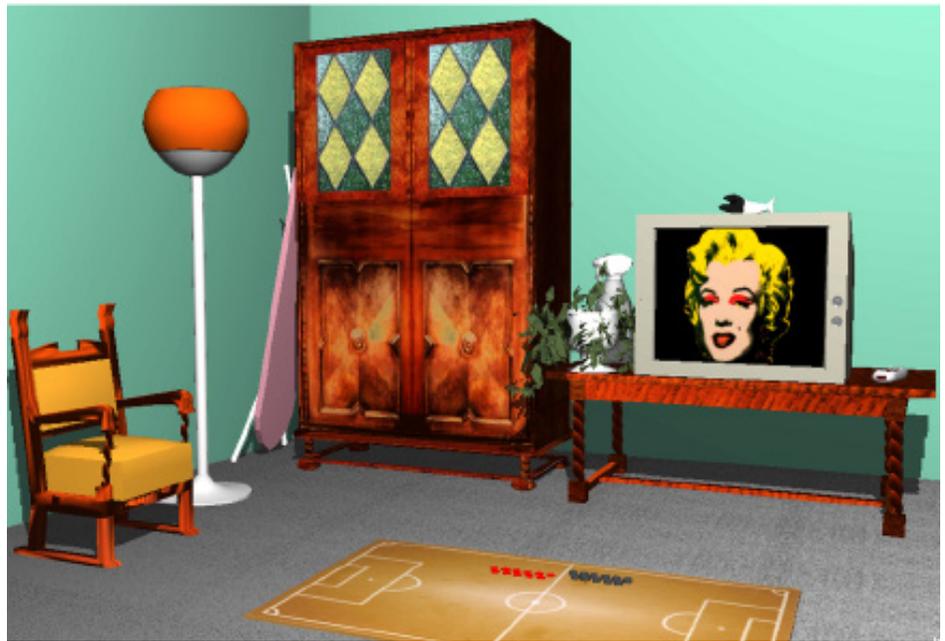


Figure 3 (a) The original artwork by Péter Hecker: Interior with Board-Game Soccer (acrylic on canvas, 120 × 145 cm, 2006). Photo: Rosta József. Collection of Ludwig Museum – Museum of Contemporary Art. (b) The 3D digital reconstruction with the light turned on. (c) The television program showing Andy Warhol.

MOHOLY PARAPHRASES

László Moholy-Nagy (1895–1946) used the imaging technology of his time in an innovative way, crossing the traditional borders of genres. He was fascinated by the role of motion and light not only in his photographs and films, but also in his sculptures, collages, and paintings. In the *Composition* series made around 1922, the set of geometric objects in each painting looks like a snapshot of an experimental process of arranging forms. *Composition II* creates a spatial feeling: the composition emerged by layering semi-transparent cutouts, inspired by looking at geometric bodies from unusual viewpoints. In his manifesto, Moholy defined space as the “relationship of objects.”¹⁵

We can assume that, lived he today, he would have embraced 3D modelling and the exploration of 3D spaces as new genres of art-making. The Moholy Paraphrases project, a student exercise in using digital technologies to enhance interpretations of art, recreated Moholy’s 2D work as constellations of spatial objects.

15 László Moholy-Nagy, *The New Vision* (New York: Wittenborn, Schultz, 1947).

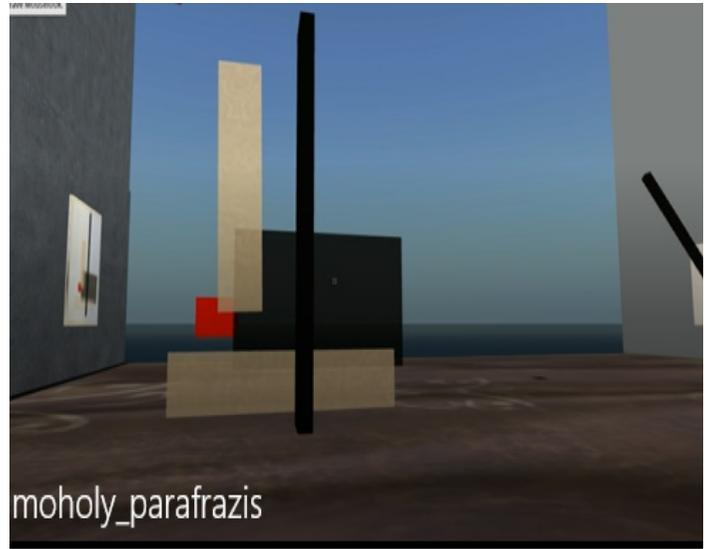
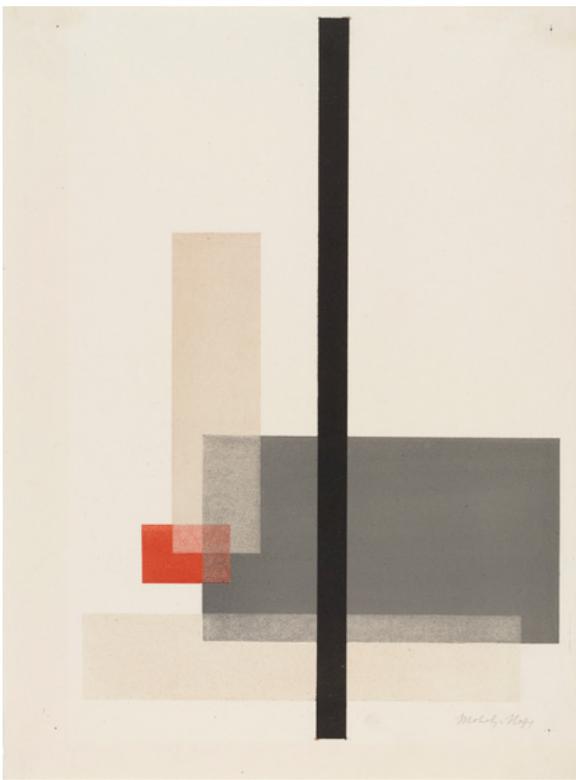


Figure 4 (a): László Moholy-Nagy: *Composition* from *Masters' Portfolio of the Staatliches Bauhaus (Meistermappe des Staatlichen Bauhauses)*, 1923. Lithograph from a portfolio of three lithographs, three woodcuts and two etchings, composition: 14 3/16 × 9 7/16 in. (36.1 × 24 cm); sheet: 15 3/8 × 11 5/8 in. (39 × 29.5 cm). Publisher: Staatliches Bauhaus, Weimar (Bauhausverlag G.m.b.H., Munich-Weimar). Printer: Staatliches Bauhaus, Weimar. Edition: 100. Larry Aldrich Fund. Acc. no.: 843.1956.6. New York, Museum of Modern Art (MoMA). © 2021. Digital image, The Museum of Modern Art, New York/Scala, Florence; (b) In the virtual exhibition space, one is challenged to walk around 3D geometric objects present in the original painting, and find a view matching it.

Visitors find themselves in a virtual exhibition that does not offer remote access to a set of artworks, but a virtual space filled with geometric 3D objects floating in a way that they never could in a real space. As they walk around and among these objects, viewers eventually discover them to be elements from paintings by Moholy-Nagy. Virtual copies of the corresponding paintings hang on a wall in a discrete way. The visitor is challenged to find a viewpoint in space from which the objects together look like the forms present in each painting. In the process, visitors will see a series of different arrangements, and probably ask themselves what makes the one chosen by Moholy-Nagy special. Ultimately, they will perceive space as a relationship of objects.

VASARELY EXPLORATIONS

Victor Vasarely (1906–1997) is considered the father of Op-Art. While his paintings give the illusion of depth, motion, and sources of light, he was concerned with expressing human values for a general public, outside the physical and mental terrain of galleries.¹⁶ Had he been born eighty years later, he might have used digital methods rather than canvas, brushes, and paint. He created many of his works by using systematic, reproducible definitions of visual content. To explore expression and effect, he made plans for playing around with possibilities of forms and colors. This involved the tedious systematic work of making many variations—in color, composition, and/or materials—of a single idea. He worked like a researcher. From 1965 onwards, he had assistants create the paintings on the basis of his design notes.

¹⁶ See Jean-Louis Ferrier, *Entretiens avec Victor Vasarely* (Paris: Editions Pierre Belfond, 1969).

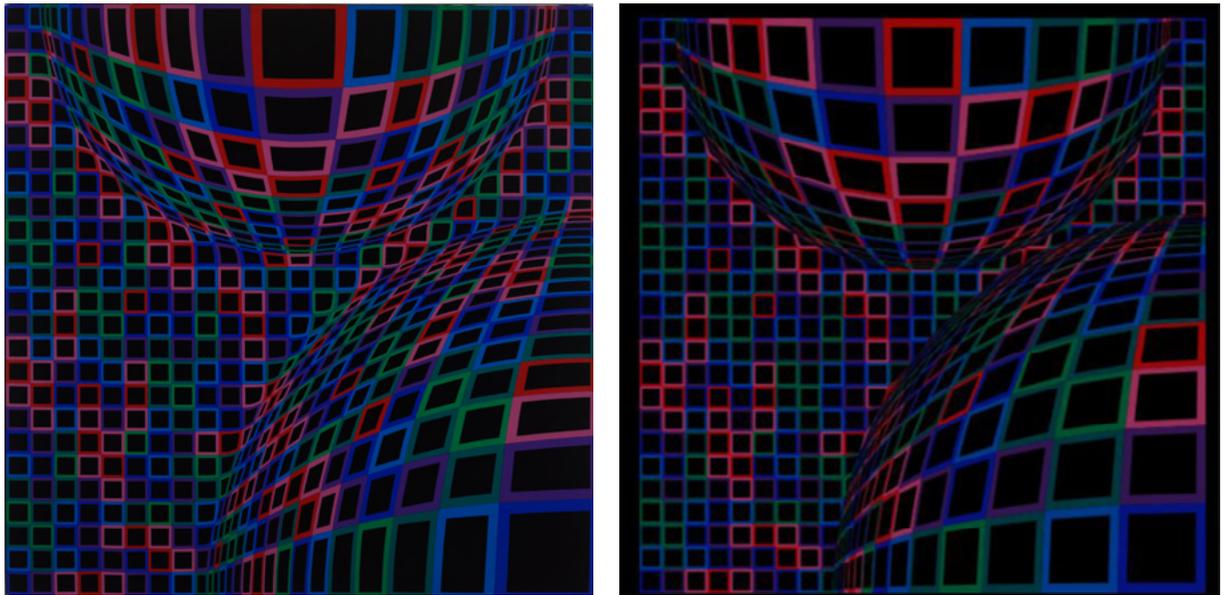


Figure 6. A digital reproduction of *Bull*. (a) The original artwork by Victor Vasarely: *Bull*. Collection of Vasarely Museum, © Szépművészeti Múzeum, 2021 (b) Using reverse engineering to find which geometric projections would produce the bulging grids, a reproduction was created that closely match the original.

The computer-programming analogy for Vasarely’s process works on three levels:

1. coding is a conscious definition of a (visual) output, and coding language allows the separation of the creative design stage from the tedious, repetitive production stage;
2. coding provides a framework for systematic investigations;
3. a coded artwork can proliferate: once the code is known, it can be used as a means of reproduction, with modifications to suit various communal or individual purposes (such as the decoration of walls in residential blocks, as Vasarely envisioned).

With today’s computing technology, we can determine which idea or algorithm Vasarely had in mind when creating his works. During his “Vega” period (1968–84), he produced a series of paintings in which a sphere appears to bulge out or inwards; a regular grid is deformed to give this 3D effect, enhanced by the squares’ coloring. These paintings have inspired mathematicians to create similar images¹⁷ using mathematical models and software, but not investigations of Vasarely’s own methods. We took a close look at *Bull*, at the Vasarely Museum in Budapest, and found that two slightly different parametric stereographic projections to transform the plane to 3D produced a close look-alike.¹⁸

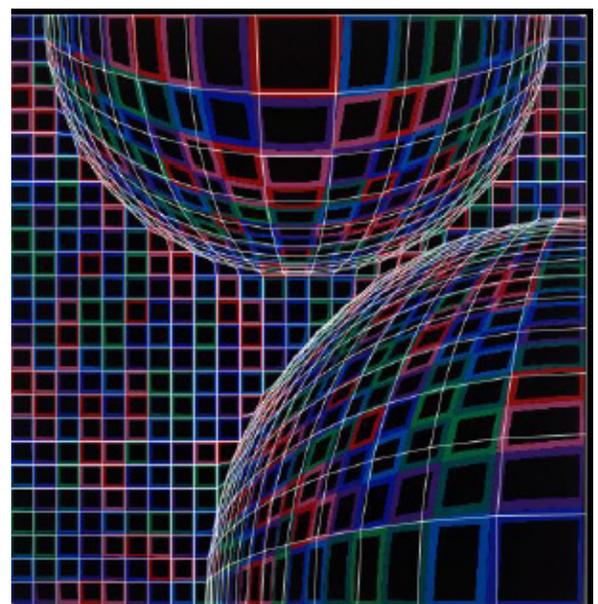


Figure 7. Superimposing a computer-generated transformation of the planar grid on the painting shows deviations.

¹⁷ See Douglas Dunham, “Hyperbolic Vasarely Patterns,” *Proceedings of Bridges 2010: Mathematics, Music, Art, Architecture, Culture* (Pécs, 2010), 347–52; Slavic Jablan and Ljiljana Radovic, *Vasarely és a matematika* (Pécs: Janus Pannonius Múzeum, 2011).

¹⁸ See Zsófia Ruttkay and Litza Juhász, “The 3D Effect of Bull by Vasarely,” *Proceedings of Bridges 2013: Mathematics, Music, Art, Architecture, Culture* (Enschede, 2013), 499–502, http://dimu.hu/publications/Ruttkay_2013_Bull_Bridges.pdf.

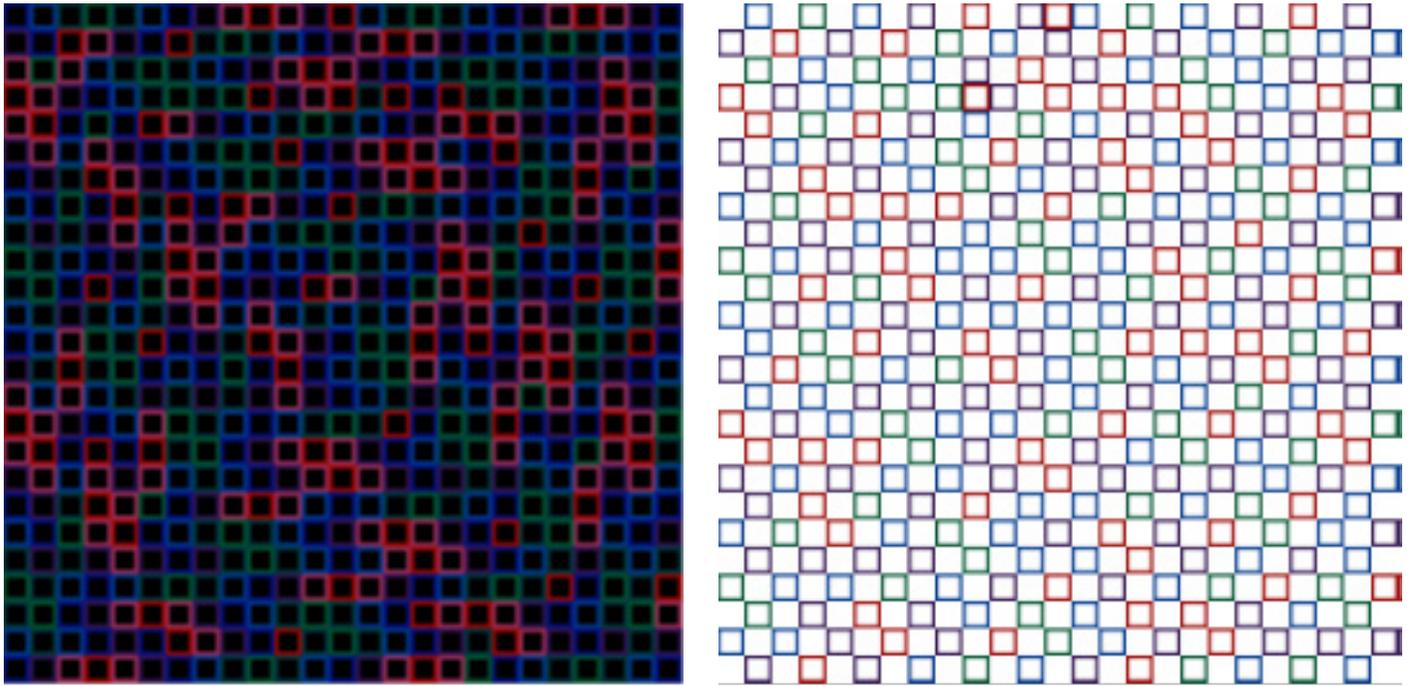


Figure 8. Investigating the coloring of *Bull* (a / left) The coloring shown on the flattened grid (b / right) Selecting squares with four of the seven colors, we get an almost regular grid, with only two extra (highlighted).

What could be the cause of the deviation from the mathematically correct projection? Vasarely may have initially plotted the transformed grid points by calculating the coordinates, and then, after producing several paintings with bulging spheres, discarded such aid to draw the transformed lines by hand. Indeed, he once said in an interview¹⁹: “The drawing became free, at least in the deformed parts, but still not excluding the possibility of the collective execution.”

To study the coloring of *Bull* we “flattened” it by creating a 25 x 25 grid with the coloring of the corresponding squares in the original painting (see Figure 8a). We wrote an interactive program to switch off the colors one by one to discover whether Vasarely followed a principle for their placement. Figure 8b shows how four colors produce an almost regular grid: only two red squares are extra. The choice of red for the middle one in the top row may have been a conscious one, as this square is the biggest and closest. This software allows investigation of other Vega paintings, including where circles are placed inside squares. Such hands-on investigations help us understand the principle, craftsmanship, and math behind a painting.

CONCLUSION

These projects demonstrate a range of benefits of using digital technologies next to or inspired by physical artworks. What I find most exciting is using computing technologies to put oneself in the artist’s mindset. This is interesting for scholars and visitors: hypotheses may be checked by using programming, while an interactive exploratory approach facilitates an understanding of the artwork and triggers creativity. The oeuvres of many more artists would profit from a posthumous investigation using today’s computing technologies.

¹⁹ Ferrier, *Entretiens avec Victor Vasarely*, 69.

More scientific evidence of the merits of digital technologies, and of the hybrid use of real and digital more generally, is needed. Unfortunately, the tedious work of gathering data on usage and impact on museum visitors, as well as a settled methodological framework to evaluate impacts on visitor numbers, learning, creativity, and changing attitude towards art and its institutions, both traditional and future, seems to be beyond the competences and interest of developers, and a low priority compared to ongoing deadlines and future challenges for GLAM institutions. University doctoral programs could provide a framework for such investigations.

The design and development of hybrid genres is far from simple. Deciding on the role of the real and the digital, the physical space and the virtual, selecting the most appropriate digital extensions and inventing new means for specific content requires close collaboration among institutional staff and those responsible for design and implementation: ICT experts and creative designers. The university-level education of museum experts and ICT specialists should be extended to include new applications of digital technologies in the cultural heritage sector.

Zsófia Ruttkay is a professor at Moholy-Nagy University of Art and Design Budapest (MOME). After joining MOME in 2009, Ruttkay founded the Creative Technology Lab, which she now runs, aiming to invent applications which are playful, inviting, aesthetically appealing, engaging, and at the same time societally relevant. Its primary focus is the use of digital technologies to extend the museum visit within and beyond walls, in both physical and virtual space. The Lab has partnered with more than twenty-five leading galleries, libraries, archives, and museums, conceiving and implementing over a dozen commissioned projects. It also delivers the Digital Museum interdisciplinary course, in which design students at MOME and programming students at Technical University Budapest work together to propose novel modes of interpretation and engagement. Ruttkay has designed digital tools for scholars and restaurateurs to investigate of paintings dating back to the European Renaissance and up to the twentieth century. She is fascinated by artistic, scholarly, and educational activities positioned on the intersection of mathematics, art, and technology. With a degree in applied mathematics, a PhD in computer science, and twenty-five years of academic work on artificial intelligence, computer graphics, and human-computer interaction, she is intellectually and creatively inspired by the ways in which decades of research in these fields have enabled new modes of expression.

PERFORMANCE-ORIENTED RESEARCH PROMOTING COMMUNITY ENGAGEMENT IN MUSEUM ACTIVITIES

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*This text is an edited transcript of the
conference presentation delivered at HyMEx.*

First, I would like to thank my colleagues at Ludwig Museum and in the Beyond Matter VR project for the short research project that facilitated this presentation. I am professor of new media at Aalto University. Aalto University is a young university that was formed in 2010 from the merger of three already existing universities, the University of Technology, the Helsinki School of Business, and the University of Art and Design Helsinki. I am located in the department of media, specifically in the Media Lab, and I am particularly going to present work that I do with the Systems of Representation research group.

Systems of Representation is a research group that I formed in 1998. I came to Finland in the mid-1990s to pursue a doctorate in new media and the bringing together of new media and digital cultural heritage, as I called it back then. We have been involved in this research ever since. Among the topics that we work with are the translation of heritage to the virtual dimension, digital cartography, and user experience. In the group, we are also involved in design, research, education, design and digital humanities, and education in virtual reality: how to design, create and produce, for example, virtual worlds.

In the group and in the Media Lab in general, we have a mantra: “hands on with minds on,” or thinking together with doing. In my group, we have produced a few advanced information processing tools over the years, and we always work in collaboration with other partners. One tool we have produced is Imanote, an annotation and digital cartography system that allows us to display gigapixel images.¹ We also created a tool to visualize similarity clusters of vector-based ontologies. We have likewise done work with virtual reality, particularly in the area of 3D interface design. Like others in this field, we are always looking into the future. One of the things that is particular about our approach is our sustainability strategy, which we emphasize in long-term data acquisition. Meaning that when we do data acquisition, particularly when digitizing heritage objects, we

¹ Imanote, <http://sysrep.aalto.fi/research/imanote8/>.

always try to do what Henrik Haggrén said: “To gather as much as would be needed for future generations.” Our emphasis is on quality not necessarily quantity. We also work with a design idea of creating modular and adaptable interfaces and make use as much as possible of participatory design methodologies.

Now, we have created several noteworthy digital cultural heritage artefacts over the years—including the first Digital Facsimile of the Map of Mexico 1550 and also the first interactive Digital Carta Marina based on the 1539 map created by Olaus Magnus—but I’m only going to present three of our most recent works realized using immersive media technologies such as virtual reality (VR). Note that one could consider the work we’ve done as classifiable within a continuum that ranges from simulations that should be or aim to be as accurate as possible (from a sense of accurate in the scientific perspective), to other simulations that are more artistically-oriented and perhaps allows us to take a very open approach in how we work with the subject matter.

The first work I’m going to present is an artefact we created between 2010 and 2012. It was a project that we did in a collaboration between the Media Lab, the National Board of Antiquities in Finland (*Museovirasto*), and the Maritime Center in Vellamo, in Kotka, Finland. It is called *Rediscovering Vrouw Maria*, and *Vrouw Maria* was a Dutch ship that sank in Finnish waters in 1771, bearing a precious cargo for Empress Catherine the Great of Russia. The Interactive 3D historical reconstruction of *Vrouw Maria* was created as part of the final stage in a ten-year research project carried out by the Board of Antiquities. This work has been shown in exhibitions nationally and internationally, including *Spoil of Riches: Stories of the Vrouw Maria and the St. Michel*. Here I’m showing some sections of that exhibition, which included, among other things, selected items salvaged during explorations of the two shipwrecks. The photos of *Vrouw Maria* are those with a blue background, and I thought it would be very interesting to call attention to the design of the exhibition—how you have small dioramas with all these small objects placed to create beautiful still-life visuals. You can see the entrance of the exhibition, with the *Vrouw Maria* installation placed in the center. And then, to the left, the *Vrouw Maria* findings, and to the right the findings from the *St. Michel*. It is almost as if you were surveying an open book.



Figure 1: Exhibition display of items salvaged from the *Vrouw Maria* shipwreck shown at *Spoils of Riches – the Stories of the Vrouw Maria and the St. Michel*, April 25, 2012–January 13, 2013, Maritime Centre Vellamo in Kotka, Finland. Photo: Lily Díaz-Kommonen

The simulation itself was housed in a dimly lit space, separated by a transparent set of curtains. You can barely see them in the small image insert, but they also helped to contain the sound. The simulation could be used in the exhibition in Finnish, Swedish, English, Dutch, and Russian, so viewers would select the translation. The sources for the simulation were several, including underwater photography and video, the drawings made by artists on the basis of those photographs and videos, and the topography of the seabed



Figure 2 (left): The Vrouw Maria 3D historical reconstruction installation in use at the Maritime Centre Vellamo in Kotka, Finland. Photo: Lily Díaz-Kommonen. Figure 3 (right): Visitors wear polarized glasses to visually perceive the 3D visual effects. Photo: Lily Díaz-Kommonen

or ground marine environment that was obtained from a multibeam sonar survey that was carried out in 2010.

I think this is one of the great things too about all these digital technologies, how then we can consider that the underwater landscape is indeed a landscape which can be rendered. That is, there is a certain ecosystem there. Here you see the space where Vrouw Maria still lies.² The shipwreck is in an area that is a protected natural reserve. You cannot dive there, and that was one reason for creating this simulation: it offers the public an idea of what the underwater heritage site looks like. The software platform used was Unity 3D. The programmed interaction enabled navigation around the site using a three-meter-wide stereoscopic image displayed using rear-screen projection. The sound reproduction system was a 5.1 surround sound, used to access a soundscape perfectly synchronized to the images and created on the basis of sounds collected in the Baltic area from various sources, including the Finnish Naval Research Institute. To experience the 3D aspects of the installation, the audience used polarized glasses. Here you can see our diagram of the setup.

According to the project's final report, the public feedback received was largely positive and engaged. Some visitors only came to the exhibition because of the simulation, and some came more than once. In its 3D form, the simulation was the thing that drew visitors to the exhibition.³

One interesting aspect to consider here is how different “spaces”—whether images, sound, or interaction—designed and realized through different tools have to merge into one model to create the experience of the simulation. As visitors move along the different spaces of the landscape or the cargo hole, the sound environment, the light, and other objects such as the fish must react in a synchronized manner.

² *Re-discovering Vrouw Maria*, <https://vimeo.com/240541021>.

³ *The Vrouw Maria Underwater project 2009–2012 Final Report* (2014), 47–51, <https://www.museovirasto.fi/uploads/Arkisto-ja-kokoelmapalvelut/julkaisut/vrouw-maria-final-report.pdf>.

Now I will briefly talk about the Finnish pavilion at the 1900 World Fair in Paris. This is another work that we have realized both as a short film documentary and an interactive VR installation. You can see in the bottom-right image the film being shown for the first time at the Musée d'Orsay in Paris. The pavilion is a very interesting case of intangible heritage. When the real pavilion was made at end of the nineteenth century, it was assembled for participation in the 1900 Paris fair. After that event the structure was torn apart and its contents distributed around Finland and abroad. Up to the moment that this work was realized, the notion of the pavilion lived as a narrative to be read about in books related to the history of art and the history of Finnish design. Our work has ranged from doing archival research—here the largest contribution has been from Derek Fewster and his students at the University of Helsinki—to the creation and full implementation of the model as a hypothetical space that can be visited through virtual reality. There is a version of the video we put together for the 100 Year Anniversary that you can check out online.

The last artwork I will show today is *Interactive Diorama – Rembrandt 1632*.⁴ Here the diorama concept is used to instantiate a virtual reality simulation based on the famous artwork by Rembrandt, *The Anatomy Lesson of Dr. Nicolaes Tulp*. Several of the characters in the painting have been recreated and animated (through idle animation techniques, for example) using motion-capture technologies. They have been recombined with other audiovisual media including sound and video. The work offers a hypothetical reconstruction of the anatomical theater that existed back in 1691 at Waag Society in Amsterdam, which is where the original work was created.

The body of the executed criminal body skin has not been included. This was something that we had a lot of discussion over in the group when we were doing this work. Eventually we all decided that indeed we should offer this strategy. It would not have been too difficult to add yet one more body there—we already had the doctors. As visitors enter the simulation, they assume Aris Kindt's perspective. Prior to entering, the visitor can choose or skip an initial sequence which simulates from a first-person point of view the experience of hanging. This introduction was selected through a series of audience participation studies; we showed different possible introductions, and this was the one that was thought to be the best fit for the work. In this manner, our work seeks

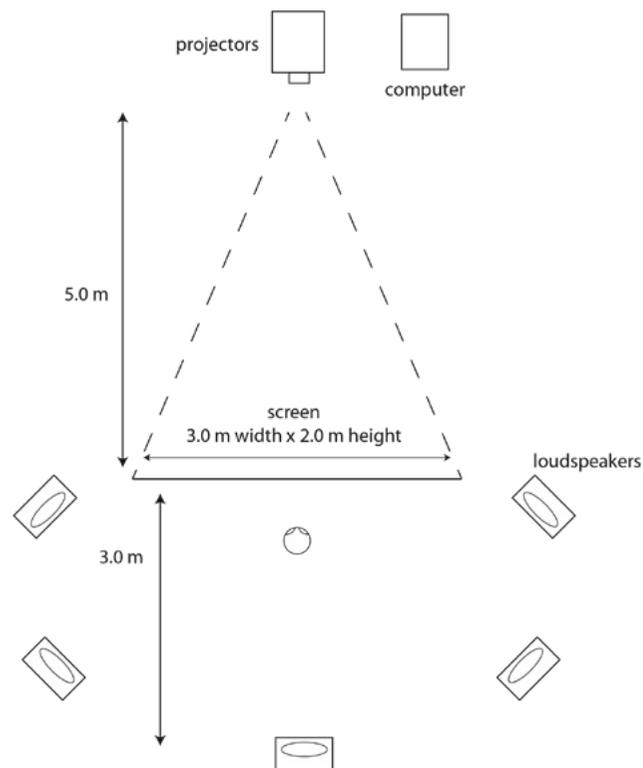


Figure 4: As the setup sketch shows, the 3D film and images are retro-projected behind a 3 x 2-meter screen. A 5.1 surround-sound system delivers a 3D soundscape synchronized with the visual content. A user's movements in the interaction space are tracked through a (Kinect) camera sensor unit. The work was awarded a Special Mention of the Jury at the Cultural Heritage, Europa Nostra awards in Oslo in 2015 [<https://www.europanostra.org/2015-eu-prize-cultural-heritageeuropa-nostra-awards-special-mentions/>].

⁴ *Interactive Diorama, The Anatomy Lesson of Dr. Nicolaes Tulp by Rembrandt, 1632* (2017), <https://vimeo.com/225970453>.

to question the more traditional interpretation that the painting is about scientific practice and art. Just as Hendrick Averkamp's paintings from practically the same period render Sunday afternoon picnics in which citizens and those who were executed seem to be sharing the landscape, Rembrandt's work also deals with power, politics, and cruelty.

In the project a key issue has been the illusion of materialities, as they become absorbed into this new genre of virtual reality. For example, we printed part (fifty pages to be exact) of the book that is so emblematic in the painting—believed to be Andreas Vesalius' *Anatomy Handbook* from 1543—on archival paper and hung the pages around in the space to indicate the sensor's tracking area. This is the area of interaction in which the audience can engage with the work. At the same time, we took an image of the painting itself in a very high-resolution format and inserted it inside the theater space, where visitors can appreciate it in a way that would be impossible in the gallery.

As I mentioned in the beginning of my presentation, we are now also involved in *Beyond Matter: Cultural Heritage on the Verge Virtual Reality*. As part of our work in this project, we will be carrying out a series of workshops where participants actually help to develop new research protocols. Over the last two decades museum communications have evolved partly in response to the increasing use of new media. In the contemporary museum, more and more messages from the exhibition arrive to the public via and through the visitor's own direct involvement. This involvement is usually promoted and often mediated using digital media and information communication technologies.

A key challenge for media design in this situation is the creation of meaningful communication cycles that involve recognition, exploration, and reliance. This is what Klaus Krippendorff refers to as the natural handling of something so that attention can be focused on the consequences of its use, thus supporting and facilitating the audience and community's attention and learning through exhibitions.⁵ Among the key activities of designers is instantiating design spaces that open up a given set of conditions to reinterpretation. Design space can be characterized, among other things, by complexity, non-linearity, and at the same time, potentially paradoxically, its situated activity. All of these aspects carry a tremendous responsibility for the designers.

I will close my talk with what we are currently doing. What we seek to do with the research protocols for our workshops and some of our other starting points includes think-



An interactive VR historical reconstruction

The project has created an interactive VR historical reconstruction and a short documentary of this landmark in Finnish design history.

Figure 5: A slide from the conference presentation. The Pavilion of Finland at the 1900 World Fair in Paris, a short documentary about the work done for the 3D historical reconstruction project on display at Musée d'Orsay, Paris. Photos: Lily Díaz-Kommonen

⁵ See Klaus Krippendorff, *The Semantic Turn: A New Foundation for Design* (Boca Raton, London, New York: CRC Taylor Francis, 2006).

ing about the notion of the museum as a platform for distributed cognition. We do not claim that this is a completely original idea or great innovation. After all, the notion of distributed cognition has been around at least since the beginning of the twentieth century through the work of Lev Vygotsky and many others who have built on his work. And I think museums and their staff—curators, educators, and so on—already have this very much internalized and understand it in this way, since it is one of the key design aspects of exhibition display. A topic or theme can be illuminated through the display of material cultural artefacts situated in the (potentially) manifold spaces of a gallery. This is our focus to start with. Then, as part of our protocols, we are looking into ways in which we can promote the use of single autoethnographic narratives or combined duoethnographic narratives. These would focus on instances where an inner speech, perhaps resulting as the reaction of the audience to an exhibition, can be released. Why are we interested in this? Because we really want to learn from audiences and their responses to an exhibition. Not so much in terms of “Do I like this?” or “I don’t like it at all,” but perhaps from perspectives that deal with notions such as compassion, empathy, and a sense of belonging. So the questions might be more like: “Do I feel like I belong here in this museum?” or “Does this subject matter speak to me?” These are things that we want to explore.

Lily Díaz-Kommonen (Lily Díaz) is professor in new media at Aalto University, School of Design, Art and Architecture, Finland. Since 1998 she has led the Systems of Representation research group that works on visualization and virtual reality for culture and heritage. She has published over ninety articles in selected peer-reviewed journals and conference proceedings, and four books: *Art, Fact, and Artifact Production. Design Research and Multidisciplinary Collaboration* (2002), *Digital Culture and E-Tourism: Technologies, Applications and Management Approaches* (2010), *Ubiquitous Computing, Complexity and Culture* (2016), and *Adaptation and Convergence of Media – High Culture Intermediality versus Low Culture Intermediality* (2018). She currently serves on the editorial board of *Journal of Visual Arts Practices* and as associate editor for *She Ji: The Journal of Design, Economics and Innovation*. She is an active researcher and artist-designer. Among the artistic research and design projects she has realized are *Digital Facsimile of the Map of Mexico 1550*, an interactive virtual reality installation and film documentary of the *Finnish Pavilion at the 1900 World Fair in Paris*, the *Vrouw Maria Interactive 3D Virtual Simulation*, and *Interactive Diorama – Rembrandt, 1632*, shown at Ars Electronica in 2017 and at the Helsinki Public Library in 2019. For her work with cultural heritage she was made First Class Knight of the Order of the White Rose of Finland in 2017.

NOTES ON ART AND THE COMING METAVERSE

Ben VICKERS

Curator, writer, publisher, and technologist (GBR)

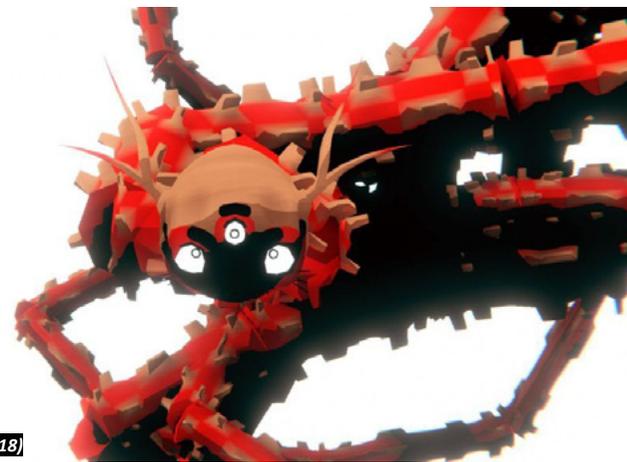
This text is an edited transcript of the conference presentation delivered at HyMEx.

I am the chief technology officer at the Serpentine Galleries in London as well as the co-director of Ignota Books, and I have been invited to speak about the subject of digitization. To approach that, I'm going to talk from the perspective of the work I have been doing at the Serpentine Galleries over the course of the last six years, but also outline a thought experiment in relation to the way that I think that technologies develop and the ways in which the arts can play a critical role in the narrative formation around any particular technology. To start, I will give a bit of background about the sorts of projects that I have worked on.

In 2017, I worked with Zaha Hadid Architects to develop the Zaha Hadid Virtual Reality Experience, which focused on taking paintings that Zaha had painted for buildings that were never realized and then extrapolating them out into virtual environments. This was one of the first virtual reality experiences in the second wave of VR to appear in a museum context.

In 2018, I worked with the artist Ian Cheng to develop the exhibition *BOB*, which stood for “bag of beliefs.” This was the development of an artificial life form that lived in the gallery over the course of the four or five months in which the exhibition was on.

That was quickly followed by a project called Augmented Architecture, which was developed in collaboration with Google Arts and Culture and David Adjaye. Augmented Architecture was a competition that raised the question of what the impact of augmented reality will be on architecture going into the future. We observed that for a long time architecture had not really been involved in the development of this field. So we came up with the idea of augmented architecture. We put out an international open call and made it open for anybody to apply—anybody who was working in anything from Google Sketch-Up through to video games or architecture practices to create new types of experiences.



Ian Cheng - BOB (2018)

Figure 1: © Ian Cheng, 2018. All rights reserved.



Figure 2: Jakob Kudsk Steensen, *The Deep Listener*, 2019. AR Visualisation.
Courtesy the artist.

From the call, we selected the artist Jakob Steensen to make a work called the *Deeplis- tener*. The *Deeplis- tener* was an augmented reality experience that played out across Hyde Park and Kensington Gardens. It had a deep engagement with various species that popu- late the parks—from the plane tree to the dragonflies to the parakeets.

This was followed by a project that we developed with Jakob and the international boyband BTS as part of their project Connect BTS. Jakob developed a simulation of an old-growth forest, which staged on large LED screens in the park outside the Serpentine Gallery. This represented a sort of slow form of media.

Now, I just wanted to present a couple of those projects to give context to what I'm go- ing to speak about next. When we're thinking about digitization, it's really important to think about how technologies develop. What's critical is that big jumps in technology normally happen at the intersection of a series of emerging technologies. To illustrate this, we could take the emergence in the 1990s and early 2000s of social media, online video, mobile apps, and 3G—we didn't think enough about what might come about as a result of the intersection of those technologies, but without that interaction you wouldn't get the emergence of things like Airbnb, YouTube, Twitch, etc. It's at the mo- ment when technologies reach a certain stage of maturity that new opportunities and possibilities emerge.

This is particularly relevant to the present moment, because over the course of the last three or four years we've seen the emergence of technologies that, in terms of impact, are on the scale of the internet. Virtual reality and augmented reality, robotics and drones, blockchain, artificial intelligence—these are all producing new things. Now we're begin- ning to see the intersection of these technologies, but what they will produce in the fu- ture is quite difficult to actually predict. This is important to think about, because we're also in a moment in which technologies are accelerating at an unusually fast rate. We're also seeing, particularly in 2020, the emergence of things like cheap aerospace. There's

been an enormous explosion in discussion around these sorts of projects, like the idea—this week—that we can have 4G on the moon, the emergence of CRISPR,¹ the ability to develop biological projects synthetically, the maturity of quantum computing and what many people refer to as artificial general intelligence. We’re seeing that with GPT3,² for example. It is really beyond the pale to be able to even think about what the intersection of those technologies might produce.

This is the framework that informs the work that I’ve done in developing a digital strategy at the Serpentine Gallery over the last five years—looking at opportunities where artists can work with this early-stage development and begin to shape what those technologies might be.

One of the models that I often refer to in the context of this work is the Gartner Hype Cycle, which is released each year and looks at the development of various technologies. On the axis going up the side you can see expectations, and time runs along the bottom. What it shows is a kind of innovation trigger. When technologies emerge they begin to be hyped, expectations around what they can do raise significantly, and then, as a result of those technologies’ failure to deliver, they hit a “trough of disillusionment.” But as more time passes, they begin to enter the “slope of enlightenment” and the “plateau of productivity.” In the process of digitalization and how it affects artistic production, this is useful to think about because for the most part institutions and museums—the centers that make the largest investment in the development of new types of artistic practice—tend to enter the cycle during the slope of enlightenment or the plateau of productivity. By then, all of the decisions about what that technology can be and what it will do in the world have broadly been made and they’ve been made by a very select, small group of people. Most of what is produced from that point forward really only represents content on top of the platform. I think it’s important to think about that and about what artistic practices and different ways of seeing and knowing in the world can bring to the development of the technology.

One of the things we’ve focused on in our work at the Serpentine is the idea of narrative formation, that technology is more than its component parts and its context. It is the story that really shapes what technology can do. Individual technologies can therefore be reshaped by the stories we tell through them. It’s important at this moment in time to understand that new narrative formations around a technology can change its trajectory over time because of the way in which such technologies are developed.

Speaking specifically to the idea of digitization and the sort of new models that might emerge, earlier this year we released in collaboration with Rival Strategy a report called *Future Ecosystems*, which looks specifically at this intersection of art and advanced technology, starting to think about what are the new leverage points, new possibilities and

1 As Wikipedia explains, CRISPR is a family of DNA sequences found in the genomes of prokaryotic organisms such as bacteria and archaea. Cas9 enzymes together with CRISPR sequences form the basis of a technology known as CRISPR-Cas9 that can be used to edit genes within organisms.

2 Wikipedia, Generative Pre-trained Transformer 3 (GPT-3) is an autoregressive language model that uses deep learning to produce human-like text,” <https://en.wikipedia.org/wiki/GPT-3>.

new forms that might emerge as the field begins to mature. What do the individuals who are working with this now look towards in the future, and what must be built in terms of back-end infrastructure? To summarize a very long strategic briefing, the three key findings that I think are particularly relevant to our discussion today are:

1. The definition of the artist is being transformed by team-based creativity.
2. Ecosystems and business models outside of the traditional art world have the potential to eclipse its current role. (I think that because of this it's really important to think about the development of these areas on a much longer trajectory. Considering the effects of globalization on the establishment of a kind of art world industrial complex globally, we can now begin to think about the long-term implications of the merging between entertainment, video games, etc, which will potentially have a significant impact on how we think about artistic work.)
3. Big tech innovation will have a transformative impact on art over the next decade. (Probably not dissimilar to the same way the Church previously had an impact on artistic development in Europe.)

I want to zoom in on the thought experiment I mentioned at the beginning of this presentation, using the framework of the intersection of various technologies, to point out four things which are emerging now that are not necessarily just technology: video games engines, augmented reality, and 5G; the concept of the metaverse, of some other kind of virtualized space, another world but one that has the potential to be overlaid on to our existing reality; and the emerging idea of the experiential economy.

One example of where this intersection is beginning to enter cultural production is that of Teamlab, an artist group of 500 individuals based in Japan, who in the last couple of years developed and opened their own museum called Borderless, which likely grosses over USD100 million a year. This is a very interesting emerging disruptive situation, and they primarily use technology for the experiences they share. I also want to point to the Getty Museum's making digital versions of all of their artworks available for download into the video game series Animal Crossing, as an example where you begin to get these worlds crossing over. Then, interestingly, Manchester International Festival has a new museum or cultural production space called the Factory due to open in Manchester at some point in the future—dependent on the pandemic—and this year they created a version of the factory in the online video game Fortnite. Amazingly, over the course of a couple of months they have had more than a million visitors, in a time when COVID has been very present and there may be no return to normal.

I think it's critical that we begin thinking about what these other spaces are. Who are their audiences and what is the potential in terms of new forms of cultural production? They can be broadly bracketed under the idea of the metaverse, the secondary virtual space, digital twins—it's something that's not yet defined. I want to point to some of the qualities of the metaverse:

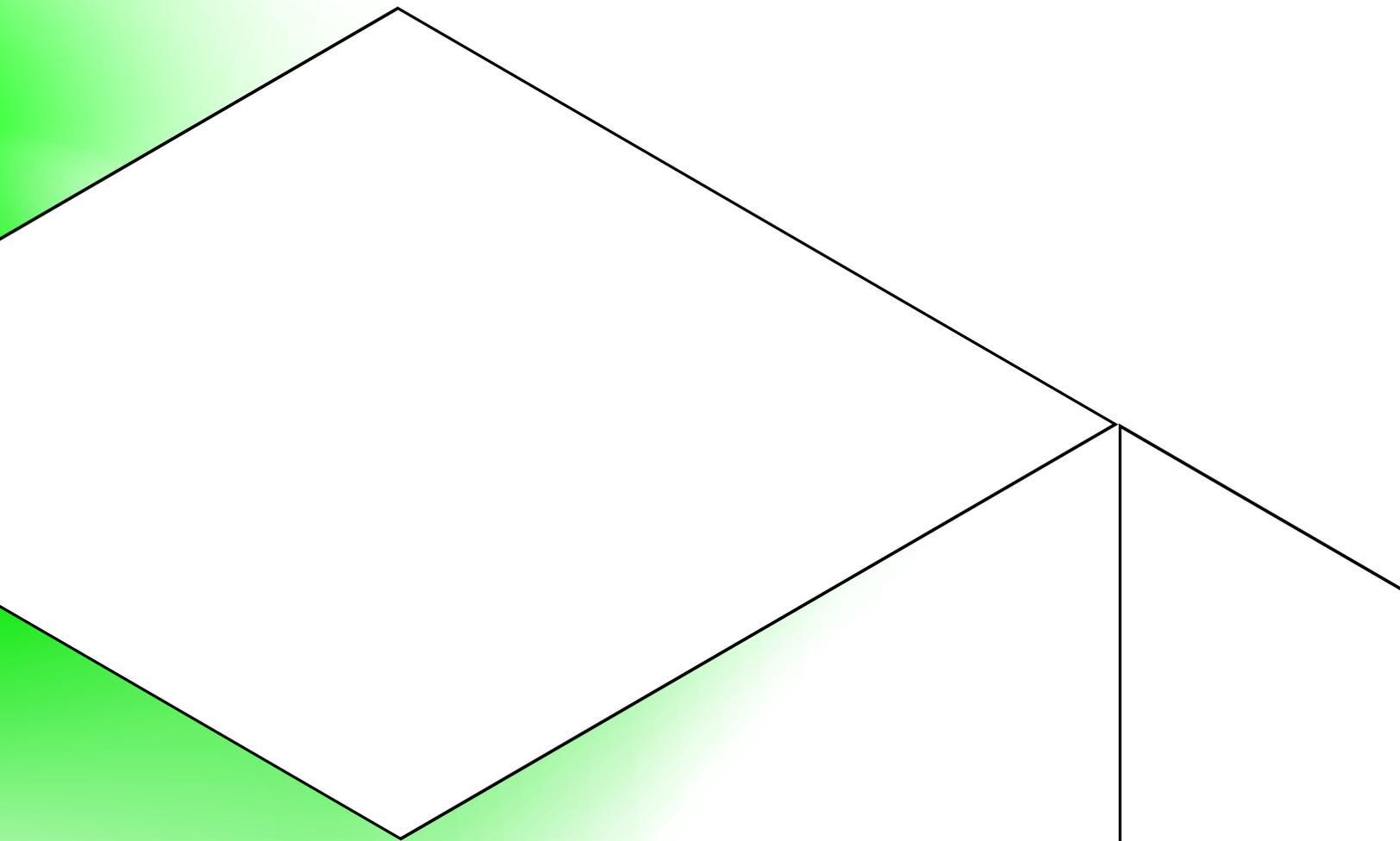
1. It is participative and open.
2. It is persistent and 24/7.

3. It moves beyond the concept of “gaming.”
4. It has fully integrated economies of its own.
5. It is hardware-agnostic.
6. It extends beyond the screen to AR layers in the physical world.

Some of these concepts come from somebody who’s doing some great work around the metaverse right now, the US digital media strategist Matthew Ball; some of them come from my own experience of participating in these types of worlds. I think they have some interesting potential implications for the art world and artistic cultural production more generally. To summarize:

1. Arts organizational models will need to change.
2. Audiences will be transnational by default.
3. Younger audiences will define these changes.
4. Many traditional institutions will be displaced as a result of this. (I think we can already see this in the early waves and the impact of technological change.)
5. Tech companies will increasingly shape culture, for better or worse.
6. The market for “digital art” will likely increase (as unlikely as that seemed in previous decades).
7. Perhaps most importantly, video games will be recognized as an art form in and of themselves.

Ben Vickers is a curator, writer, publisher and technologist. He held the position of Senior Strategist at Large (formerly Chief Technology Officer) at the Serpentine Galleries in London until end of 2021. He is Co-Director of Ignota Books, a publishing house co-founded with Sarah Shin which publishes content at the intersection of technology, myth-making and magic. Shin and Vickers co-edited and published *The Carrier Bag Theory of Fiction* (2019) which features Ursula Le Guin’s original text from 1986 with an introductory essay by Donna Haraway. Vickers is an initiator of the open-source monastic order, unMonastery, a social clinic for the future aimed at addressing the interlinked needs of empty space, unemployment and depleting social services by embedding committed, skilled individuals within communities that could benefit from their presence. He is also a founding member of the decentralised blockchain group called Guild. Vickers serves on the boards and advisory panels for Light Art Space, Transmediale, Auto Italia, Furtherfield, Complex Earth, SXSW Arts Programme and the Warburg Institute in London. In 2018, he was co-curator of the Serpentine Marathon on the topic of the future of work. He is interested in examining technology and alternative forms of social interaction including our relationship with non-human AI. Vickers is currently thinking about and contributing energy flows to #ArtsTechnologies #creativeAI #cryptocircle #BIOS #worlding #cosmicterra amongst other hashtags.



**Evolving Architectures:
Algorithmic, Dynamic and
Performative Spaces**

A SCHOOL FOR VERNACULAR ALGORITHMS, WITS ART MUSEUM

Tegan BRISTOW

Senior lecturer, University of the Witwatersrand, Wits School of Arts (ZAF)
Director, Fak’ugesi African Digital Innovation Festival (ZAF)

*This text is an edited transcript of the
conference presentation delivered at HyMEx.*

I will be speaking about African fractals, a project called A Vocabulary for Vernacular Algorithms, and in extension a project started this year called School for Vernacular Algorithms. I have written a paper as a longer encounter with the theory and politics of the Vernacular Algorithms project, but have chosen to use this engagement with HyMEx 2021 to speak about the Vocabulary for Vernacular Algorithms and the School for Vernacular Algorithms from a progressive viewpoint, one that situates these developments around the Wits Art Museum and in the context of this particular conference on museums and museum-like spaces.

DIGITALITY IN RESPONSE TO THE COLLECTION AT THE WITS ART MUSEUM

Talking of locations, this work centers around an engagement between myself as a researcher and a teacher at the University of the Witwatersrand and with Wits Art Museum in Johannesburg, South Africa. Wits Art Museum, also referred to as WAM, is located on the periphery of Wits University and within the edges of downtown Johannesburg. Let me remind you that Johannesburg is still considered one of the most dangerous cities in the world. This alone speaks to the levels of social imbalance still prevalent in its Apartheid legacy. So it’s a complicated cultural location. The Wits Art Museum is a university museum and houses significant collections of African art from various historical collections. It collects contemporary art on an annual basis.

For a bit of context into my relationship with the Wits Art Museum and the work that I’m currently working on in the Vernacular Algorithms project, I’ll start by presenting an exhibition of interactive art called *Meaning Motion*, which focused on the implicit meaning-making between the body, movement, and interaction in digital interactivity. It was an exhibition that I produced with artist Nathaniel Stern in 2013 in which we sought to interrogate where meaning is located when we move it from the head and into the body. We explored what other types of knowledge are accessed through the body and implicit meaning-making. I use this particular exhibition as an example to segue into where I am



Figure 1 (left): Shangani Dance Skirt, Wits Art Museum collection. Photo: Tegan Bristow

Figure 2 (right): Wooden Hakata tablets, Wits Art Museum collection. Photo: Tegan Bristow

now. You see, Wits Art Museum is mandated to show with all exhibitions a selection of historical African art from its collection, and so Nathaniel and I were invited to select a series of works from that collection to show alongside our own digital work.

It was at this point that I became fascinated by African art’s functional encounter with meaning-making, community engagement, and the potential for social cultural interactive forms as a location for knowledge production. I will only reference this briefly here, but you can read more in my paper titled “With objects that speak: the force of interaction in historical African artefacts and contemporary art.”¹ The two pieces that I have selected as examples here began to lead me down the path to Vernacular Algorithms. The first is a dance skirt of Tsonga Shangaan origin. It was designed geometrically in its beaded patterns to have a very specific effect with the movement of the body underneath it. So the relationship between the beadwork, the skirt, and the wearer were integral to each other and integral to the ceremony and performance that they entertained. The other piece is the Hakata. These are Shona of Zimbabwean origin, and are divination tablets. These two are examples of the interactive and divinatory objects we chose to present alongside the *Meaning Motion* exhibition. Divination is a very common African cultural format. As an interactive form it requires a level of interaction between the Sangoma, which is the witch doctor, the spirit that the witch doctor channels through themselves, and the client who has come to understand more about what is happening with them. It is a highly interactive in its contribution to meaning-making. Therefore we can understand both of these pieces as interfaces, in effect—interfaces of a different kind of technology, a social and cultural technology, and a spiritual technology. When placed together with the digital interactive works of the *Meaning Motion* exhibition, they began to speak the same language of interaction we were exploring between the digital interface and the body. It became a fascinating space for me. But as they were museum objects, the skirt and the Hakata were behind glass. We couldn’t interact with them the same way we would with the interactive pieces installed on the walls.

¹ *International Journal of Art and Technology* 10, 2 (2017), 150-160.

This takes me to the next contextual frame of the work I'm presenting. For a number of years I ran a master's program in interactive media at the Wits School of Arts, teaching expertise in building interactive installations and interactive encounters. In 2015 my lab was invited by the Wits Art Museum to participate in an exhibition titled *Activate/Captivate* curated by Laura De Becker and Leigh Leyde. It aimed to interrogate the cultural and ethical difficulties of archives and museum collections. They invited various local artists and student groups to critically engage with questions about histories of the collection and their related cultures. A museum like this in a South African cultural context begins to unearth questions about the validity of its own collections, location, and what it claims to do. In this context, my student group was invited to respond to a selection of masks. The premise of the invitation was that the masks were designed to be worn and performed in ceremonies, but in the museum context they could not be touched and had to be set on the wall out of reach.

The exhibition catalogue of *Activate/Captivate* presents the works in full, and I will only talk through two examples here. Detailed research about the masks was conducted by the students as they planned and designed the kinds of interactions they were going to build. The first example uses the Mbangu mask, known to be used for ceremonies and performances that deal specifically with illness—a performative and socio-cultural encounter around illness within this particular community. Its black-and-white features represent the union of darkness and light, which is the way we look at illness and health, but also body and mind. In the traditional ceremony within which this particular mask is performed there is a call-and-response song between the audience and the wearer of a mask. It speaks of physical and mental health, and invites the community to learn through this performance. The student, William Saunders, developed an interactive piece using an artificial intelligence Twitter chatbot. What he did was invite audience members to message the Mbangu mask with @MbanguMask and ask it questions or leave comments about health and mental health. The mask would respond through the chatbot with excerpts of the song that had been translated into English. Saunders brought a technological form together with the historical form, thus keeping the value of the interaction and the song as it was performed with a mask. Whether that solves the ethical problem of the collection is a different question, but it is an interesting investigation. In fact, once while we were visiting the museum we saw a group of nurses really fascinated by the work. They felt it was really accurate. They were asking many questions and seemed to be getting the right answers.

The second mask was one of the most exciting projects for me. It is hard to capture, but the mask had a very strange feeling about it whenever you came near it. It was covered in sacrificial blood, it contained teeth and bones, it had an aura around it which is really hard to explain, and it was also very uncomfortable to be around. Katherine Donald, the student who chose this mask, had found through her research that it was a mask of a secret society, that the mask should never ever be seen by anyone other than the maker of the mask and the secret society it was performed with. She felt that the museum had violated the mask and the secret society simply by having it in its collection. For those of you in museum practice, I'm sure there's a lot of resonance in that statement. So what she decided to do was to hide the mask. She cut off the vitrine with curtains which had



Figure 3: Interactive masks installation by Katherine Hayes. Photo: Wits Art Museum

a distance sensor. If you tried to come any closer to the mask than two meters, the curtains would abruptly close. That way one could never see the mask close up. I would see a lot of people visiting the museum trying to sneak up to the mask or peaking around the corner to get a better look. This became a performance in its own right, and an interrogation of what we can and cannot see and where in fact knowledge resides, how that knowledge is accessed and by whom.

Working with the collection critical questions like these became very fascinating for me. It also allowed my African students, both South African and from the region, to begin interrogating not only the locations of knowledge in their own cultures, what it means for social, cultural, and social political engagement, but further how their own cultures had been disenfranchised by institutions like museums, collections, and the Western academic constructs of the university in which they were studying. The museum interaction became a valuable way for me to interrogate what was missing in these Western methodologies and a location through which the students could respond.

AFRICAN FRACTALS AND CULTURAL KNOWLEDGE

Moving forward, in 2017 I started a teaching module around African fractals. It was a response to research during my PhD on decoloniality and actional methodologies in art and cultural practice in African cultures of technology. As a key debate course for third- and fourth-year art and engineering students, it highlighted important positions and philosophies associated with culture and technology in Africa. Up to this point there had been no module that interrogated the interactions between culture and technology from Africa. The module centered around the Wits Art Museum collection through the lens of fractals and ethnomathematics, in a direct response to a book by ethnomathematician Ron Eglash, *African Fractals: Modern Computing and Indigenous Design*.

In my research into historical positions on technology and culture I had initially been disappointed to find that most scholarship was largely archeological, anthropological, or anthropologically-led art history, which apart from being very Euro-American in perspective, was largely empirical and non-theoretical. The research methods contributed little to understanding the philosophies of technology in precolonial African cultures. My research expands on that more and I'm not going to get into too much detail now, because there are many positions that talk about alternative philosophies of technology and how they can be used to criticize current philosophies of technology. But as an entry point, Eglash's text draws on multiple dimensions. He looks at the political, the cultural, religious, and computational aspects of culture to present an understanding of mathematical forms that originated in Africa. These include fractal mathematics and other mathematical forms found in traditional ways of constructing homes, cultural and religious rights, artworks, and useful aesthetic objects. What is most fascinating about Eglash's examples is that they are all egalitarian or socially focused at their core.

My module, which was taught in the digital arts department, began to unpack six fractal mathematics systems—namely recursion, infinity, scaling, complexity, geometric algorithms and numerical systems. Students would enter into the collection and explore it through the lens of fractal mathematics, rather than through the lens of European-led African art history. My experience of teaching the course and the response from the students was extraordinary. Apart from the fact that I saw a spike in the confidence of students from African heritage around the validity of their culture and what their culture offers to technological societies, I found students who would normally linger at the back of the class sitting up front by the second lesson, proving this exploration to be a confidence-building site. Many students could stand up and own their own cultures and abilities. In the second iteration one of the things that came up very strongly was a repeated frustration about the lack of references and research on the influences of mathematics and technical thinking in African art and how it's documented, and the assumption that technology is a product of the West and has no value or historical link to African culture.

An augmented reality application was built for a series of exhibitions and workshops under the title *Digital Imaginaries*, which took place in Senegal, Johannesburg, and at the ZKM | Center for Art and Media Karlsruhe in Germany. The AR application showed three works through which student groups chose to present their research around the relevant mathematical constructs and their link to culture. We additionally explored beadwork from the collection and the beginnings of the *Vocabulary for Vernacular Algorithms*, which started at the same time as a personal project within the frame of *Digital Imaginaries*.

In a *Vocabulary for Vernacular Algorithms* we started unpacking the value of the mathematical constructs within pieces of beadwork from Zulu culture, which is very prevalent in South Africa. We started teaching how we can learn code through Indigenous beadwork, based on Lindiwe Matlali's investigation into how she could teach coding from knitting. What we found was a lot more complex than just a translation of pattern into recursive mathematics, because the beadwork itself held so many aspects—histories of civilizations, nuanced cultures, emotions, and personal impressions of different times and places. In the beadwork we found friendships, loves, and communications

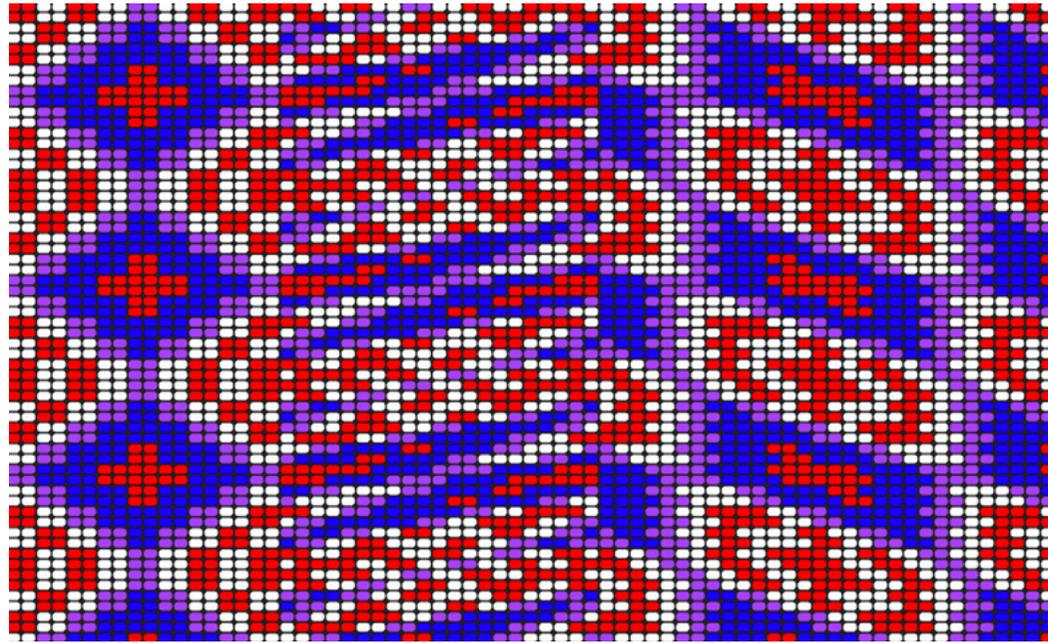


Figure 5 (left): Detail of work by Philisiwe Dube. Photo: Zivanai Matangi

Figure 6 (right): Screen capture of interactive work for the School of Vernacular Algorithms by Tegan Bristow.

that could only happen between the maker and the wearer. We began to unpack this “vocabulary” for Vernacular Algorithms through a series of workshops across the African continent and also at the ZKM when it showed there. The workshops asked a couple of questions: How do we conflate the geometric and its very mathematical forms with the experiential and the symbolic? Is this through a philosophy of culture and algorithmic engagement—a new philosophy of technology, perhaps? How do we develop a curriculum for these coded vernaculars towards new ways of thinking in technology that are egalitarian and not material? The project is still probing these questions as a community unpacking of what it means to engage with “vernacular algorithms.”

In 2021 I was invited to present the project as a School for Vernacular Algorithms. The “school” is being designed with new community collaborators as a three-week curriculum to explore vernacular algorithms and African algorithmic thinking, the politics of algorithmic and computational thinking between Africa and the West, and between the social and the material. It is currently being presented as part of a project titled “University of African Futures” and has three contributors. Philisiwe Dube will offer the beadwork-making component; this is an example of the work she creates. It is beautiful, practical, challenging, and from a mathematical perspective it’s highly complex with many computational aspects, such as recursion and scaling. Her focus is on mathematics and cultural meaning. As such, a display of work and its history is partnered with an interactive installation that I built, a body-triggered installation of beadwork patterns as they shift color and shape based on your interaction with them—a codified response to worn beadwork. The second person is Nhlanhla Mahlangu, a very well-known dancer, choreographer, and singer who will present African algorithms through the perspective of song and children’s stories, through rhythm, polyrhythm, and body memory. He explores the location of algorithmic thinking and mathematical formulations within the body and within sound. The third person is myself, and I am focused on math, coding, and algorithmic thinking in culture. This is where we are now, and the School for



Figure 4 (left): Philisiwe Dube, beadwork artist. Photo: Zivanai Matangi
 Figure 7 (middle): Nhlanhla Mthlangu, composer and choreographer. Photo: Zivanai Matangi
 Figure 8 (right): Tegan Bristow, digital artist and creative coder. Photo: Zivanai Matangi

Vernacular Algorithms grows with interest, with interrogations of Western computational thinking. We don't quite know where it's going yet, but we're excited about the prospects of what it might bring to culture and technology in and from Africa.

Dr Tegan Bristow is director of Fak'ugesi African Digital Innovation Festival, Johannesburg, South Africa. Founded in 2014, the festival works on the assumption that in order for technological innovation to succeed, a strong connection must be made to African cultural practices and creative encounters. Alongside fundraising, curation, and program development for the festival, Bristow leads an annually engaged group of producers and project managers in developing and managing content producers and creative partners across the African continent and beyond. She is also senior lecturer in interactive digital media at the Wits School of the Arts, Johannesburg, where she specializes in African art, culture, and technology. Bristow is editor in chief and digital editor of the *Ellipses Journal of Creative Research*. She develops interactive digital media in installation, performance, and screen-based and online media. Bristow completed her PhD on "Decoloniality and Actional Methodologies in Art and Cultural Practices in African Cultures of Technology" in 2017, which she wrote with the Planetary Collegium at the Centre for Interdisciplinary Arts at Plymouth University, UK. Her curatorial highlights beyond Fak'ugesi Festival include *Digital Imaginaries* (2018) at Afro Pixel (Senegal); Wits Art Museum (South Africa), and ZKM | Karlsruhe (Germany); *The Centre for the Less Good Idea* (2017); and *Post African Futures* (2015) with the Goodman Gallery, Johannesburg. <http://teganbristow.co.za/>

INHABITED INFORMATION SPACES: A “LANDSCAPES FOR THE SENSES”

Sarah KENDERDINE

Head of Laboratory for Experimental Museology (eM+), director and lead curator, EPFL Pavilions, École Polytechnique Fédérale de Lausanne (CHE)

This text is an edited transcript of the conference presentation delivered at HyMEx.

Speech, it seems, is little more than an ugly convenience for sharing data...

All science is in some sense painting: it is the eye that thinks.

–Daniel Albright, *Panaesthetics*, 2014

In 1889 the curator G. B. Goode, of the Smithsonian Institute, delivered an anticipatory lecture entitled “The Future of the Museum” in which he said “this future museum would stand side by side with the library and the laboratory.”¹ Convergence in collecting organizations propelled by the liquidity of digital data now sees them reconciled as information providers in a networked world. The media theorist Lev Manovich described this world order as “database logic,” whereby users transform the physical assets of cultural organizations into digital assets to be uploaded, downloaded, visualized, and shared by users who treat institutions not as storehouses of physical objects but as datasets to be manipulated.² This presentation explores ways in which such a mechanistic description can be replaced by one that is informed by the “experiential, spatial and materialized; embedded and embodied” aspects that have come to characterize computation.³ It was at the birth of the Information Age in the 1950s that designer György Kepes of MIT wrote that information abundance should be formed into a landscape of the senses that organizes both perception and practice.⁴ This “felt order,” he said, could be “a source of beauty, data transformed from its measured quantities and recreated as sensed forms exhibiting properties of harmony, rhythm and proportion.”⁵

For the past twenty years, I’ve been designing and building large-scale interactive frameworks for public engagement with art, culture and science. I was originally doing so at

1 George Brown Goode, “The Museums of the Future:,” *Report of the National Museum, 1888–’89* 1 (1891): 427–45.

2 See Mike Pepi, “Is a Museum a Database?: Institutional Conditions in Net Utopia,” *e-flux Journal* (December 2014).

3 David Berry and Michael Dieter, *Thinking Postdigital Aesthetics: Art, Computation and Design* (London: Palgrave Macmillan, 2015).

4 György Kepes, *The New Landscape in Art and Science* (Chicago: Paul Theobald, 1956), 24.

5 Orit Halpern, *Beautiful Data: A History of Vision and Reason since 1945* (Durham, NC: Duke University Press, 2014), 14.

Museums Victoria in Melbourne, Australia, before starting to collaborate with universities to help sustain this kind of infrastructure across the GLAM sector. There was an increasing need for computer scientists in the kind of work that we wanted to explore. I then co-established with Jeffrey Shaw the Applied Laboratory for Interactive Visualization and Embodiment, located at the Science Park in Hong Kong. Eventually, I returned to Australia and founded the Expanded Perception and Interaction Center at UNSW.

At EPFL, where I am now professor of digital museology in Switzerland, we have configured twelve large-scale systems as experimental platforms through which to pioneer computational museology. These systems offer strategies for a post-cinematic multisensory engagement in human-to-human as well as human-to-machine interaction. Our lab, EM+, is a transdisciplinary initiative at the intersection of imaging technologies, immersive visualization, visual analytics, and digital aesthetics. We explore ways in which mechanistic descriptions of database logic can be replaced and computation can become experiential, spatial, and materialized, embedded and embodied a landscape for the senses. The EPFL Pavilions is a partner for HyMEx and *Spatial Affairs*, and in September we will launch “Deep Fakes: Art and Its Double.” Deep fakes are technologically empowered objects of art and science that offer forensic insights normally hidden from view. They stimulate alternative cultural forces that prompt a renegotiation of our understanding of copies, replicas, reenactment, and materiality itself.

Our work increasingly makes use of machine learning; we recently installed a photogrammetric model of Nefertari’s tomb in which machine learning was used to create a model of billions of points and then transferred to our 360-degree 3D system of 40 million pixels. It’s the world’s first demonstrator of unreal engines and display technology synchronized across a powerful eleven-PC cluster. We can create precious objects in 3D and peer inside to see what was previously unseen. We can zoom in to art in a way that reveals even the tiniest brushstroke and more than the naked eye can see. We’re also capturing embodied knowledge systems through various forms of motion capture emotion over time analytics, and the framework we’re developing could be described as this computational museology as a whole of environment encoding. Such framework unites artificial intelligence with data curation, ontology with visualization, and community within body participation through immersive and interactive systems. From this body of research, I’ve selected just four themes to share with you today.

The new museum is marked by a shift in our understandings of the archivist. For some time, the archive was described by Western thinkers as a product of bureaucracy, designed to be used as an instrument of management in power; Michel Foucault, for example, set this out in *The Archaeology of Knowledge* (1969). In *Archive Fever* (1996), Jacques Derrida described how the mechanization and digitization of archival materials created instant access to databases employing dendrite classification and retrieval as well as statistical analysis. New archival access modalities, however, are based on recollection, regeneration, and reworking, which corresponds to a shift from classification to remix and from orthodox models of stewardship to models of coproduction.

As an example, I will first take a familiar audiovisual archive: the World Montreux Jazz Archive. The sheer size and temporal nature of its audiovisual material presents its custodians with significant challenges to providing access and meaningful engagement. *Jazz Luminaries* is based on jazz greats from an archive digitized by the EPFL. The installation cuts, remixes and replays 5400 artists and 13,000 videos from a total archive of 11,000 hours. The neural net-like image on the dome is based on the artists' social network and the clustering is based on the number of times an artist played with other artists. At the very center of this network is BB King. Visitors lie under the dome and to navigate the constellation they use a spherical interface that emulates the hemisphere in which it is staged. The search paradigm is akin to tuning a radio search by listening, which circumvents any lack of knowledge of who the jazz greats are. Hearing what you like drives the design to unfold in three layers—from a sample, to all songs, to a full song.

At most museums, only a fraction of the collections is on display—at Museums Victoria, about 8 percent of its 16 million objects. We did an export from the content management system for 100,000 objects and interactively distributed them across eighteen themes. Using basic metadata, user can interactively access the objects. The system makes linkages between natural sciences, social history, and indigenous materials across the 100,000 objects. It operates like a real-time curation machine, with no search interface; as with the Montreux jazz project, there is no text-based interface to these systems. It's an emergent system in which you will always be presented with the unexpected.

Museums have long been ordering machines generating conventions of looking. Because the digital installations I am involved in making are positioned on thresholds of new ways of seeing, such work continues to occupy an uneasy space within museums; the intangibility, reproducibility, and transmissibility of digital materialities pose a threat to institutionalized claims of uniqueness and authenticity. They challenge museums' conventions of interpretation.

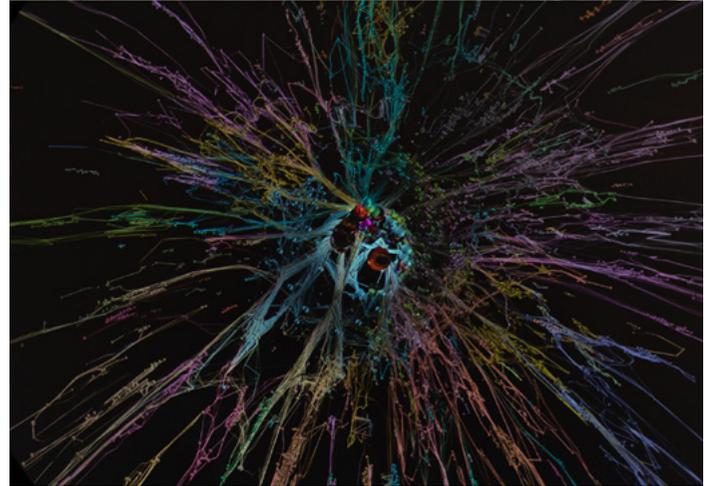


Figure 1: *Jazz Luminaries* (2019): an interactive full-dome application-based social network of jazz greats from the UNESCO Memory of the World Montreux Jazz Archive, this installation cuts, remixes, and replays 5400 artists and 13000 videos. © Kenderdine (2019). Photo: Catherine Leutenegger

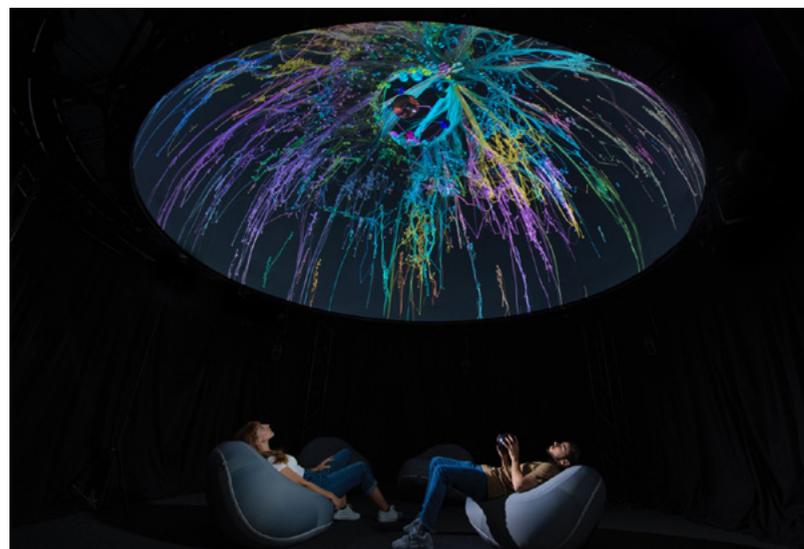


Figure 2: *Jazz Luminaries* (2019): an interactive full-dome application-based social network of jazz greats from the UNESCO Memory of the World Montreux Jazz Archive. © Kenderdine (2019). Photo: Catherine Leutenegger

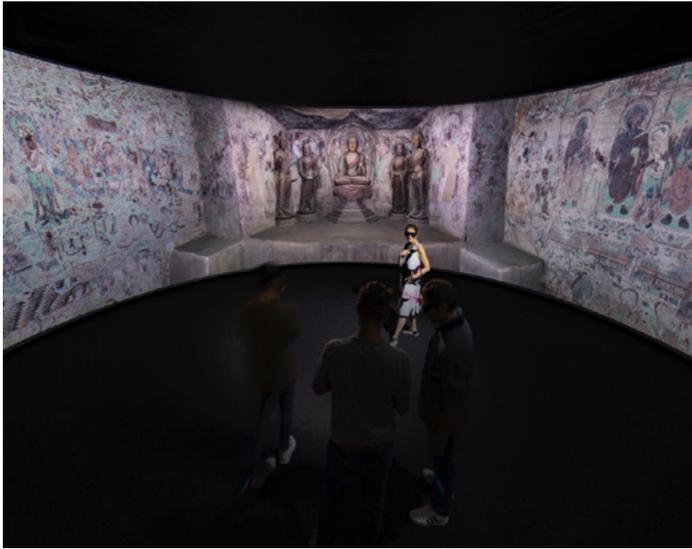


Figure 3: Pure Land: Inside the Mogao Grottoes at Dunhuang. © Sarah Kenderdine and Jeffrey Shaw (2012). Photo: Catherine Leutenegger



Figure 4: Pure Land: Augmented Reality Edition. © Sarah Kenderdine and Jeffrey Shaw (2012). Photo: Art Gallery of New South Wales (2015)

Recent debates, of course, clearly indicate how digital copies in fact any kind of replica or rendering form part of a trajectory of the originating objects cultural career. In the 1970s, the artist Douglas Davis used a wonderful term—the “post-original original”—to describe this phenomenon.

To illustrate, I’ll explore a work based on the Dunghuang caves in the Gobi Desert of northern west China. It’s a world-heritage site with 492 caves dug into an escarpment containing 45,000 square meters of mural paintings and over 2,000 statues crafted by Buddhist monks over 1000 years. Almost all the caves are closed because mass tourism had started creating a microclimate change. A huge digitization effort is therefore underway. We took the wireframe from the laser scan of cave (220), which is permanently closed, to create 360-degree versions of the space and augment them with interactive features. For one of the versions, we printed the wireframe from the laser scan on the walls of an exhibition booth at one-to-one scale, which allows visitors to walk inside using a tablet like a window on the world to examine this space. In Figure 3 you can see groups of people harnessed into the screen with a single-operator, multi-spectator scenario. Socialization is at the core of this kind of museum experience—it should cater to young children, middle-aged people, grandparent, and grandchild. One noteworthy quality is that of virtual-virtual tourism. In Figure 4 the woman takes an iPad from her handbag and films her husband’s experience as if they were really there.

The conservator Adam Lowe described for the *New Yorker* last year how a digitally recorded copy can both hold a load of forensically accurate information, but also act as a vehicle for evoking a deep emotional response. Bruno Latour and Lowe talk about the migration of aura from real to virtual. In the museological world, I prefer to talk about the proliferation of aura—where objects of the real and the digital have powerful but different auratic experiences in their own rights.



Figure 5. (left) Look Up Mumbai.

© Sarah Kenderdine and Jeffrey Shaw (2015).

Photo: Sarah Kenderdine

Figure 6. (right) Look Up Mumbai.

© Sarah Kenderdine and Jeffrey Shaw (2015).

Photo: Sarah Kenderdine

In the world of architecture and archaeology, the archaeologist Christopher Tilley talks about how kinesthetic approaches to landscape stress the role of the human body, the way we perceive and relate to visual imagery is fundamentally related to the kinds of bodies we have. Corporeal embodied aesthetics is the way in which iconic images have transfixed their viewers, and indeed embodiment theory, which informs presence theory, is central to a post-digital encounter. Figures 5 and 6 show the Chhatrapati Shivaji Maharaj Vastu Sangrahalaya, formerly the Prince of Wales Museum, in India. The dome was used as an artistic exploration that specifically focuses on the ceiling architecture of Mumbai, both heritage and contemporary buildings, and transforms them into an urban, celestial imaginary. We collected 168-gigapixel images throughout the city. These were staged as a biology lab museum at Terminal 2 the Mumbai airport, which allowed 2000 people a day to rediscover the city with fresh eyes. Importantly, it gave new perspectives on the many spaces that are socially exclusive despite their heritage status. The work uses a simple computer vision algorithm that randomly selects pairs of images, which means people could lie there all day and never see the same thing twice.

The concept of an experiential domed environment emerged from attempts to simulate the spherical nature of the human visual field and thus to exploit and extend sensory perception. In collaboration with the National Museum of Australia, we created two dome experiences depicting a sacred songline. Songlines are one of the most defining metanarratives in ancient mainland Australia, but have never been told in public; obtaining the permissions to do this work took seven years of negotiation. The work involves photogrammetry of a sacred cave that had never been photographed before.

Time-lapse photography, drone-based panoramas, and gigapixel imaging ambisonics gives visitors intimate views contained within its sandstone faults. A second dome experience immerses visitors in a series of artworks by artist custodians and tells the story of the Seven Sisters as they travel the country. Women painted big full-dome pictures, which were then interpreted for the dome. It was an attempt to make the complex contemporary morality tale more explicit in order to bring it into the public domain.

Intangible cultural expressions are enacted and transmitted socially, and they are intimately linked to people. They include traditions and performances defined by their reliance on tacit and embodied knowledge systems. Figures 8 and 9 show the Hong Kong Martial Arts project, which we've been working on since 2012 with thirty-three masters. Hong Kong is a reservoir of the, intangible heritage of the Hakka people and from the mid twentieth-century it provided refuge for thousands of migrants from Mainland China. Among these exiles were some of the most prominent martial artists in the world. With globalization, urbanization, and dwindling numbers of practitioners, this living heritage made internationally famous by Jackie Chan, Gordon Liu and Hong Kong cinema, is now in danger of becoming lost. We are taking a 4D approach to capturing the martial arts masters in a myriad of ways. As a result of this, we've had nine exhibitions and the Hong Kong government is currently building a research center and museum for the community. It is an interactive system where kung fu movements are analyzed and reinterpreted using motion capture. Brian Rotman talks about motion capture as a corporeal of gestural haptic writing, and he sees motion capture as a continuous topological model which allows us in easier attainment of movement's effective qualities. The difference between capture and notation is critical here, for instead of translating movement into symbols, as done when speeches are transposed into writing, gestural haptic writing is a mediating technology that escapes purely signifying and the representational. It operates very well in interactive and participatory and immersive regimes. Many of these interfaces build on performance theories such as Diana Taylor's provocation that embodied performed acts generate records and transmit knowledge. We're doing all sorts of different types of documentation, including video at 500 to 1000 frames per second.

Remaking the Confucian Rites is a project with Tsinghua University, Li Jia Hall, Jia Hall and City University, and EPFL focused on the Chinese body and recreating specific rituals which haven't been performed for hundreds of years. Confucian Li is a concept spanning aesthetics, ethics and ideology; it's also a technique of the body, a skill which is learned and inscribed. In the sequences of the capping ceremony every facet of the reenactment is filmed in numerous ways. The reconstructions are based on lengthy rereading



Figure 7. Travelling Kungkarangkalpa.
© Sarah Kenderdine (2017).
Photo Sarah Kenderdine

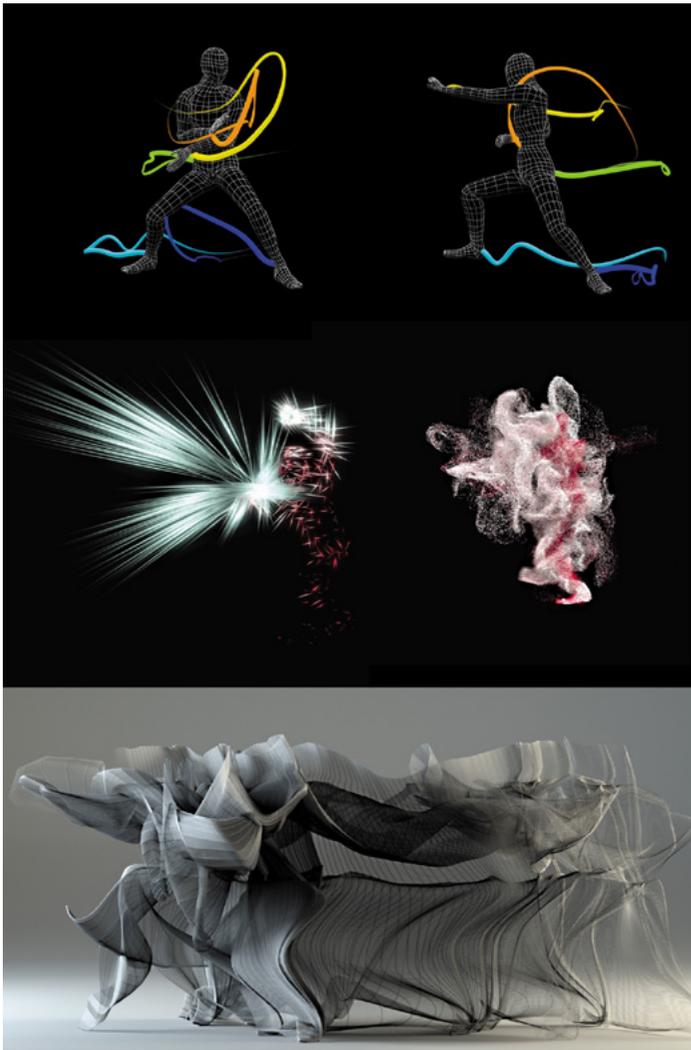


Figure 8. (left)

Hong Kong Martial Arts Living Archive.

© Sarah Kenderdine and Jeffrey Shaw (2015)

Figure 9. (right)

Hong Kong Martial Arts Living Archive.

© Sarah Kenderdine and Jeffrey Shaw (2016)

of the second century set of collections of the etiquette. Arguably, Confucian ritual is at the forefront of Chinese political rhetoric, intellectual debate, and popular practices today, signaling its importance on the world stage. The essential, the corporeal, and the kinesthetic tools of inquiry for scholars' reenactment is a process of critical thinking that permits us to dig deep through an ontologically intense method of research.

Archives call for the creation of new prosthetic architectures for producing and sharing their resources. The work we are doing spans immersive visualization technologies, visual analytics, aesthetics, and cultural (big) data to create digital cultural heritage experiences of archives which take into account scientific, artistic, and humanistic perspectives. It makes a case for a more general reformulation of engagement with digital archives at the intersection of the tangible and intangible, and as a convergence across domains. The performative interfaces and repertoires described here demonstrate opportunities to recreate narrative in a digital context and thus support personal affective engagement with cultural memory.

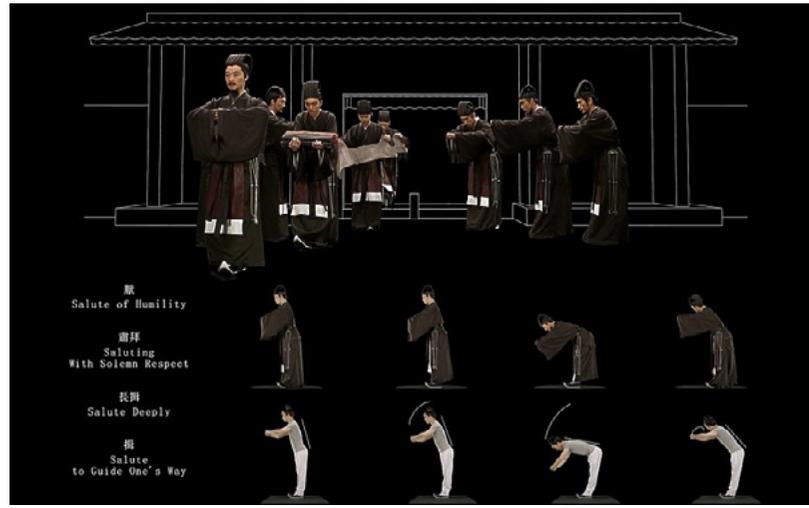


Figure 10: Capping Ceremony, Remaking the Confucian Rites. 8th Triennial of Contemporary Art, Ljubljana, Slovenia (2016).

© Sarah Kenderdine, Jeffrey Shaw, Johnson Chang, and Peng Lin (2014). Image: Paul Nichola

Figure 11. Capping Ceremony, Remaking the Confucian Rites.

© Sarah Kenderdine, Jeffrey Shaw, Johnson Chang, and Peng Lin (2014). Image: Paul Nichola

Sarah Kenderdine is professor of digital museology, founder and head of the Laboratory for Experimental Museology (eM+), and director and lead curator at EPFL Pavilions, École polytechnique fédérale de Lausanne (EPFL), Switzerland. She researches at the forefront of interactive and immersive experiences for galleries, libraries, archives, and museums. In widely exhibited installation works, she has amalgamated cultural heritage with new media art practice, especially in the realms of interactive cinema, augmented reality, and embodied narrative. At EPFL, Kenderdine teaches and supervises students on the Digital Humanities and the Architecture and Sciences of the City doctoral programs. eM+ explores the convergence of aesthetic practice, visual analytics, and cultural (big) data. It engages in research from scientific, artistic, and humanistic perspectives, and promotes post-cinematic multisensory engagement using experimental platforms. At EPFL Pavilions, Kenderdine works towards reaching beyond object-oriented curation to blend experimental curatorship and contemporary aesthetics with open science, digital humanism, and emerging technologies. EPFL Pavilions is an amplifier for art and science in society, and a meeting place for all disciplines.

META-ARCHITECTURE: AI STRATEGIES IN ARCHITECTURE AND ART

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This text is an academic paper based on the conference presentation delivered at HyMEx.

INTRODUCTION

The first part of this article focuses on the concept of a dynamic environment. Then evolutionary architecture, based on the idea of adaptation to environmental changes, is introduced. We present and analyze selected methods of architectural modelling that use deep learning. Popular machine-learning algorithms and neural networks have a limited range because they deal with individual tasks; they are not sufficient for modelling complex adaptation processes. We therefore propose an approach based on advanced methods such as meta-learning, in which the knowledge gained in solving one task can be generalized and applied to many other tasks. We present our applications of meta-learning to the analysis and design of architecture. We test our framework in the form of an immersive installation.

DYNAMIC ENVIRONMENTS

In our view, urban architectural structures are complex and multidimensional, intertwining natural processes with interactions between large groups of agents, communication flows, information networks, and others. They undergo continuous transformation. The term “evolving architecture” refers to architecture that relies on physical and virtual processes that transform and assemble into structures in response to environmental properties and capabilities.¹ A dynamic environment is any space that surrounds us and changes structurally over time, sometimes through modification by groups of agents. Spaces can be closed, with relatively well-defined boundaries, or open, without well-defined boundaries. Examples of confined spaces include homes, offices, hospitals, classrooms, and cars. Open spaces include streets, bridges and parking lots, fields (in agriculture), air (in the case of airplanes), and the sea (for underwater pollution measurements and tsunami early-warning systems). The latter environments are usually rich,

¹ See John Frazer, *An Evolutionary Architecture* (London: Architectural Association Publications, 1995).

complex, and unpredictable; they can generate significant “noisy” data, and unstructured and sometimes very dynamic changes. This project investigates a living dynamic system as a complex set of natural and cultural sub-processes in which each interacting entity and system creates complex aggregates. It employs various data, such as from human (transport, communication, information, technology), natural (wind speed, rain, temperature, tornadoes, floods and droughts) and biodiverse (microorganisms, animals, insects, plants) activities. Machine-learning methods make it easier to reveal and use correlations, patterns and transformations; little can be said about a single series of numbers, but we can often say much more when we can compare between different series.

AI STRATEGIES IN ARCHITECTURE

The environmental forces that transform architecture vary greatly.² The variability of architectural forms depends on the volume and combination of these forces.³ Each force is revealed through a series of transformations of spatial objects, like the logic behind changing an equation or transforming a neural network. In the case of neural networks, these transformations are often discontinuous. Deep artificial neural networks (DNNs) are multilayered networks of nodes and connections between nodes (weights) typically trained via gradient-based learning algorithms such as backpropagation.⁴ Math transformations may seem trivial or limited in possibilities, but when you combine them, the shapes can change in much more complex and unpredictable ways. It seems that almost any shape or curve can be generated, because neural networks are universal function estimators. Universality means that neural networks can approximate many different complex functions. Training a neural network on data approximates unknown underlying mapping function from inputs to outputs.

The next step was to research evolutionary strategies, specifically the transformation of architectural objects over time, and to implement them by modifying selected layers in the network. We evolved the weights of our deep neural network by applying additive Gaussian noise in such a way that the general features of the training class of 3D objects are kept, but its evolution is possible. We created a mechanism for controlling the hyperparameters of the neural network, and ipso facto for controlling generated output numbers that represent new 3D objects. In this way it was possible to create a fully universal 3D-object generator, and propose a new method of designing complex original architectures. Implementing evolutionary strategy in this way was a step toward research focused on the self-organization of complex structures from random elements. This method is general enough to become the starting point for meta-learning research and for creating a universal toolkit that supports architects, designers, and so on. Working with large data sets obtained from a changing environment requires advanced

² See John H. Holland, *Adaptation in Natural and Artificial Systems: An Introductory Analysis with Applications to Biology, Control, and Artificial Intelligence* (Cambridge, MA, The MIT Press, 1992).

³ Jason Gauci and Kenneth Stanley, “A Case Study on the Critical Role of Geometric Regularity in Machine Learning,” in *Proceedings of the Twenty-Third AAAI Conference on Artificial Intelligence, AAAI 2008, Chicago, Illinois, USA, July 13–17, 2008* (Chicago, Illinois: AAAI Press, 2008), 628–33, <http://www.aaai.org/Library/AAAI/2008/aaai08-100.php>.

⁴ Yann LeCun, Y. Bengio, and G. Hinton, “Deep learning,” *Nature* 521, 7553 (2008): 436–44, <http://www.nature.com/articles/nature14539>.

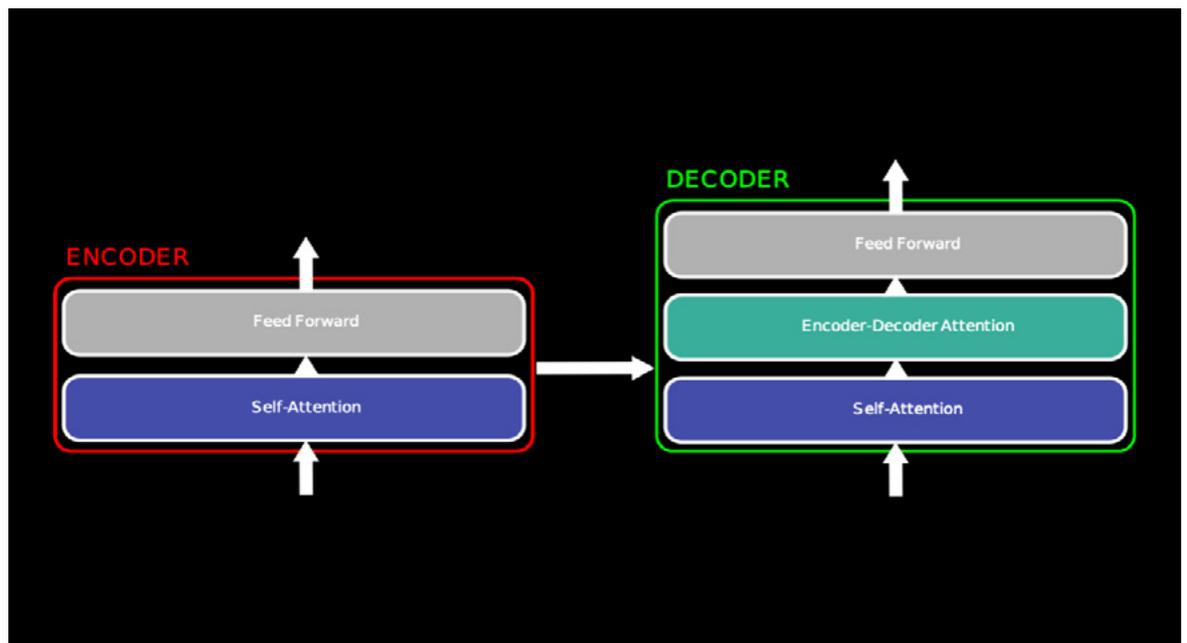


Figure 1. Schema of transformer.

machine-learning methods. We tested various AI methods for modeling and generating new architectural forms. We found that transformers which work by using convolutional neural networks together with attention models are much more efficient than prior models. We had previously tested recurrent neural networks (RNN), long short-term memory networks (LSTM), and variational auto-encoders (VAE).⁵

The transformer model is a seq2seq model which uses attention in the encoder and in the decoder.⁶ Transformers have been used for many conditional sequence generation tasks, such as machine translation, constituency parsing, and protein sequence generation, and can be used for architecture design. Transformer models consist of an encoder and a decoder. The encoder takes the input sequence and maps it into a higher dimensional space (n-dimensional vector). That abstract vector is fed into the decoder which turns it into an output sequence, which can be any sequence of numbers, symbols, etc. The attention mechanism looks at an input sequence and decides at each step which other parts of the sequence are important. Self-attention is an attention mechanism relating to different positions within a single sequence in order to compute a representation of that sequence. It can be intuitively explained using a text example: when reading this text, you are temporarily focused on the word being read, but at the same time your mind keeps the important keywords of the text to provide context. In our research, we worked with sequences of numbers that represent a 3D object as positions of its particles/elements and velocity.

⁵ See Robert B. Lisek, "Meta – Composer," in *Yearbook 2019–2020* (Budapest: Institute of Advanced Study, CEU, 2020).

⁶ Ashish Vaswami et al., "Attention is all you need," in *NIPS'17: Proceedings of the 31st International Conference on Neural Information Processing Systems* (New York: Curran Associates, 2017), 6000–10.

META-LEARNING

Our approach to analyzing and creating evolving architecture is based on meta-learning. The next generation of artificial intelligence systems, meta-learning goes by many different names: learning to learn, multi-task learning, transfer learning, zero shot learning, etc. People can easily transfer knowledge acquired through solving one task to another, more general task; we naturally recognize and apply previously acquired knowledge to new tasks. The more closely a new task is related to our previous experience, the easier we can master it. In contrast, popular machine learning algorithms deal with individual tasks and problems. Transfer learning attempts to change this by developing methods to transfer knowledge acquired in one or more source tasks and using them to improve learning in a related target task. The goal is to improve learning in a target task by using knowledge from a source task. Techniques enabling knowledge transfer will enable significant progress in AI and architecture.

We have developed a learning strategy for a set of neural network modules that can be combined in various ways. We train different modular structures on a set of related tasks and generalize to new tasks, composing the learned architectural modules in a new way. For composing, we use concatenation, addition, and product operators. We quickly learn something about a new task based on previous tasks without training our model from scratch. Our system finds two or more suitable modules that can be combined as optimal solution for the new task.

VIBRATIONAL ARCHITECTURE

In the wake of multiple political and ecological crisis, architecture now has increased potential to address communication opportunities across media and scales. Architecture should work on a city scale where new living conditions arise, and negotiate and create bridges between different groups and social processes. Architecture should be at the center of public debate about space. Architectural criticism should play an activating role, judging intentions according to their purposes, roles, and effectiveness. Large-scale architecture requires a combination of research and technology. Projects created in virtual space can be viewed as tests of large-scale architecture. Where can you expect new spatial solutions? What ideas will drive this search? It is useful to create bold hypotheses that can lead to a better understanding of dynamic social processes and architectural constraints. Our approach reveals blind spots and proposes a program, including tasks, for architecture and urban planning. Architecture is no longer based on straight lines or shapes described by linear equations, but fields of vibrational phenomena, waves and particles. We propose a topology of oscillations, gradients, and fluctuations where each manifold potentially hosts new manifolds, elastic unity created by balance of forces between tension and relaxation, expansion and contraction. A space created in this project is never static. A space is never a given, but rather the result of an empirical body that determines the timing of its actions. Space emerges from the unpredictability of becoming as a series of potential expressions of pure movements, defined as differentiations. It is a process of becoming, that is, not a unity of predetermined systems or a crystallized structure, but a constantly evolving assembling and unfolding mechanism. There is no

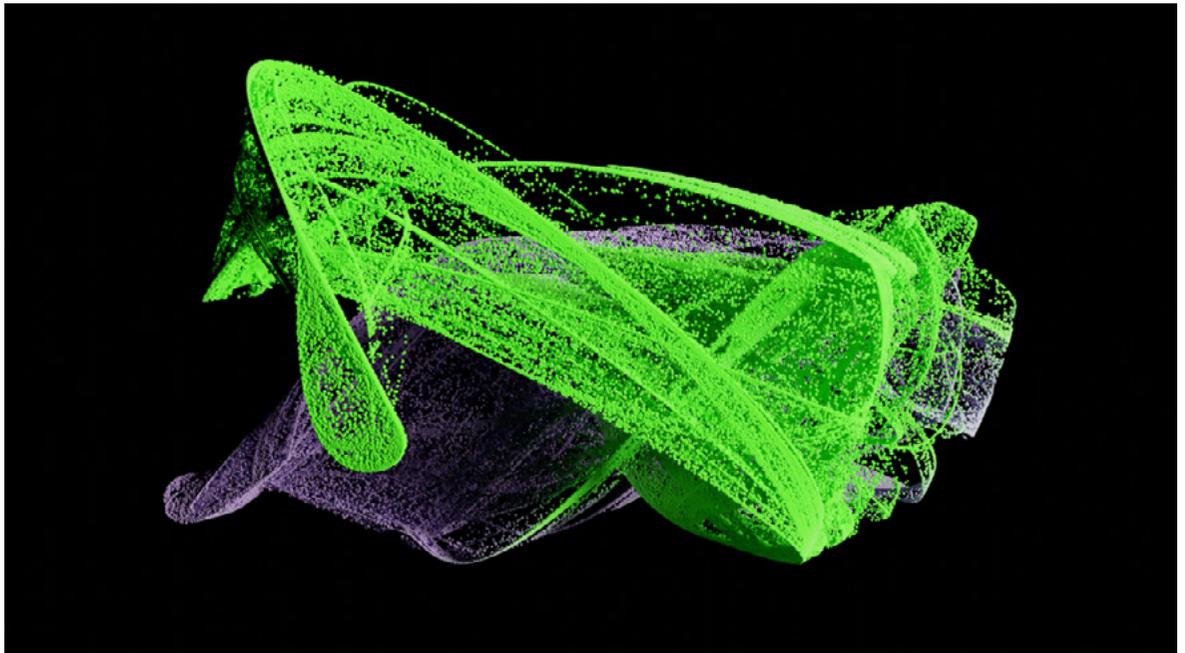


Figure 2. Vibrational architecture.

division between the performer and the environment. “Inner” space is topologically in contact with “outer” space. There is flow from outside to inside, in various scales and dynamics. The external has no fixed boundary, but is moving, vibrating matter. We explore pulsar quantization of time and space, the mass of pulsating particles and sound events that transform performance space. The performer now begins chasing vibes, causing a new series of interactions and shifts. It is a transforming and transmuting system that is constantly evolving. Everything is involved in the continual process of transforming into something else—everything is opened up and put together. Performances in space conceptualize an experiential, living, vital body. The body is a multiplied pattern that tries to gain stability through action. Bodies transcend time by acting, entering time, and connecting with other bodies and their activities. The space is revealed only as a result of synchronization and connection.

IMMERSIVE INSTALLATION

An interesting direction for research in modern architecture is related to the problem of immersion, creating virtual environments and sound spatialization. Virtual environments also provide an excellent space for testing machine-learning methods and architectural hypothesis. Restrictions introduced during the pandemic motivated us to research the potential of AI and virtual architecture for the evolution of society. Our research was focused on the roles of presence, flow, immersion, and interactivity. We were particularly interested in the problem of presence and flow in virtual environments. Presence is defined as the subjective experience of being in one place or environment even when one is physically situated in another. Presence is a normal awareness phenomenon that requires directed attention and is based in the interaction between sensory stimulation and environmental factors that encourage and enable immersion. Flow is a state in which someone is completely absorbed and immersed in an activity. We researched relations between presence, adaptation, and interactivity, such as how interactivity and adaptation improve experience of presence. We tested our meta-learning approach in virtual environments. We studied how various new methods of operation in



Figure 3. Immersive VR installation, *Evo/ver*, 2020.

virtual architecture can influence future social structures. We created immersive architectural installations that were presented during Siggraph Asia 2020 and at the Institute of Electronic Arts.

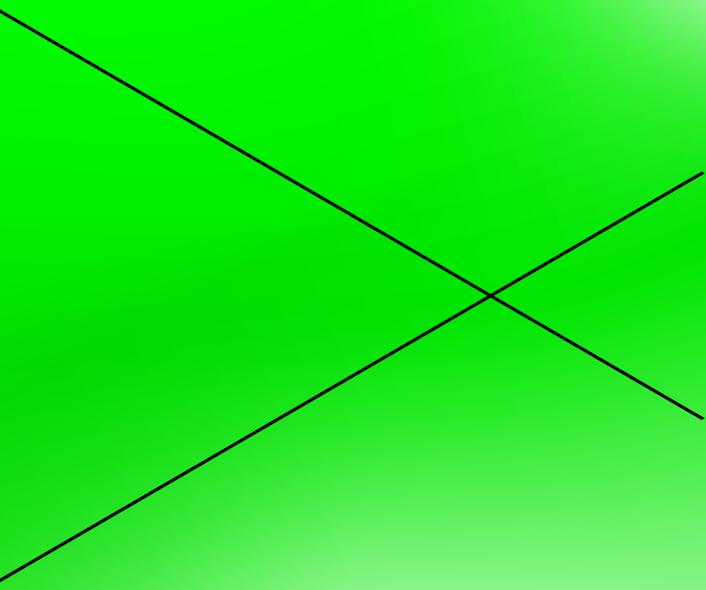
FUTURE RESEARCH

The goal is to create new support tools in the form of software for researching and developing new architecture. The research described above can be fundamental to future architecture that will be well adapted, in particular a flexible safe architecture that accommodates mass migrations and crisis situations such as pandemics. It is necessary to create large groups of researchers, architects, and urban planners that change and adapt the architecture of our cities and suburbs to the new needs of their inhabitants.

Funding: This research was supported by Institute of Advanced Study CEU and by CTU grant SGS19/117/OHK1/2I/15.

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Karolína Kotnour is an architect and artist dedicated to architectural spatial and audio-visual production. She creates and initiates evolving architectures by adapting methods from neuroscience, machine learning, and immersive and sound spatialization research. Her projects connect and synchronize architectural and sound structures. She works with space as it evolves over time, its parallel paths and mutual confrontations and reflections. Human acoustic presence and performance play significant roles.



Summoning Ghosts: From Reconstructions to Virtual Models

RECONSTRUCTING, RE-INTERPRETING, AND RE-PRESENTING HISTORICAL EXHIBITIONS IN LIGHT OF THE DIGITAL

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This text is an academic paper based on the conference presentation delivered at HyMEx.

From the standpoint of someone who has been working on the history of exhibitions for more than three decades, the recent growth in exhibition studies and the attention paid to historical exhibitions has been especially gratifying. And one of the most striking aspects of this increased interest has been the phenomenon of exhibitions about exhibitions.¹ Although such projects come in various forms, those receiving the greatest attention involve the re-creation and re-presentation of shows from the past. The best-known—and most well-funded—of these was mounted alongside the 2013 Venice Biennale by the Prada Foundation.² This was a reconstruction of the 1969 exhibition *When Attitudes Become Form: Work-Concepts-Processes-Situations-Information*, originally presented at the Kunsthalle Bern and assembled by the most acclaimed curator of the second half of the twentieth century, Harald Szeemann.³ While much discussion of that show and others like it has centered on their successes and failures as public events, I want to turn our attention to something else. For these projects also are very much research enterprises, aimed not only at celebrating their subjects and edifying their audiences, but also centrally directed at expanding knowledge of the original exhibition and, often, of exhibitions and curatorial practice more generally.

¹ For discussions of this phenomenon, from which some of my examples have been drawn, see Reesa Greenberg, “Remembering Exhibitions’: From Point to Line to Web,” *Tate Papers* 12 (2009), <https://www.tate.org.uk/research/publications/tate-papers/12/remembering-exhibitions-from-point-to-line-to-web>, and Chelsea Haines, “Exhibitions on Exhibitions,” *Mousse* 39 (Summer 2013), https://www.academia.edu/4408627/Exhibitions_on_Exhibitions.

² *When Attitudes Become Form: Bern 1969/Venice 2013*, Fondazione Prada, Ca’ Corner Della Regina, Venice, June 1–November 3, 2013.

³ For the most complete account of the original 1969 exhibition, see Christian Rattemeyer et al., *Exhibiting the New Art: “Op Losse Schroeven” and “When Attitudes Become Form” 1969* (London: Afterall Books, 2010). For additional documentation and analysis, see Bruce Altshuler, *Biennials and Beyond: Exhibitions that Made Art History, 1962–2002* (London: Phaidon Press, 2013), 93–110, and Germano Celant et al., *When Attitudes Become Form: Bern 1969/Venice 2013* (Milan: Fondazione Prada, 2013).

In viewing exhibitions about exhibitions as projects and events of knowledge production, it is important to consider the different kinds of knowledge produced and the uses to which they might be put. To state things very generally, it seems to me that these projects primarily yield two kinds of knowledge: propositional knowledge, claims about what is or was the case, and what one might call experiential knowledge. These outcomes can be used for various purposes, including the expansion of scholarship, the development of practical skills and approaches to exhibition practice, and—in a more activist register—changing our view of past events and the lessons that they hold for the present, and for the future.

The Prada Foundation's re-presentation of *When Attitudes Become Form* is a good place to begin. The 1969 show already was a very well-known exhibition, a landmark of what is often called the "heroic" period of curating so closely associated with the work of Szeemann. (The Venice project was led by Germano Celant, himself a central curatorial figure of that time.) The original exhibition was very well documented, and had been examined in detail in the historical and curatorial literature. Its notoriety certainly contributed to the long lines and significant buzz in Venice. Despite all of the documentation and existing scholarship, the Prada Foundation created a multi-year research team dedicated to filling gaps in the historical record and exhuming long-buried information. Among much else, the researchers unearthed previously unknown images through an ambitious exploration of newspaper archives and conducted many interviews. To mention just one example, this work yielded important information about a little-mentioned annex of the exhibition where pieces that arrived late were shown. In association with the Getty Research Institute, which had recently acquired the massive Szeemann archive, the Prada researchers explored a great deal that had not been studied previously. In addition to a high-visibility public event, the result was a significant expansion of knowledge about the exhibition.

But the knowledge generated went beyond the discovery and accumulation of facts concerning the organization, the artworks, and the visual record of *When Attitudes Become Form*. For the physical reconstruction in Venice gave visitors an opportunity to experience aspects of the exhibition, to feel the relationship between the works and their spatial choreography. Of course, for many reasons one can never fully return to the original audience's experience of a historical exhibition. For past shows were seen in a different cultural moment by individuals with very different beliefs and expectations. Those viewers, furthermore, had no idea of the place that the artworks and the exhibition would assume within future art-historical narratives. And often the works in a reconstruction are themselves different, perhaps because there were difficulties in finding the original objects, or they had come to the exhibition in poor condition, or the organizers could not afford to insure them given their current high value. Ironically, and perhaps in spite of itself, the Venice exhibition can be seen to have made clear that one cannot experience a reconstructed exhibition as the original had been experienced. For although the radiators, wall moldings, and parquet floor of the Kunsthalle were reproduced within an ornate palazzo on the Grand Canal at great cost, there was no effort to hide the eighteenth-century backdrop for this twentieth-century stage set. The show spared little expense in replicating the original setting, yet at the same time the scenography suggested that such replication is impossible.

This is not to say that similar experiences could not be had, and that one could not learn much from viewing the Venice exhibition. The point was brought home to me in part because my mental images of *When Attitudes Become Form* were very much tied to the most widely published photographs of the exhibition, taken by Harry Shunk. In these photos the rooms of the Kunsthalle appeared quite large, and the placement of the works relatively spacious. But in Venice, where the art was installed in spaces identical in size and shape to those in Bern, and the works positioned identically within those spaces, things were extremely crowded. This was not a matter of just learning that the rooms were differently sized and the works more tightly installed than I had thought. For what I acquired was important kinaesthetic knowledge derived from the experience of moving through the galleries and among the sculptures. Perhaps in my case this was made more striking by its overturning impressions gained from photographs. But it also was reinforced by an aspect of the Prada show that certainly was not intended to reproduce the earlier experience. This was the visitors receiving loud admonishments to keep away from the artworks that were displayed so closely to one another, works that in 2013—unlike in 1969—were worth a great deal of money.

Another feature of the photographs of many exhibitions of that period is that they are in black and white, often giving a false impression, and one that can be reclaimed through a re-presentation of the works. An interesting example is *Primary Structures*, mounted at New York's Jewish Museum in 1966 and curated by Kynaston McShine. Generally remembered as an exhibition of austere North American Minimalism, it actually presented works by both US and British sculptors, many of which were brightly colored. But the black-and-white photographs reinforced this historical misremembering to cement the image of the exhibition as one of classic Minimalism. That this was not the case became clear through a model of the original exhibition that was displayed in a 2014 show at the same institution, *Other Primary Structures*.⁴

But *Other Primary Structures* was a different sort of exhibition about an exhibition. For rather than displaying what was included in the exhibition that was its subject, it presented what was not in that show. Taking a revisionist stance, this exhibition, curated by Jens Hoffmann, presented works from outside the Euro-American centers, pieces that might have been shown in New York in 1966 if its artworld had been what we now would call a global one. Against a background of photo murals of *Primary Structures*, the exhibition's two parts displayed sculptures in a Minimalist mode from that period in Eastern Europe, Latin America, Africa, East Asia, and the Middle East. For our purposes it is important to note that the institution's ability to identify these works was the product of significant research. And this research grounded a postcolonial and activist project directing attention towards what was excluded from display and commercial promotion in major Western art centers.

Research supporting a critical stance also was found in the eighteen-month program at the Van Abbemuseum entitled *Play Van Abbe*, which interrogated museum exhibition and collection practices with an eye to generating a more progressive institutional direc-

4 The Jewish Museum, New York, March 14–May 18 and May 25–August 3, 2014.

tion in the twenty-first century.⁵ The series began in 2009 with *Reconstruction: Summer Display 1983*, which recreated an exhibition originally shown in the same galleries, an exhibition based on formal relationships among modern and contemporary works arranged without regard to chronology. It was the first of a number of elements of *Play Van Abbe* that contextualized the different aesthetic values promoted by exhibitions mounted at different times, and their role in influencing how artworks are interpreted by the public.

Another sort of exhibition about exhibitions also branches beyond the content of the subject show, but in the direction of research into the contemporary. Here the research is conducted not by a curatorial team but by artists. This is a different sort of research, perhaps we might call it engaged research, an investigation of works or ideas of the original show that takes the form of contemporary artistic response. *When Attitudes Become Form* was treated this way by Jens Hoffmann in *When Attitudes Became Form Become Attitudes*, in which contemporary artists were invited to respond to concepts Szeemann and his selected artists explored in the 1969 show.⁶ (The project also included a documentation section, including a model of the original exhibition.) Another example was part of the celebration of the fiftieth anniversary of documenta, *Archive in Motion*.⁷ Organized by Walter Glasmeier, it presented contemporary artworks in conjunction with archival displays from across the exhibition's long history. Here archival research united with contemporary artistic research, combining two different forms of inquiry that have grounded exhibitions about exhibitions.

When considering the relation of digital technologies to the kind of exhibition-of-exhibition projects that I have discussed, of course we think about the profusion of research materials that are increasingly accessible online. A good example is the ambitious Exhibition History Project of New York's Museum of Modern Art, which has made available on the museum's website installation photographs, checklists, catalogues, and press releases for thousands of its exhibitions.⁸

And there is the world of photographs. When I began my research into historical exhibitions, during the 1990s, many installation images could be found only by visiting institutional archives or via a slow process of correspondence with curators, artists, galleries, and other possible sources. Making such images available to a broad public was a central motivation for the publication of my two large volumes of exhibition documentation.⁹ But now, of course, photographs of a vast number of exhibitions can be retrieved by anyone online, many more than will ever appear in print.

5 Van Abbemuseum, Eindhoven, November 28, 2009–June 26, 2011.

6 CCA Wattis Institute for Contemporary Arts, September 13–December 1, 2012.

7 Kunsthalle Fridericianum Kassel, September 1–November 20, 2005.

8 See <https://www.moma.org/calendar/exhibitions/history/>.

9 See Bruce Altshuler, *Salon to Biennial: Exhibitions that Made Art History, 1863–1959* (London: Phaidon Press, 2008) and Altshuler, *Biennials and Beyond*.

Until recently, most installation images showed exhibition spaces with no or very few people. This is not surprising, because generally these photographs were intended to document or promote only the art and its display. But with the explosion of social media, we can find many photos taken in exhibitions that are filled with people. This might seem like a trivial development. But it can supply very useful information about what people are actually looking at, what they are congregating around. In terms of the historical record of exhibitions, one of the greatest gaps is information about the responses of ordinary viewers. Through publications and archived correspondence, we know what the critics and curators were thinking. But what about the general public? Photographs on social media might well provide surprising information for the analysis of what was seen by a broad audience as interesting and important.

Extensive documentation is required for the kind of digital revival of historical exhibitions envisioned by the Beyond Matter project. I say this not only because of the importance of documentation for reconstructing details of the physical exhibitions themselves, but because digital presentations allow for the inclusion of so much of what is required for a more complete view of exhibitions. It is crucial to understand that art exhibitions are sites of intersection and overlap of complex networks of artists, dealers, critics, curators, collectors, museum officials, politicians, and funders. And that all of these agents are embedded within institutional, governmental, commercial, and other larger systems of production, distribution, control, and valuation. As obvious examples, consider the political contexts of two important German exhibitions, the *First International Dada Fair* (Berlin, 1920) and the *Exhibition of Degenerate Art* (Munich, 1937). Or take “*Primitivism and 20th Century Art* (New York, 1984) and *Magiciens de la terre* (Paris, 1989), both shows enmeshed in conflicts between colonial and postcolonial values. Each of these examples can be seen as rooted in the broader systems I mentioned above. Digital presentation allows for links to information about all of this, as well as to subsequent developments such as—to take these cases—the more recent growth of nationalism and xenophobia, or the restitution or repatriation of stolen works from public collections to families or source communities.

For multidisciplinary exhibitions such as *Iconoclash* and *Les Immatériaux*, opportunities for depth of linkage and breadth of connection expand to a dizzying degree. For these exhibitions range beyond the disciplines of cultural, social, and political history to the fields of technology, science, philosophy, and religion. I believe that to present a full picture of any of these exhibitions, we must go beyond what was the case at the time of the original show to engage further developments in thought and action. Addressing these changes opens new vistas onto the events and beliefs of the past, for the historical and conceptual contexts that so enrich exhibition studies look forward as well as backward.

The digital revivals of *Iconoclash* and *Les Immatériaux* are in themselves extremely ambitious and challenging projects, so reconstructing the physical exhibitions in virtual form would seem to be sufficient, without layering on multiple elements of historical context. But I prefer to view these promised digital shows as exhibitions within something like an ideal museum of exhibition history. And like things displayed in museums, they should to be set within frameworks of understanding that connect with multiple

narratives of culture, history, and thought. The idea of such a treatment of individual exhibitions, much less of a museum constituted by them, is clearly an aspirational concept, something like a Kantian *regulative ideal* guiding our conduct but never fully achievable. If we are to treat historical exhibitions like the important events that many of us believe them to be, however, this seems to be what is needed.

Bruce Altshuler is director of the Museum Studies Program at the Graduate School of Arts and Science at New York University, where he leads the courses Art Exhibitions After 1960, Museums and Contemporary Art, and Research in Museum Studies. He has held positions at organizations across New York, including at the New-York Historical Society, Zabriskie Gallery, and Christie's Education, and was director of the Isamu Noguchi Garden Museum in Long Island City for six years. Altshuler is the author of *The Avant-Garde in Exhibition: New Art in the 20th Century* (1994), *Isamu Noguchi* (1994), *Salon to Biennial: Exhibitions that Made Art History, 1863–1959* (2008), and *Biennials and Beyond: Exhibitions that Made Art History, 1962–2002* (2013). He is also the editor of *Collecting the New: Museums and Contemporary Art* (2005), and co-editor of *Isamu Noguchi: Essays and Conversations* (1994). He has published extensively and lectured internationally about exhibition and curatorial history, the history of museums, and modern and contemporary art. Recent writings include “The Art Market and Exhibitions of the Avant-Garde” in *Double Trouble in Exhibiting the Contemporary: Art Fairs and Shows* (2020), and “Innovating Sites” in *Site Read: Seven Curators on their Landmark Exhibitions* (2020). Altshuler has been a member of the graduate faculty of the Bard Center for Curatorial Studies, and the board of directors of the International Association of Art Critics/United States Section (AICA/USA).

THE DIGITAL DOCUMENTATION OF *LES IMMATÉRIEAUX* AND THE ELUSIVENESS OF PAST EXHIBITIONS

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*This text is an edited transcript of the
conference presentation delivered at HyMEx.*

I will briefly talk about our attempts to digitally document an exhibition that took place in our museum thirty-six years ago, from March to July 1985, called *Les Immatériaux*, which you could translate as “the immaterials.” This is a documentation project that Marcella Lista, Julie Champion, and I have been working on with the researchers Andreas Broeckmann and Marie Vicet, with Aalto University, and with the ZKM | Karlsruhe in the framework of the Beyond Matter project. I will try to share with you some of the challenges we have had to face in this task.

First I will tell you a bit more about the exhibition itself, which was curated by Jean-François Lyotard and Thierry Chaput. Most of you probably know the philosopher Lyotard, but Chaput is perhaps less well known today. He was a design expert who worked as a curator in the Centre de Creation Industrielle (CCI) at the Centre Pompidou during the end of the 1970s and the 1980s. The CCI was an organization specialized in industrial design, architecture, and urbanism. The exhibition *Les Immatériaux* started as a CCI project, an exhibition devoted to the way new materials affect creation. It evolved under Lyotard's influence to become an exhibition exploring the transformation of the post-modern world, doing so through five key notions from the same etymological root.

Those five notions are: *matière* (“matter”), *matériau* (“support”), *maternité* (“maternity”), *matériel* (“hardware”), and *matrice* (“matrix”). Five words all coming from the prefix *mat-*, dealing with the idea of a rational hold on the world. They also relate to our approach to knowledge and communication, as this diagram shows: maternity being linked to the author; matter to the idea of the referent of a message (what the message is about); material being linked to the hardware interface to read the message; matrix being the code it is written in; and, lastly, material being what the message is written on. Part of what made the exhibition so singular is the association of this important philosophical ground linked to the more technical and scientific approach of the original direction of the CCI.

« Infra-Mince »

« Quand la fumée de tabac sent aussi de la bouche qui l'exhale, les deux odeurs s'épousent par infra-mince. » (Marcel Duchamp). Une apparition secrète sous l'apparence. L'artiste traque l'événement dans son caractère insaisissable. L'œuvre visuelle se fait témoin de l'invisible dans le visible.



Figure 3: Page dedicated to the *Infra-Mince* site in the catalogue *Les Immatériaux, volume 2 : Inventaire* (Paris: Centre Georges Pompidou, 1985). Collection of the Bibliothèque Kandinsky, Musée national d'art moderne, Centre Pompidou, Paris

The fact that the visitor would not have a clear path was intentional, with the idea of leaving them with no clear way to explore the sixty-one rooms of the exhibition, or, as they were called inside the exhibition, its sixty-one sites.

The scenography developed by Philippe Délis was another key curatorial feature of the exhibition, and followed on from the idea of immateriality. As much as possible, it hung the exhibited objects in order to try to give the sense that they were floating in the air. Whenever it was feasible, the exhibition relied not on walls but on hanging metal meshes, pierced by holes that let the light go through, giving a feeling of transparency and allowing the scenographer to modify the light by playing with multiple layers.

Three-dimensional objects would not be exhibited on ground pedestals but on hanging platforms. To enrich the perception even further, visitors were given headsets at the entrance that would display recorded text triggered by infrared in different areas of the exhibition, adding a soundtrack to its immersive and disorienting experience. This highly experimental approach to curation and to visitor experience is one key point for understanding the exhibition's groundbreaking importance and its legacy. It's also part of what makes its digital documentation very challenging, of course. To better grasp the approach, I suggest we go through some of the sites so that you may get a glance of the various items presented and the topics addressed.

We chose to work on a small number of sites to start with the digital documentation, trying to raise the methodological issues within this project—sites that represent the diversity of the exhibition. Below is the first, and I must underline that I'm showing you a page from the catalogue, as there are very few pictures from this part of the exhibition available. I'll come back to that point later. This is a site about the idea of inframince, which

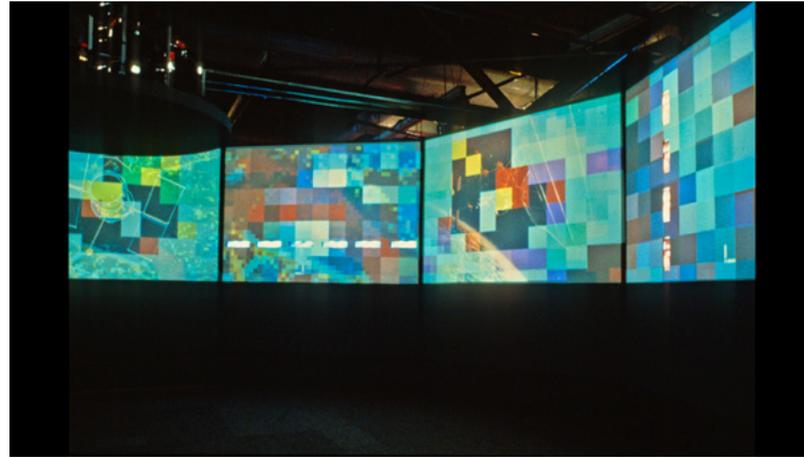


Figure 4: Views of the site *Matériaux dématérialisés*.

© Bibliothèque Kandinsky, MNAM/CCI,
Centre Pompidou – Dist. RMN-Grand Palais.
Photograph: Jean-Claude Planchet

could translated be ultrathin or “beneath the thin.” It’s a concept from Marcel Duchamp, and the site mostly presented works of art. Some were two-dimensional works, works on paper that are quite easily reproducible provided you can identify them precisely, but there were also much more complicated pieces. That’s the case with the Giovanni Anselmo work *Invisible*, a projection of the word “visible” that you could only see if another visitor crossed its beam. It poses the question of how to document such a work in a three-dimensional reconstruction designed for a single visitor at a time. Another challenging work here was *La Desserte Blanche* by Thierry Kuntzel, a video installation which was a mostly white video presented in a blinding white-neon-lit room with white walls. As you’d imagine, it was a work that was playing with a complicated visual phenomenon, the image barely visible.

Another example is the *Matériau dématérialisé*, or dematerialized material, site—one of the sites dealing with scientific imagery and relying on a display designed for the exhibition by Philippe Puicouyoul, a director working for the Pompidou’s AV department. We have a fairly good understanding of what the site was: a circular display on which still images of new material, selected with the help of industrial companies working in France, were screened. Through openings inside the display, TV monitors displayed other contents. It would therefore not seem to be too challenging to reproduce this site in the three-dimensional reconstruction, but unfortunately the original material is lost—neither the wall nor the monitor images have been preserved. So recreating this site would actually mean reinterpreting its content and taking an important step outside of archaeological accuracy. This raises the question of where to stand regarding the trustworthiness of the documentation and where to put the cursor between accuracy, which would mean showing only photographs of the exhibition installation, and immersivity, which would mean a reinterpreted reconstruction.

Another difficulty in providing a virtual immersive experience of this exhibition is that its interactive displays were often created specifically for the exhibition and not preserved. A good example would be the *toutes les copies*, all the copies, site created by

Liliane Therrier and Jean-Louis Boissier, a site in which someone would photocopy, at visitor request, various items available nearby. So aside from dealing with the hidden aspects of what surrounds us as everyday objects, one of the main interests of the site was its interactivity and the game of revealing unexpected aspects of plain, ordinary objects. The question here is to what extent a digital reconstruction of this experience would make sense. To what extent does a confrontation between matter and its image stand in a fully virtual concept context?

I will now talk a bit about the upcoming challenges for the digital documentation. To document the *Les Immatériaux* exhibition as closely as possible, the question of digitizing and describing available photographs is crucial. The main difficulty here is that although we have preserved hundreds of photographs from the exhibition, it is far from being fully documented visually. The reason for this is unclear, although at the time the idea of systematic, exhaustive cover was not the main goal of these photographs, which were made in order to give an overall feeling of the exhibition. But this lack of photographs is a state of fact that we have to deal with. Adding to the difficulty, some of the pictures that do exist come either from the opening of the exhibition, with the crowd sometimes hiding parts of it, or from its installation, sometimes depicting the sites in an unfinished state. Due to the displays created for the exhibition and not preserved, it is impossible to simply work from a map and a list of artworks, as you could try to do to revive other past exhibitions.

As we've seen, a lot of what was shown is missing today, so the digital recreation of some of these displays would have to be total reinterpretations, which raises strong methodological questions. Luckily, the soundtrack has been preserved. We have digitized it and will be able to present it inside the digital documentation. Another important source is the exhibition's catalogue, which is perhaps the best way to understand the articulation of the various paths of the exhibition, and the best way to understand its philosophical content today. The catalogue includes descriptions that are of great importance. A movie was also made about the exhibition—*Octave au pays des Immatériaux*—and quite crucially there are descriptions of the exhibition made by people who visited or studied it. Some of the most important are those written by Antonia Wunderlich in the book *Der Philosoph im Museum - Die Ausstellung »Les Immatériaux« von Jean François Lyotard*.

To build up the documentation of the exhibition, we've also started digitizing and describing the archival matter associated with it. Most of these are held at the Pompidou. We've been also collecting extra archival material from witnesses of the exhibition who are still alive. These strands of the research allow for a deeper understanding of the overall exhibition and its constitutive sites. Sources range from first-intention drafts to list of works that were left aside during the process or the loans of which were refused by the owners. An important layer of the available content about the exhibition, a key part of the reflection, comes from this archival material, which we have yet to work out how to implement in the reconstruction's interface. As you can see, the project is not about doing a Pompeii-like recreation or a photorealistic reconstruction. It is rather about articulating what is known of the exhibition, not to relive it but to summon its spirits through its remains, and doing this by treating documentation of various forms—texts, visuals,

sounds, and other types—with the same attention: archival traces of the exhibition, traces of the exhibits, traces of its surrounding program, traces of the memories of people involved in the exhibition. A lot of discussions are still to be held regarding the overall design of the project, which might include finding different solutions for different parts of the exhibition according to the specificity of each experience, the specificity of each site, sometimes of each artwork. It is of course a work in progress, and those questions will have to be answered. This will be our task in the upcoming months together with the design students from Aalto University helping us with the project: Edoardo Pirrodi, Punit Hiremath, and Niklas Alenius. We wanted to share with you these questions which we have come across so far in working on this very exciting project.

Philippe Bettinelli is a curator working in the New Media Department of the National Museum of Modern Art at Centre Pompidou in Paris. Currently he is part of the Beyond Matter project, in which he working with colleagues on the revival of the iconic show *Les Immatériaux*, originally staged at Centre Pompidou in 1985. He has previously been in charge of public art at the French Centre national des arts plastiques (CNAP), and the curator in charge of Visual Arts 1960–1990 at the same collection. Notable works by Yona Friedman, Niki de Saint Phalle, and Mona Hatoum feature in CNAP’s collections. Aside from issues related to new media and public art, his research focuses on the crisis of landscape in modern and contemporary art, which was the subject of a three-year teaching cycle he gave with Baptiste Brun at École du Louvre. He has served as a member of the drafting committee of the journal *Histoire de l’art*, and currently participates in the drafting committee of *Perspective*. Bettinelli studied cultural law at Université Paris Sud and history of art at the École du Louvre before completing his studies in conversation at the Institut national du patrimoine (2014–15).

MULTIDISCIPLINARY PREPARATIONS FOR THE VIRTUAL REVIVAL OF ICONOCLASH: A CASE STUDY FOR THE IMPLEMENTATION OF PAST EXHIBITIONS AS 3D MODELS

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This text is an academic paper based on the conference presentation delivered at HyMEx.

I would like to try to give an exemplary overview of what the processing and preparation of a virtual exhibition reenactment as a digital 3D model can look like, depending on the material available for it, and which decisions can be associated with it. Of course, a general formula is not to be expected, but at least the presentation of an exemplary workflow. The project I would like to tell you about, and of which I am a member, is part of the current research and development project Beyond Matter, which runs until 2023 and deals in various sub-projects on the practical effects of the ever-increasing mediatization of the museum field and art production. Under the direction of Lívía Nolasco-Rózsás, and in collaboration with other European museums including the Centre Pompidou, the ZKM | Karlsruhe is researching, among other things, the digital revival of past exhibitions.¹

Iconoclash, an exhibition realized at the ZKM | Karlsruhe in 2002, was chosen as a case study not only because of its important role in the history of art exhibitions, but also because of its innovative role-model character for various fields of museum activity, such as art education and exhibition scenography. In addition, we found that when working with archival material and primary sources, it considerably increases productive indexing if the exhibition is examined within the museum building where it was produced. It seemed especially important to ensure interdepartmental or interdisciplinary cooperation, because exhibitions must be understood as structures that are not created only by curatorial practices, but also by a complex network of content-related, logistical, administrative, and political correspondences between a multitude of social actors who are negotiating with each other around artworks (or exhibits).²

¹ I would like to take this opportunity to thank the entire team who worked on the research and preparation of the archival material for the *Iconoclash* exhibition: Amanda Tristao Parra, Moritz Konrad, Aurora Bertoli, Luka Zimmer, Jiakuan Cai, Danica Detelic, Aline Weber, Theo Gomes, and Felix Mittelberger.

² See Ernst Cassirer, *Philosophie der symbolischen Formen* volumes 1–3 (Berlin: Bruno Cassirer Verlag, 1923–29).

A project about exhibition reconstruction can be interesting not only from a museological or exhibition history perspective—as a subject of scholarly debate—but can also open up new mediating dimensions for museum practice. This makes it clear how complex and, depending on the perspective, different the answer is as to which form of “reconstruction” or revival is the most adequate, since meaning and significance are negotiated by different communities of interest. I would like to mention these quite important issues only in passing today, but the question of whether such a model should be placed in as historically accurate a context as possible, or prioritize orientation towards the user in order to provide the opportunity to experience the past in a multilayered way, cannot be completely ignored, since they play a decisive role in the conception of the user interface, especially when deciding on digital visualization and usability.

The Beyond Matter team agreed that in modelling *Iconoclash* we do not aim to create “digital twins”—in other words virtual copies of past assemblages of artefacts and the surrounding architecture—but to emulate the exhibition in an experiential manner, in line with its curatorial concept. The publication of the exhibition model has a substantial effect on the future reception of the chosen exhibition, so its production is based on the collaboration of technological and museological experts, with the involvement of the curators and the artists who participated in the realization of *Iconoclash*.

The discursive or theoretical classification of the exhibition is a first conceptual step. *Iconoclash* can be described as a “thought exhibition.” Its concept was developed by Bruno Latour, and he put it into practice for the first time with *Iconoclash*. In a conversation with curator Hans Ulrich Obrist, Latour described the thought exhibition as a “think tank” in which experts from different disciplines work together. Latour, ZKM | Karlsruhe artistic director Peter Weibel, science historian and former curator Peter Galison, art historians Joseph Leo Koerner and Dario Gamboni, artist Adam Lowe, and Obrist were also on the curatorial team. A scientific advisory board was consulted, which included a range of experts from art history and art criticism, oriental studies, philosophy, media theory, musicology, and anthropology. Even if this cast did not guarantee a gender-neutral perspective—Heather Stoddard was the only woman in the team—its laboratory-like approach and the practice of conceptualization was innovative. The exhibition can thus be described as a manifested thought experiment attempting to map a multiplicity of discourses that took place in parallel or in sequence within different social spaces. Aesthetically, it had similarities with a cabinet of curiosities in which orientation was often difficult—and was intended to be difficult!



Figure 1: Installation view of the exhibition *Iconoclash*.

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Latour described the idea behind the exhibition thus:

The experiment we have designed brings together three sources of Iconoclashes: religion, science, and contemporary art. In the tension created by this triangle, we want to locate the many works, sites, events and examples presented in the catalogue and the exhibition. Even though a lot of religious material is gathered in *Iconoclash*, it is not a theological pilgrimage; even though numerous scientific inscriptions are presented, it is not an educational science museum; and even though a great many works of art are gathered, it is not an art exhibition.³

The term *iconoclash*, which was thought up by the writer Richard Powers, a good friend of Latour's, as a neologism of "iconoclasm" and "clash," stands precisely for this field of tension within which representations repeatedly find themselves at the center of disputes about their indispensability, their inviolability, and their power. The monotheistic religions, not unlike scientific theory and contemporary art, according to Latour's thesis, all struggle with a contradictory impulse to produce representations, images, and emblems, but also to destroy them. This dialectic, which has become intrinsic to the self-understanding of the Western world, the exhibition organizers continue, was explored in the exhibition through well over 400 exhibits from various areas of life and research.⁴ In this context, each exhibit could be seen as a kind of memory site, in terms of the theory of memory culture, since as a symbolic form it is representative not only of a subjective perception, but also of a collective memory in the Assmannian sense.⁵ This spatialized and, in Latour's words, thing-like thought experiment aimed to overcome the simple notion of image warfare by making something else visible behind the spectacular history of image destruction: a whole cascade of image creations that find expression in religious, scientific, and cultural things.

Even though *Iconoclash* was conceived within the structure of three major cultural fields—art, science, and religion—it is easy to grasp from the archival material that the curatorial team divided them into so-called cells, bringing them into smaller thematic contexts of meaning. Traces of this development process can also be followed in the exhibition catalogue, which was published for the opening and can be understood as a kind of field book that unfolds the stories represented by the exhibits in the form of numerous essays.

³ Bruno Latour, *Iconoclash oder Gibt es eine Welt jenseits des Bilderkrieges?* (Berlin: Merve Verlag, 2002). Translated from the German.

⁴ *Iconoclash. Beyond the Image Wars in Science, Religion, and Art*, ZKM | Center for Art and Media Karlsruhe, May 4–September 1, 2002, www.iconoclash.de.

⁵ The term *lieu de mémoire*, which can be traced back to the French sociologist Pierre Nora, is associated with the idea that the collective memory of a social group is crystallized in certain places and, as a historical-social reference point, is formative for the respective culture of memory. The term "place" is to be understood in a figurative sense and can manifest itself in different ways—as a geographical place, for example, but equally as a mythical figure, a historical event, institution or concept, a book or work of art, etc. These "places" have a particularly charged symbolic meaning that has an identity-forming function for the respective group. In this context, the cultural scientist Aleida Assmann has pointed out the importance of the carrier medium itself, since its state of development helps to change the constitution of collective memory.

During the interviews with the exhibition organizers, which were recorded as part of the research process and published as online talks,⁶ the architect of the exhibition scenography, Manfred Wolff-Plottegg, reported that the presentation concept attempted to break down these connections.⁷ Although the architecture referenced the Trinity, which was also present in the title of the exhibition, Weibel and Wolff-Plottegg tried to deconstruct these cells again and again, to let them fray and to mix them. This only worked to a certain extent, however; for example, certain historical works could only be shown under special climatic conditions in a separate scenographic spatial element—as can be seen in the “Traces,” “Faces,” and “Places” cells curated by Joseph Leo Koerner—and thus ultimately formed almost complete cells.

Digital space can emulate Euclidean space, but without being bound to actual physical conditions. For the Beyond Matter team, this is the great strength of digital translation. New, possibly even more suitable spaces and spatial laws can be thought out starting from the original scenography, as a thought experiment that thinks through the original further, transmogrifying it. While physical exhibitions are always subject to certain conditions of production—restrictive reasons that force the curator to adapt their initial ideas—it seems that the physical laws of space can and should be overcome by the possibilities offered by digital space—at least according to the unanimous response of Latour and Weibel, the exhibition’s chief curators. Accordingly, a pure reconstruction was not an option for *Iconoclash*.

In order to make the curator’s game of ideas tangible in the digital realm, no static spatial model was to be developed, let alone already known approaches such as a two-dimensional timeline or assemblage. Rather, scenography was to be understood as a spatial expression, as an important element of the curatorial concept. With the help of clustering algorithms, we would like to offer a dynamic exhibition that reshuffles itself—offering

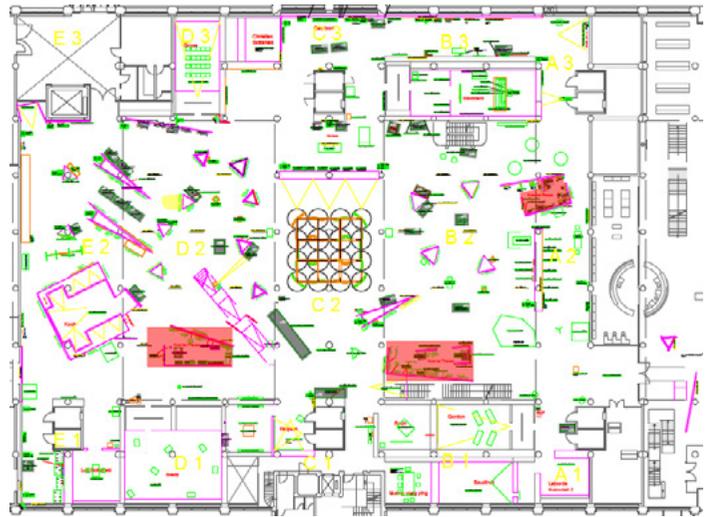


Figure 2: Highlighted Koerner Cells on the exhibition plan of *Iconoclash*.

© ZKM | Center for Art and Media Karlsruhe



Figure 3: 3D design of the exhibition architecture of *Iconoclash*. © Manfred Wolff-Plottegg

6 The online talks can be viewed on the YouTube channel of ZKM | Karlsruhe, <https://www.youtube.com/c/zkm/videos>.

7 See Cf. Manfred Wolff-Plottegg, “Netzwerkdenken in der Szenografie. Online-Gespräch mit Peter Weibel und Manfred Wolff-Plottegg” (2021), <https://www.youtube.com/watch?v=oMDAMVWG1Sg>.



Figure 4: Detail of the shuffling 3D environment of the digital exhibition model */conoclash*.

© Thomas Schwab

a new scenography and distribution of the exhibits—depending on the decisions made by the user, thus pushing further Weibel and Plottegg’s rhizomatic idea of mix. For this we are working with a team of scenographers, 3D artists, user experience designers, and an internet agency.⁸

We want to use these possibilities of personalization to offer the user ever newly generated paths through the exhibition and constellations of exhibits. According to Galison this is absolutely necessary when it comes to presenting a *dispositif* of thoughts, according to a Latourian thought exhibition. Each object in the exhibition is tagged with keywords and thematic tags under a variety of taxonomies. In this way, the rhizomatic connections between the exhibited artefacts, which are made clear to the visitors by the curators, can be recreated and systemically predetermined, but also selected and even co-produced by the visitors’ own subjective decisions and experiences. Similar algorithms are also used, for example, on the internet to generate personalized advertising.

The multidimensional vector space offered by the digital creates many new possibilities, especially to think with and in a new way about the subject-related component of knowledge development. Interaction with the exhibits should therefore be kept as free and intuitive as possible. Here we alternate between two modes of acquiring knowledge: through bodily experience and through reflection. Both are to be ensured by the concept of interaction and the design of the user interface. A three-dimensional level of movement is envisaged, where one can directly experience the ever-changing constellations of exhibits, above all the relationships of the exhibits to one another, which are visualized spatially. And then there will be a flatter HTML-based research level where one can immerse oneself in the archival material, the interactive 3D model, or the context of the exhibit.

⁸ At this point I would also like to mention the following people and companies by name: Matthias Heckel (UI/UX design, software developer), Matthias Clostermann (3D artist), Thomas Schwab (3D artist), Schröder&Rauch (exhibition design and scenography), and Netzbewegung (internet agency).

Of course, it is not always easy to reconstruct an exhibition's original curatorial concept. The further away an exhibition project lies in the past, the more likely it was inadequately documented. In our experience the detailed art-historical reappraisal is therefore an inevitable prerequisite for any abstraction through a digital concept. Thus, the detailed scientific reappraisal of the empirical material also precedes any further digital processing. It does not matter which technical implementation is aimed at, the material must be prepared in such a manner that it can be stored in a structured way in an asset management system. The core questions of the project—How can the original intention of the exhibition-makers be transmogrified into a digital concept? Who is the model aimed at anyway? What functions does the user have?—are developed in parallel, and are in any case dependent on the quality and quantity of the information material collected.

It is therefore essential, just as in any practice-based design research, to enable repeated corrections and adjustments through iterative steps of reflection. At this threshold between material preparation and concept development on the one hand and the technical and functional translation into a digital concept on the other, art historians' classical competences can become bogged down, as there is usually little technical knowledge available. Communication is at least as big a problem that many interdisciplinary projects have to face. In order to find a common vocabulary, it is advisable to appoint a coordinator in good time who can take on a hybrid position. Archivists with experience in dealing with multimedia archives are an equally important part of the team.

The documentation of *Iconoclash* can be broken down into a diverse collection of materials that also allow us to look back at the structural collaboration on the exhibition, because the curatorial department, communications, press, exhibition technology, the publications department, the video studio, and the Institute for Basic Research—in other words almost all the departments of the ZKM—worked with the curators and scientific advisory board, all leaving documented traces in the form of the most diverse materials. Over the past year, we have sifted through, sorted, and transferred into databases a large number of physical and digital archival folders full of email correspondence, minutes of meetings, invoices, work lists, photo and video documentation, preliminary concepts, plan sketches, fully drawn floor plans, brochures, press releases, print data, wall and banner texts, and much more. In addition to the material traces of the social actors involved, we also want to retrieve and include their undocumented knowledge through qualitative interviews, biographical methods, action and system analyses, and the evaluation of process-generated data.

However, the most important primary sources for reconstructing the content are the catalogue, which can be seen as an extension of the exhibition at almost 700 pages, and the website iconoclash.de, which represents an innovative form of information transfer for an exhibition from 2002.⁹ As well as sifting through and analyzing already existing material, in the course of the reappraisal process we also try to close undocumented gaps

9 Through archival sources, we found out that the website was first used as a kind of intranet to share documents within the exhibition team, before the idea emerged (this can be read in the email correspondence) to give the physical exhibition a digital extension—only for this to be abandoned shortly afterwards in favor of an information site.

by collecting and evaluating a wide variety of media statements from contemporary witnesses, researchers, and participants. To this end, we are in contact with a large number of lenders and artists, who are particularly helpful in identifying and giving meaning to works of art and exhibits—not to mention obtaining their legal consent. Conversations with former ZKM employees have also helped us clarify questions about the blind spots of *Iconoclash*. The online talks with the former curators and exhibition makers published as part of the project have proven particularly productive, especially for reconstructing the intentions behind *Iconoclash* and their transformation over the course of its preparations. In order to do justice to the sheer mass of data processing, the collected material is being sifted through, interpreted, and filed in databases by a team of archivists and art historians. Due to its broad materiality, we have resorted to a network of databases in which technical and content-related information, text and image files as well as video data, are structured and filed according to a uniform labelling system and interlinked via hyperlinks.

First the individual physical components of the exhibition were to be identified. What was actually in the exhibition? Not only the exhibits but also the scenography—the spatial structuring through wall elements or similar design interventions in the room layouts. Image and video sources as well as work lists and room plans had to be checked. It was usually also directly determined which aesthetic dimensions were also decisive for each exhibit. Was there sound? Smell? Interaction?

The next step was to locate the individual elements spatially, for which Wolff-Plottegg's archive files and the exhibition technology department of the ZKM were particularly helpful. We were fortunate to have a large amount of data on the spatial distribution of the physical components of the exhibition, especially labelled floor plans and, in a particularly advanced move, 3D renderings. Illustrator or AutoCad files, which were not a given the time, were made available to us. These files were a rich treasure trove, as they show exact positionings in space, and, because they were still readable, can be edited and reused. They also showed the orientation structure according to which the exhibition space was divided into sectors, which we could adopt for research.

But all this was only of limited help, since—as is typical in exhibition practice—many small changes and readjustments happened shortly before the opening and therefore remained undocumented. With the help of the conservation sheets, it was possible to trace at least some of the changes that were printed incorrectly in the catalogue and brochure—and were sometimes made after the actual opening. After an exhibit had been identified and located, the collected information was filed in a folder structure according to a clear ordering and coding system. We distinguished between informational and reconstructive material. We also had to determine each exhibit's level of interactivity of and how it was contextualized in the exhibition. Here, close cooperation between the curators and 3D designers was beneficial. The text analysis in the catalogue articles helped enormously. Through our previous conceptual reconstruction of the exhibition, it was also possible to draw connections and relations between the exhibits, which we defined in the form of taxonomies and stored in the metadata and as additional information in the exhibition database, using FileMaker. Once the outlined processes have been

completed, the user experience and design concept, including all structured data, could be outsourced to an internet agency or software development and design companies, which took over the entire package or individual components of the model's technical implementation.

Felix Koberstein is an art historian and curator. His research focuses on documentary processes of and through art, especially spatial artworks. Koberstein is a founding member of the nonprofit art space FlurII in Brunswick, Germany, and co-directed it from 2014 to 2018. He then worked at the Heidelberger Kunstverein as curatorial assistant, before joining the team at ZKM | Karlsruhe and ZKM | Hertz-Lab. Currently he is working at ZKM | Karlsruhe on the practice-based research project Beyond Matter, where he is involved in the scientific processing of research material on the digital revival of historical exhibitions. He is also project coordinator for Experiments in Art and Economics, a short-term residency program by In4Art and ZKM | Karlsruhe launched in May 2021. Prior to his involvement in Beyond Matter and Experiments in Art and Economics, Koberstein was curatorial assistant for *Drifting, Browsing, Cruising*, a site-specific VR installation by artists Theodoulos Polyvios and Eleni Diana Elias.

DEBATE, PART 2

Moderated by Livia NOLASCO-RÓZSÁS

Panelists: Bruce ALTSHULER, Lily DÍAZ-KOMMONEN,
Sarah KENDERDINE

The discussion between Bruce Altshuler, Lily Díaz-Kommonen and Sarah Kenderdine closed the symposium. The panelists engaged with question how digital documentation methods might influence the reception and interpretation of exhibitions, and generally exhibition histories, from three very different professional perspectives. Bruce Altshuler approached the subject from the perspective of a historian, Díaz-Kommonen emphasized the role of the beholder, and Kenderdine the infrastructural issues digital storage yields.

Reflecting on the idea that digital “recreations” of exhibitions might have an impact on exhibition histories, Bruce Altshuler referred back to the presented planned models of the exhibitions *Les Immatériaux* and *Iconoclash*, which aim to provide a massive amount of information through the chosen format. They are to supply fantastic material for anyone interested in thinking about exhibitions, curatorial strategies, collective aspects of exhibition creation, technologies of a presentation, as well as the detailed histories of the genesis of these exhibitions and the ways in which they’re carried out. Sarah Kenderdine added that the pyramid of curatorial data and the exhibition is a certain the top, which sits on a massive amount of material that can be re-articulated in a myriad of ways. The augmentation of a built exhibition with its ‘digital replica’ and then all the subsequent modes of documentation, which fed into the exhibition itself, result in incredibly rich layers. How exhibitions are being archived today with the tools that we have today is a fundamental question to answer to create an archival framework for all the elements that exist within them.

Kenderdine then mentioned the importance of historical consciousness: of the idea that we separate ourselves into modern and pre-modern. Looking into the past is essential to identify that change.

The articulation of such models that enable the glimpse into the past rely on exhibition documentation, Nolasco-Rózsás added, referring again to the models of *Iconoclash* and *Les Immatériaux*. The documented exhibition space may be only the tip of the pyramid of the curatorial research, but all elements find their place in the exhibition space, where different dialogues between the artworks are being realized. Modeling the spatial aspect of an exhibition is essential to understand the curatorial concept.

Besides, as Díaz-Kommonen noted, bodies of the visitors are an important factor to consider. And as Kenderdine added, with contemporary tools, it’s possible to track every single interaction that happens in every interactive system, in this case an exhibition. At the Laboratory of Experimental Museology (eM+) an evaluation tool was developed that

tries to give visitors a voice. It addresses the qualitative experiences of these exhibitions through drawings, audio files, photographs the visitors take, anything they want to do, for us a series of interactive graphics that talk about socialization, embodiment learning, etc., while it reacts to ethical and privacy issues with full transparency: the tool is very explicit, the visitors know that they are contributing to it.

Data anonymization and the right to be forgotten, the decision of the visitor whether they want to be observed and followed should be respected, as Díaz-Kommonen added. Her note propelled a question about the way data is being collected, on documentation tools that evolve over time, and whether they have an influence on the idea of and the understanding of scientific accuracy?

Bruce Altshuler shared his pragmatic standpoint and declared that all the accessible data shall be used. The scientific accuracy is, on his opinion, relative to the data that one uses to generate something, whether or not the methods being used to draw conclusions or to develop reconstructions is accurate or not. In the end, the whole idea of accuracy is problematic. In fact, there's an infinite number of things that can be generated from any set of data, and the translation of material from the historical record to a presentation of some construct based on that, allows for many different outcomes. If there is transparency in terms of how the inferences are made, what the conclusions are based on, what the constructs, how the constructs are generated, that is relevant to answering the question of the scientific nature of the enterprise.

At this point Kenderdine brought up the interpretive level of exhibition modeling, and refers to a constant hermeneutic cycle of reinterpretation, where one returns to the sources, and creates a new narrative every time.

In reaction to Altshuler's argument regarding accuracy, Díaz-Kommonen referred to the book "*Raw Data*" is an Oxymoron¹, in which the impossibility of non-interpreted data is being outlined. Altshuler added that the phenomenon of data implies inherent biases, thus future investigations of data come to different kinds of constructions, which implies the need of ongoing investigation on a particular exhibition. Additional layers are being added to the past exhibitions, especially in case of landmark exhibitions, just like *Les Immatériaux*, which has already been interpreted by numerous authors, even monographs were written on the exhibition.

The discussion was closed by a question that has partially already been addressed by the panelists, nevertheless it opened up new perspectives and may serve as basis for further discussion: Besides the necessary awareness and care towards the narratives, communities and the manifestations represented within the digital exhibitions, should and how could the technological apparatus or documentation specificity be approached ethically in historical exhibition translations?

¹ Lisa Gitelman (ed.), "*Raw Data*" is an Oxymoron (Cambridge, MA: The MIT Press, 2013)

One of the looming problems in the digital humanities, or even within museums lye in their materials, they have to be able to archive adequately, Kenderdine answers. Organizations for repositories, and for the collection of archives are vital in our contemporary digital moment, because they are extremely volatile. Data is being collected but where shall it be placed in a long term? And unless these relationships are made, the data will be lost. On Kenderdine's opinion it is vastly unethical to spend millions of dollars of public funding if safekeeping of the results is not provided. Thus it is an infrastructural issue. Kenderdine demands collective, and not instant institutional, association of the data, which instead of closing the discussion led to new, yet unaddressed challenges, which may be discussed in the next conference to be organized in the framework of the collaborative project Beyond Matter.

SPATIAL AFFAIRS

The exhibition *Spatial Affairs* was presented at the Ludwig Museum – Museum of Contemporary Art, Budapest from April 29 to June 27, 2021. Its [digital twin](#) is on view online until July 31, 2023, as well as the multi-user online environment that complements the physical exhibition, under the title [Spatial Affairs. Worlding – A tér világlása](#).

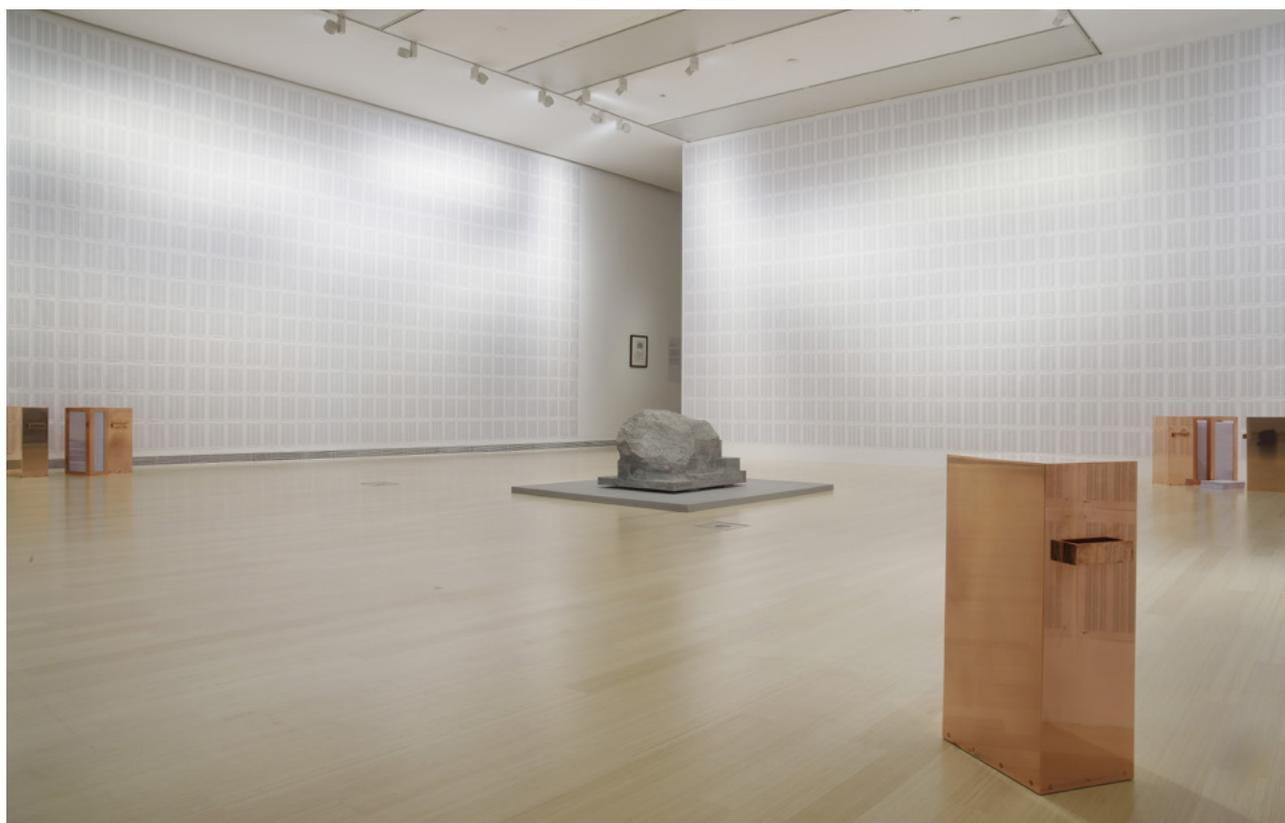
The exhibition questions the inner consistency of space, its philosophical and ontological status, its attachment and relationship to reality—issues that have long formed a latent undercurrent in the visual arts. This occasionally passionate, other times rather secretive attachment to such ontological affairs may have caused strong feelings among certain betrayed parties—narrative, for example—yet the relationship has proved to have a persistent hold.

If its termination is unthinkable, questioning around space and its entanglement with reality has also been continually reframed through the proliferation of immaterial spheres that become legitimate parallel dimensions of our perception, expression, experience, knowledge, communication, and analysis. With the arrival of generative imagery, reflecting on this only becomes more pertinent.

Computer-generated simulations, virtual realities, networked digital platforms—from cyberspace to metaverse—are no longer science-fiction locations. Their significance and role are now almost equivalent to those of real spaces. The immaterial spheres of information technology have become legitimate, parallel dimensions of our perception, experience, knowledge, communication, and selves, in which the real and the virtual are no longer antithetical. We must therefore re-examine our three-dimensional conception of space.



Interior view of the exhibition *Spatial Affairs*. Photo © József ROSTA, courtesy of the Archives of Ludwig Museum – Museum of Contemporary Art

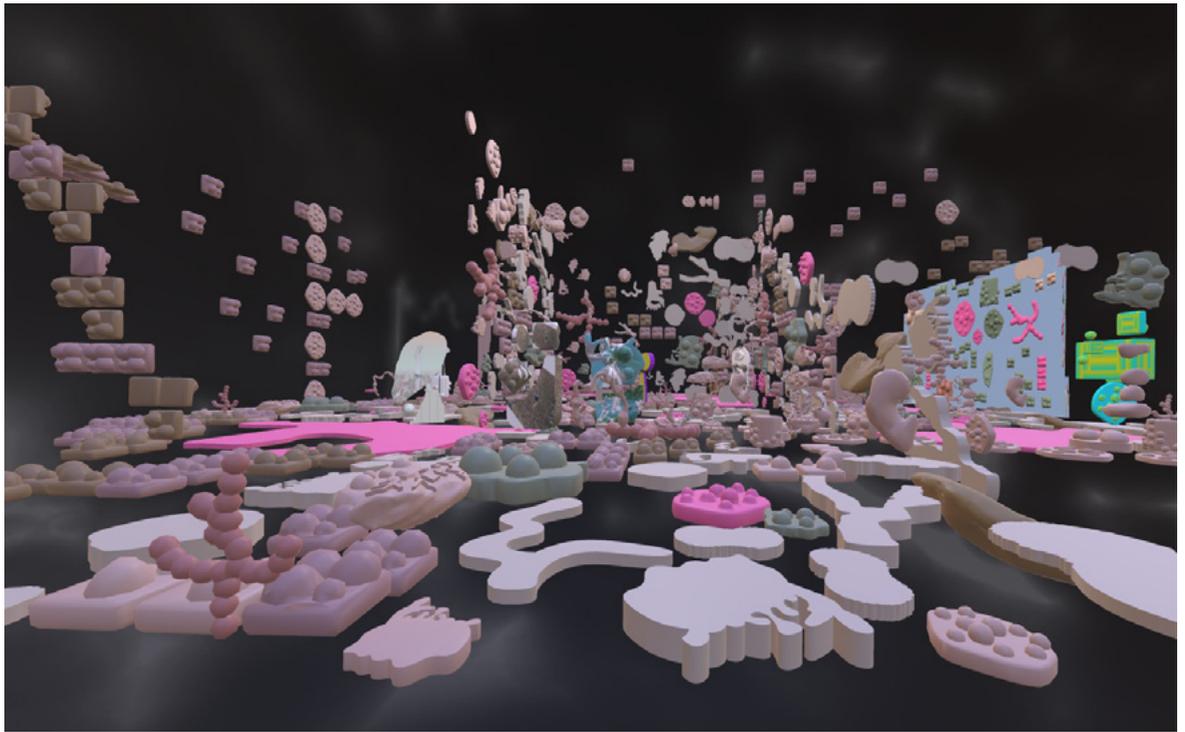


Interior view of the exhibition *Spatial Affairs* with Alicia Kwade's work *Gegebenenfalls die Wirklichkeit* (2017) on the picture. Photo © József ROSTA, courtesy of the Archives of Ludwig Museum – Museum of Contemporary Art

The goal of *Spatial Affairs* is to analyze the relationship and mutual dependence between physical and digital presence through conceptual and contemporary artworks and manifestos. From before and after the emergence of computer technology, the positions presented share a common trait regardless of medium: they all examine the development and social impact of science and technology through the notion of space, thereby pointing to the co-dependency between the tangible real and the intangible digital.

The exhibition endeavors to reassess certain widely accepted but not necessarily valid ideas regarding space. Instead of exploring the differences between transcendental idealist and materialist conceptions, the following question is posed: do computer technology and computer-generated spaces influence our conventional knowledge of space, and if yes, how? *Spatial Affairs* explores artistic reactions that include pre- and post-computational approaches from the early avant-garde through conceptualism to very recent works of art. The binary relationship between the actual and the virtual, the real and the possible, evaporates into a multidimensionality in which the only betrayed party is dualism, leading to exploded axes of complex and multiplied notions of space.

As early as the 1970s, the pioneers of computer art had already demonstrated that the computer was capable of creating and representing artificial spaces—as the works of Hiroshi Kawano and Georg Nees manifest. Supplanting early descriptive practices, contemporary artists have shifted from formalism towards critical approaches: made in 2016, *Information Skies*, a piece of digital video art by the Metahaven collective, visualizes the ubiquity of networked social spaces and the epistemological complications they generate, as well as the condition created by fake news.



Spatial Affairs. Worlding, digital environment. © The Rodina, screenshot, <https://spatialaffairs.beyondmatter.eu/en>

Way before the spread of computers, the impact of information technology and science on notions of space and visual arts inspired many authors to write manifestos and create new types of artworks. Key examples include the 1936 *Dimensionist Manifesto* by Károly Tamkó Sirató, and Lucio Fontana's environments from the 1940s and 1950s.

Because it is inherently invisible, representing space is a complex task, whether it is approached as absolute, relative, real, or virtual. In exposing modernist conceptions of space and their non-modern reflections, *Spatial Affairs* necessarily explores the possibilities offered by information technology.

Spatial Affairs. Worlding is the online extension of the exhibition, designed by The Rodina. In this multi-user environment, figures representing works of net.art and browser-based digital art move around the virtual space mingling with visitors represented by avatars. The environment was inspired by the theory Konrad Zuse expounded in *Calculating Space* (*Rechnender Raum*, 1969), which describes the universe as a space inhabited by living and evolving automata, more precisely, as self-reproducing and self-reprogramming cellular automata. Boundaries between digital objects and active subjects dissolve for good in such a virtual world.

With the online environment designed for *Spatial Affairs. Worlding*, The Rodina propose one possible answer to the curators' questions: How can the content of an online exhibition be developed into a spatial and adaptive experience? What if artworks are represented by avatars? What if the exhibition becomes an ecosystem and, to use Zuse's phrase, generates a "computing cosmos"?

Such an ever-evolving ecosystem requires its own ontology as arbitrary, performative, and processual, as a binary-code-based yet essentially pluralistic virtual environment. Boundaries between subject and surroundings are coming apart; all entities become agents even if they act without the agency of matter. *Worlding* refers to a constant process of bringing to light as yet undisclosed folds in digital space that lead to further speculations, theses, stories, and games, which in turn manifest as born-digital internet-based works of art. The environment's multiple, generative spatiality is enhanced by artist Enrico Boccioletti's organic soundscape of ever-changing textures, composed out of scatters created from recordings of hard drives' electromagnetic radiation and vocal humming.

The exhibition, both physical and digital, is documented by a catalogue that contains reproductions of exhibited artworks as well as essays by theoreticians and selected manifestos, supplemented by additional content via Transbooking Augmented Reality.

Spatial Affairs was created within the scope of the international collaborative project [Beyond Matter: Cultural Heritage on the Verge of Virtual Reality](#) in the form of collaboration between ZKM | Center for Art and Media Karlsruhe and Ludwig Museum – Museum of Contemporary Art, Budapest, with additional contribution by Aalto University. *Spatial Affairs. Worlding* is a coproduction of ZKM and EPFL Pavilions, Swiss Federal Institute of Technology, Lausanne. The exhibitions are co-financed by the Creative Europe Programme of the European Union. catalogue was printed in April 2021 published by Hatje Cantz (<https://www.hatjecantz.de/spatial-affairs-8033-1.html>). The Hungarian version was published by Ludwig Museum - Museum of Contemporary Art.

The contributing artists are:

Morehshin ALLAHYARI, Andreas ANGELIDAKIS, Carola BONFILI, Adam BROOMBERG & Guy de LANCEY & Brian O'DOHERTY, Petra CORTRIGHT, Agnes DENES, Aleksandra DOMANOVIĆ, Louise DRULHE, Wojciech FANGOR, Stanislav FILKO, Lucio FONTANA, Dora GARCÍA, Sam GHANTOUS, János GULYÁS, Hans HOLLEIN, Lauren HURET, JODI, Hiroshi KAWANO, Katarzyna KOBRO, Alicja KWADE, Sam LAVIGNE & Tega BRAIN, Oliver LARIC, Jan Robert LEEGTE, Stano MASÁR, METAHAVEN, Cildo MEIRELES, Rosa MENKMAN, Imre NAGY, Georg NEES, Robert OLAWUYI, Gyula PAUER, Goran PETERCOL, Sascha POHFLEPP & Alessia NIGRETTI & Matthew LUTZ, Àngels RIBÉ, The RODINA, Rafaël ROZENDAAL, Jeffrey SHAW, Andrej ŠKUFCA, Károly TAMKÓ SIRATÓ, Viktor TIMOFEEV, UNRATED, Gyula VÁRNAI

Giulia Bini and Lívía Nolasco-Rózsás curated *Spatial Affairs*, with the curatorial assistance of Jan Elantkowski and Fruzsina Feigl.

Giulia Bini, originally trained as an art historian, works at the intersection of visual art, media, science, and emerging technologies, in curatorial practice, theory, and writing. Since 2018 she has worked as curator and producer at the EPFL Pavilions, Swiss Federal Institute of Technology, Lausanne, where she recently curated the exhibition and associated program *Nature of Robotics: An Expanded Field* (2020–21). In 2021 she also curated the exhibition *Spatial Affairs* with Lívía Nolasco-Rózsás, at the Ludwig Museum – Kortárs Művészeti Múzeum, Budapest. As a member of the curatorial team of the ZKM | Karlsruhe from 2014 to 2017, she collaborated with international institutions such as MAXXI Rome, as scientific associate for the exhibition and edited volume *LOW FORM. Imaginaries and Visions in the Age of Artificial Intelligence* (2018). She regularly contributes to publications, including most recently the catalogue *The Dreamers*, 58th October Salon, Belgrade Biennale 2021. In 2017 she completed a PhD at IUAV (Istituto Universitario di Architettura) Venice with a thesis at the crossroads of media theory and philosophy, curatorial studies, architectural theory, and cybernetics, reflecting on the impact of techno-scientific discourse and artistic practice in rethinking institutional models and exhibition methods. Since August 2021 she is program manager and curator for the newly established Artist-in-Residence Program of the EPFL College of Humanities.

Lívía Nolasco-Rózsás has curated exhibitions at international institutions of contemporary and media art since 2006, working with topics such as the genealogy and social impact of computer code, electronic surveillance, and democracy. She has been part of the curatorial team of ZKM | Karlsruhe since 2015. As of 2019, she is acting head of the international collaboration project *Beyond Matter* (2019–23). Her recent curatorial projects include the group shows *Spatial Affairs* (Ludwig Museum Budapest), *Open Codes* (2017–2021, ZKM, Chronus Art Center, Nam June Paik Art Center); *GLOBAL CONTROL AND CENSORSHIP* (2015–18, ZKM and a tour through Eastern Europe); *On the Edge of Perceptibility: Sound Art* (2014, Kunsthalle Budapest), and solo shows by Eli Cortiñas, Shilpa Gupta, Žilvinas Kempinas, Dóra Maurer, Ágnes Háy, and Vladan Joler. She is a contributor to *BIO 26. 26th Biennial of Design Ljubljana* (2019–20) and the *OFF-Biennale Budapest* (2015 and 2021). She has published in various art magazines and worked as international editor at *Flash Art Hungary* (2014–15). She has given lectures and talks at venues such as ZHdK in Zürich, Concordia University Montréal, Tongji and New York University in Shanghai, Kunsthochschule für Medien Köln, and Aalborg University, Copenhagen. Since 2019 she has been conducting research in curatorial studies on the virtual condition and its implications in the exhibition space, in affiliation with the Academy of Fine Arts Leipzig and under the supervision of Beatrice von Bismarck.

HyMEx

Hybrid Museum Experience Symposium 2021

Proceedings

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Graphic design: Zoltán SZMOLKA

The publication is part of the Beyond Matter project (2019–23)

**beyondmatter.eu, co-funded by the Creative Europe Program
of the European Union.**

ISBN: 978-963-9537-82-8

Published by: Ludwig Museum – Museum of Contemporary Art, Budapest (HUN)

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Finalized: December 2021

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The publication is available for free as part of the research platform Beyond Matter, and is published solely in digital format (PDF and e-book).

A publication created in partnership by

**Ludwig Museum – Museum of Contemporary Art, Budapest
and ZKM | Center for Art and Media Karlsruhe.**

Ludwig Museum – Museum of Contemporary Art, Budapest

The Ludwig Museum seeks to render contemporary art available and accessible to the widest possible public, enabling a fuller understanding of today's visual culture among the youngest generations as well as older ones. Its three exhibition floors host an average of eight temporary exhibitions per year, alongside a semi-permanent selection and an international program of events. The museum also works as a research center for museum pedagogy, regularly organizes research-based conferences, gives a home to the Venice Biennale Office, and functions as a major initiator of participatory initiatives and other endeavors within the Hungarian art scene, including the ARTtransfer prize. The Ludwig Museum is a major cultural attraction in Budapest and takes a leading role in shaping the country's twenty-first-century image.

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ZKM | Center for Art and Media Karlsruhe

The ZKM | Center for Art and Media Karlsruhe is a future laboratory for art and society in the digital age. Here you can experience art in all its forms and take an active part in its future developments. Exhibitions on specific themes explore the spatial arts—such as painting, photography, and sculpture—but the main focus is on the time-based arts: film, video, media art, music, dance, and performance. The ZKM does not confine itself to presenting works of art, however. From its very inception it saw its mission as generating innovative and favorable conditions for the creation of art. At the ZKM's Hertz-Lab, guest artists and scientists from all over the world research, develop, and produce work on artificial intelligence, augmented reality, virtual reality, and much more besides. It is this interaction between research and production, between exhibitions and performance, that sets the ZKM apart from other cultural institutions. It is more than a museum—it is a center and a future lab.

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HyMEx – Hybrid Museum Experience Symposium 2021: May 6–7, 2021

An online event with a live program organized by Ludwig Museum –

Museum of Contemporary Art, Budapest as part of the

Beyond Matter project.

hymex2021.ludwigmuseum.hu

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For the list of speakers, please see pages 27–44

(original schedule and abstracts).

Exclusive guided tours created for the HyMEx platform:

Giulia BINI, curator and producer, EPFL Pavilions | co-curator of

Spatial Affairs and *Spatial Affairs. Worlding / A tér világlása*

Krisztina SZIPŐCS, deputy director of Ludwig Museum | curator of

Time Machine – A New Selection from the Collection of the Ludwig Museum

Albert-László BARABÁSI, director of BarabásiLab; presented the exhibition:

Hidden Patterns. The Language of Network Thinking.

Design: Zoltán SZMOLKA

Web development: András SZÓNYI

Visuals: Zsófia SZABÓ (Ludwig Museum)

Online presence management: Ágnes SOMOGYVÁRI (Ludwig Museum)

Music: Studio Einz - András KÁLMÁN | studioeinz.com

Special thanks to Lajos BALÁZS (MŰPA).

Symposium online platform: CreativePro Agency

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Beyond Matter partners:



Tirana Art Lab



The project was co-funded by the Creative Europe Program of the European Union.



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