CyberArts 2021

Prix Ars Electronica

S+T+ARTS
Prize '21

ARS ELECTRONICA
Art, Technology & Society

HATJE
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CyberArts 2021

Prix Ars Electronica 2021
Computer Animation · Artificial Intelligence & Life Art · Digital Musics & Sound Art
Isao Tomita Special Prize · Ars Electronica Award for Digital Humanity
u19–create your world

STARTS Prize '21
Grand Prize of the European Commission honoring Innovation
in Technology, Industry and Society stimulated by the Arts

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PRIZE'21

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STARTS—Science, Technology, and the ARTS

The S+T+ARTS = STARTS program of the European Commission was launched in 2016 to encourage synergies between the arts and technology to support innovation in industry and society. STARTS promotes the inclusion of artists in research and innovation activities in Europe.

To encourage collaboration between engineers, scientists, and artists, STARTS is currently funding different pillars: STARTS Residencies to stimulate interdisciplinary collaborations in situ, STARTS thematic pilots to finance research with artists as active parts of projects that work on concrete challenges for industry and society, STARTS Academies uniting engineers and artists to teach digital skills to citizens and young adults in a playful way, STARTS regional centers to expand the initiative on a local level in a number of European regions, Digital Innovation Hubs that help new and starting companies improve production processes and services, STARTS in Motion as an accelerator for art-tech collaborations and last but not least the annual STARTS Prize to give visibility to outstanding examples of collaboration between art and technology. In 2021 for the first time, Nesta Italia presents a STARTS Prize for social good, a pilot project to highlight a regional thematic focus on STARTS topics.

Innovation in and for Europe

Europe has historically focused its attention in engineering on R&D and standardization, and historically innovation is viewed to be the core of a competitive economy. Today, however, focusing only on technology has not proven sustainable. An increasing number of high-tech companies throughout the world assert that, in addition to scientific and technological skills, the critical skills needed for innovation to happen and to be of value for society are skills such as creativity rooted in artistic practices. In this context, the expertise and practice of artists can directly drive and influence innovation in technology. They offer new perspectives, inspire new directions, and act as a catalyst for a successful and socially responsible transformation of new technologies into new products and new economic, social, and business models. In recognition of this development the European Commission launched the STARTS initiative—Innovation at the nexus of Science, Technology, and the ARTS.

STARTS Prize '21

Grand Prize of the European Commission honoring Innovation in Technology, Industry and Society stimulated by the Arts

The European Commission's STARTS Prize highlights people and projects that have the potential to make a sustainable positive impact on Europe's economic, technological, social, and ecological future. The competition seeks innovative projects at the nexus of science, technology, and the arts. The STARTS Prize celebrates visions and achievements at the interface between innovation and creation. The winners receive the STARTS Trophy and €20,000 in prize money. Both winning projects as well as a selection of the Honorary Mentions and Nominations are showcased at the Ars Electronica Festival in Linz. Plus, projects singled out for STARTS Prize recognition are featured in exhibitions and events that Ars Electronica, BOZAR, Frankfurter Buchmesse, INOVA+, La French Tech Grande Provence, T6 Ecosystems, and Waag stage at partner institutions worldwide. The new continuation of the STARTS Prize is set to run until 2023 with an extended consortium of partners to widen the sphere of visibility and activities for the selected projects.

The STARTS Prize competition is staged annually in two categories:

Grand Prize – Artistic Exploration
Awarded for artistic exploration and art works where appropriation by the arts has a strong potential to influence or alter the use, deployment, or perception of technology.

Grand Prize – Innovative Collaboration
Awarded for innovative collaboration between industry or technology and the arts (and the cultural and creative sectors in general) that opens new pathways for innovation.

The current edition of the Prize also brings with it a thematic focus on cross-sectoral projects investigating the disruptive powers of creative data and media innovation as well as on works exploring hybrid formats, groundbreaking technologies, or initiatives of storytelling in next generation media. This year the spotlight is on the novel creation, access, and distribution of media content, and development of new, qualitative approaches in the media.

In an elaborate process of open call and nominations by advisory experts, a total of 1,564 entries from 96 countries were submitted in the application period that ran from January 11 to March 15, 2021. 805 submissions were entered directly to STARTS and 759 submissions were received via the Prix Ars Electronica in the STARTS Prize database.

The STARTS Prize jury convened for a long weekend of intense conference calls to determine the two winning projects, 10 Honorary Mentions, and 18 Nominations for the STARTS Prize '21. Following extensive deliberations, the unanimous decision was taken to award *Remix el Barrio, Food Waste Biomaterial Makers* with the STARTS Prize for Innovative Collaboration and *Oceans in Transformation* by Territorial Agency with the STARTS Prize for Artistic Exploration. *Oceans in Transformation* makes visible the profound impact of humanity on the world's oceans, which are not observable by the naked eye. Territorial Agency use high resolution remote datasets that show these transformations and use this data in a space for learning about integrated actions to safeguard the oceans. *Remix el Barrio* examines the potential to democratize the access to innovation in a series of co-design projects using food leftovers in the Barcelona neighborhood Poblenou. Anastasia Pistofidou, Marion Real and The Remixers at IaaC Fab Lab Barcelona worked together with local restaurants, markets, fashion designers, and citizens to find new models and techniques of innovating with waste.
Furthermore, 10 of the finalist projects were selected for an Honorary Mention.

Submission and evaluation process

On behalf of the European Commission, Ars Electronica in collaboration with BOZAR, Frankfurter Buchmesse, INOVA+, La French Tech Grande Provence, T6 Ecosystems, and Waag issued an open call for entries to the fifth annual competition for the STARTS Prize. Considering the interdisciplinary approach, the STARTS Prize '21 was once more launched with a dual approach for submissions:

Submission via open call

The STARTS Prize open call started on January 11 and ended on March 15, 2021. Submissions of projects could be made either by artists / creative professionals or the researchers / companies involved.

The competition was open to:
• ground-breaking collaborations and projects driven by both technology and the arts.
• all forms of artistic works and practices with a strong link to innovation in technology, business, and/or society.
• all types of technological and scientific research and development that have been inspired by art or involve artists as catalysts of novel thinking.
• artists and teams from all over the world.

Purely artistic or technologically driven projects were not the focus of this competition. The competition was not limited to any genres such as media art, digital art etc., and not limited to Information and Communication Technologies.

Recommendations by international advisors

To encourage a wider range of participants as well as a geographical and gender balance, seven international advisors who are experts in the field were engaged to recommend interesting projects and artists. These recommended participants were contacted by the Ars Electronica team and asked to submit their project via the submission platform, with the same process and deadlines as for the open submissions. These international advisors served as facilitators to identify relevant works and projects during the submission process and helped reach a wider range of artists and quickly introduce them to the award.

Jury Process

The jury consisted of five international experts from the fields of industry, technology, governmental policies, and culture. For the second time, the jury was unable to travel to Linz. Restrictions imposed due to the COVID-19 crisis necessitated a different kind of jury process. All submissions were evaluated by a pre-selection committee on arrival, to determine whether they met all formal criteria of the call. For an individual pre-jury process, the five STARTS Prize jury members each received an individual pool of projects to assess in advance of the main jury weekend. Each project was assessed by two jury members.

Since the main categories of Prix Ars Electronica have a strong overlap with the criteria of the STARTS Prize, artists submitting for the Prix Ars Electronica could decide to also enter their submission for the STARTS Prize. Out of these submissions, a total of ten projects per category were nominated for prize consideration by the three Prix Ars Electronica Expert Juries (Computer Animation, Digital Musics & Sound Art, and AI & Life Art) The resulting list of top 55 projects was presented at the remotely held main jury event and reduced to 30 finalists before the last jury meeting. The STARTS Prize jury evaluated these 30 finalists in order to select two prize-winning projects and ten Honorary Mentions. The list of the 30 finalists represents a comprehensive overview of the international state of the art collaborations between art and technology. Therefore all 30 projects are published in the *CyberArts 2021* catalogue.

STARTS Prize '21, a joint project by
Ars Electronica, Bozar, Frankfurter Buchmesse,
INOVA+, La French Tech Grande Provence,
T6 Ecosystems, and Waag.

The STARTS Trophy was designed by Nick Ervinck. The Belgian artist explores the boundaries between various media, fostering a cross-pollination between the digital and the physical. He applies tools and techniques from new media, in order to explore the aesthetic potential of sculpture, 3D prints, animation, installation, architecture, and design.
Nick Ervinck, TAWSTAR, 2016

Making the Invisible Visible
Reflections on the Here-and-Now and the Soon-to-Be

Statement of the STARTS Prize '21 Jury (Francesca Bria, Alexandra Deschamps-Sonsino, Alexander Mankowsky, Nicola Triscott, Fumi Yamazaki)

From a staggering 1,564 entries, 805 projects were directly submitted to STARTS Prize '21.

As a 'new normal' required the jury to gather virtually for the second time in the history of the prize, a spirit of hope colored the discussions as vaccination schemes had begun around the world. Settled into a year of remote work, jury members from time zones spanning across the world were able to get to know each other, collaborate, argue, and make their way as a group to a final selection. This was, of course, without the ambiance of Linz and the pleasures of face-to-face meals and conversations but with the obvious and important environmental benefits of meeting virtually. If the crisis has taught us anything, it's that other crises will be coming along shortly, and we might as well learn to live with change.

This sense that everything is changing also permeated the projects submitted. Many of them addressed the important issues of today in Europe and around the world: social injustice and climate change. Some chose to approach our ever-changing present with hope while others took a more journalistic approach of documenting our present in creative ways. Technical ambitions were high and the interest in new materials, new techniques, and ways to instrument our world out of a crisis were omnipresent. For others, it was a question of using technology to amplify the cultural impact of shared public space. Applicants showed us the power of cross-disciplinary collaboration while still retaining a strong sense of purpose and identity as artists. Over 96 countries were represented this year, proving that the interest in STARTS is continuing to expand across borders and into a wide range of creative and technical communities.

The natural systems that we are part of, our agricultural futures, the built environment and the fragile state of privacy online were some of the themes that emerged strongly. In that sense, the projects the jury chose to highlight in both their nominations and the prizes were about reflecting on the now and the soon-to-be. The COVID-19 crisis may have tampered the desire to predict a far-flung future when so much is possible now, today. The need to demonstrate the technical capabilities of today was an important dynamic. Perhaps the applicants were tired of speculating and wanted a little more action. The jury responded accordingly, choosing to award the prizes to projects that made the invisible systems that surround us a little more visible, understandable, beautiful, and something we can all act on today.

This 'can do' spirit was omnipresent this year as the COVID-19 crisis gives us a chance to reflect on how we might respond to more diffuse, complex, and multi-layered crisis. As the STARTS prizewinners announcement coincides with a surge of hope for our immediate future, artists, designers, scientists, and technologists everywhere were clear in their message: this is just the beginning of a journey that requires new tools and new skills. It's up to us to respond to their invitation not only across Europe but around the world.

STARTS Prize '21
Grand Prize— Artistic Exploration

Awarded for artistic exploration and art works where appropriation by the arts has a strong potential to influence or alter the use, deployment, or perception of technology.

Oceans in Transformation
Territorial Agency—John Palmesino and Ann-Sofi Rönnskog

Oceans in Transformation is a strong call to collaborate across disciplines to deepen our knowledge of the oceans and to act together to safeguard the future of our living ecosystems. Housed inside the Church of San Lorenzo in Venice, in a place that can remind us of the wonderful and fragile balance between man and nature, the collaborative platform Ocean Space presents the multimedia exhibition conceived by the collaboration between the architects of Territorial Agency, TBA21–Academy, and e-flux Architecture. The work is the outcome of a three-year multidisciplinary investigation and research project on the state of the oceans in transformation, linking science, arts, and politics, by producing shared images of the oceans, earth science and remote sensing datasets with data from satellites, GPS, AI, sonar scans, and climate models produced by different actors and research disciplines, revealing the magnitude of the impact of human activities on the oceans. The project makes visible what is ultimately at stake in the Anthropocene, which is the health of our aqueous planet, presenting rapid sea level rise and marine degradation. Intensive fishing, deep-sea mining, and various other activities represent dangerous anthropogenic pollution factors of the oceans that can irreversibly modify our ecologies. The project is a large-scale collaboration involving interaction with hundreds of scientists, research institutions, NGOs, environmental activists, policy makers, and artists. It brings together a group of Ocean Fellows and a rich program of digital initiatives and activities to broaden and deepen our knowledge of the Anthropocene ocean that can be accessed on the digital platform *ocean-archive.org.*

STARTS Prize '21
Grand Prize— Innovative Collaborationn

Awarded for innovative collaboration between industry or technology and the arts (and the cultural and creative sectors in general) that opens new pathways for innovation.

Remix el Barrio, Food Waste Biomaterial Makers
Anastasia Pistofidou, Marion Real and The Remixers at Fab Lab Barcelona, IaaC

Remember the 19th century Arts & Crafts Movement? *Remix el Barrio* can be seen as translation of Arts & Crafts into our times, confronting well-known contemporary issues with manufacturing and consumption in our daily life. *Remix El Barrio* is a collective of designers who propose projects with food leftovers using artisan techniques and digital manufacturing. They collaborate with agents from the Poblenou neighborhood to promote a more local and circular ecosystem. In their manifesto they want to "promote artisan-manufacturing sites and designer/craftsman cooperatives in the development of short-loop products, creating direct synergies with neighborhood actors, facilitate the access and the rehabilitation of abandoned sites, support logistics, and partnerships between local actors." The jury was most impressed by the wide array of beautifully up-cycled products made from waste—ranging from dye colors made from avocado stones, bioplastics out of orange peel, soaps from used oil, or paper made of coffee peels. Their initiative, Organic Matters, explores the intersection between design, biology, chemistry, technology, material science, community, and self-sufficiency. It could be interpreted as a reformulation of the STARTS idea itself.

A Lighter Delicacy
Sorawut Kittibanthorn

Food waste is a major concern around the world and has a major impact on climate change. It also flies in the face of global poverty, which is also on the rise again for the first time in 20 years. Sorawut Kittibanthorn wants us to rethink a common food by-product, chicken feathers, and put them back in the center of a meal. Rich in protein, they could easily be turned into a foodstuff that would rival soya, tempeh, and other similar by-products. Kittibanthorn challenges us by putting on a Michelin-star looking meal with the processed feathers at the center, inviting us to change our minds about what is waste and what is food. The project fits very well in a food landscape that is diversifying and where even dried insects are starting to feature more prominently. The impact of turning a waste by-product into a foodstuff could save the feathers from landfill, keep them out of our rivers, and in turn help feed others. These are all important and critical ideas that should travel far and wide, especially in our foodie circles.

Cloud Studies
Forensic Architecture

Cloud Studies propose a new and radical approach to investigate contemporary clouds, suggesting the need for an alternative cartography of critical zones. It is a video work that assembles eight recent investigations by Forensic Architecture under the common theme of toxic clouds in different geographical locations and local contexts—from chemical white phosphorus and glyphosate used in Gaza, tear gas used to disperse crowd protests in Hong Kong, methane in Argentina, or chlorine used in the Syrian town of Douma, and arson used to eradicate Indonesian forests for industrial plantations. In the turbulent and fragile year of the COVID-19 pandemic, where the relationship between nature, ourselves, and technology appears dangerously unbalanced, *Cloud Studies* reflects on the global atmosphere dominated by toxic clouds that colonizes the air we breathe and shapes our environment and our perception, prompting collective resistance and protests. Clouds are also a metaphor for the fragility and porosity of borders, since we are all connected and close, breathing the same toxic air. It is clearly denouncing how state and corporate powers continuously mobilize new types of clouds to control and manipulate human behaviors and their environment. Toxic clouds colonize the air we breathe, leaving traces everywhere, and it is hard not to relate it to the infrastructural "clouds" that colonize our digital life today, amassing information and data that can be used and monopolized in various ways. Audio recordings and the audiovisual narrative, together with the essays and texts read by their authors are also made accessible in a virtual exhibition platform, providing more in-depth information for the audience: *https://critical-zones.zkm.de/#!/detail:cloud-studies.*

Data Garden
Grow Your Own Cloud

Global energy consumption of data centers is a huge issue for the global environment. Data centers are emitting as much CO_2 as the aviation industry, and these numbers are growing exponentially. *Data Garden* is an organism-based data center, a carbon negative data infrastructure that can store and retrieve data from the DNA of plants, using organisms that create its own energy. Through this project, the *Grow Your Own Cloud* team aims to build an organic cloud that emits oxygen rather than CO_2. From speculative research working with local flower shops to be transformed as decentralized data centers, to working with researchers at the University of Washington, actually converting computational data such as JPGs and MP3s into DNA. *Data Garden* and its installation inspires the audience regarding how humans may be able to work with nature and data, creating regenerative data ecosystems.

ELEVENPLAY x Rhizomatiks "border 2021"
MIKIKO, Daito Manabe, Motoi Ishibashi, Takayuki Fujimoto, evala, ELEVENPLAY, Rhizomatiks

What is real and what is virtual? As technology advances, some technologies are capable of making such borders invisible. *border 2021* is a project that challenges the audience with a highly immersive experience transforming the border of the virtual and the real world. With a combination of personal mobility device and VR-headset, the audience experiences an immersive performance art going back and forth between the fictional world of VR/AR and the real world brought back by the physical touches of dancers confusing various boundaries. Everything in this project moves, from physical objects, the audience on personal mobility devices, and dancers, all of which is programmed, choreographed, and performed extremely precisely. Coping with the post-COVID-19 era, the project also provides a unique online viewing experience enabling the viewers to select viewpoints of multiple perspectives such as a bird's eye view of the entire venue, and the control screen of the controlling software. *border 2021* impresses the audience with the artistic and technical quality of the implementation, the multidisciplinary collaboration, and innovative nature of how the project is pushing the boundaries of what people could perceive in the future as 'real' and 'virtual.'

mEat me
Theresa Schubert

Not since Lee Miller photographed a severed breast on a dinner plate in 1929 and Orlan's performances of carnal art of the 1990s have we seen human flesh as food for thought. Veganism doesn't seem too extreme compared to the impressive work of artist Theresa Schubert. Taking our obsession with meat, the realities of gene manipulation, and our food production realities, she really does make us eat hyper-locally. Her videos and photographs explain the process of turning a sample of her own blood cells into lab-grown meat. By treating the human body as just another food choice, her work puts us back into the animal kingdom and Nature where we belong. It's bold and might even be shocking to some, but the reality is, if we treat our own bodies the way we treat the bodies of the animals that help us both to nourish us and to overcome disease, we might find commonalities instead of differences.

On View
Ania Catherine, Dejha Ti

In modern society, users are constantly exposed online to various addictive interfaces, surveillance, and data privacy, often not knowing what is actually going on. *On View* (2019) is an installation that allows the audience to interact with those interfaces in the virtual world, with no virtual layer, being exposed directly to that awkwardness that is usually hidden behind the online interactions. Through the installation, the audience is forced to experience, learn, and feel the weight of what is actually going on when they sign the Terms & Conditions online that they may not read, unaware that they may be signing up for facial detection and facial recognition. *On View* raises awareness of the issues such as privacy, data protection, data ethics, and surveillance capitalism, which are concerns often addressed in Europe with the GDPR.

Project Habitate
Yuning Chan, Tom Hartley, Yishan Qin

When we are talking about the Anthropocene with its destruction of the biosphere, then we imagine large mammals, whales or the Amazon forest. What is missing in our cultural imagery of nature, is the barely visible, in case of trees the profane: mosses, lichen, and fungi. In *Project Habitate,* the artists have created scientifically proven wearables which are ready to be accepted by mosses, lichen, and fungi. The wearer would be enabled to replace a tree as host. The original host is the ash tree: the jewelry mimics the ash tree's bark texture, light level, porosity, and pH and leverages human movement to support guest species' spore dispersal. The living wearable can be seen as an indicator of ecological-social connectivity, as a reminder that no species is an island. From the STARTS perspective, *Project Habitate* provides scientifically sound ideas on how the destructive aspects of the Anthropocene can be countered through the creation and application of materials that can serve as habitats for neglected species.

The Growing Pavilion
Company New Heroes / Biobased Creations

Biobased or recycled materials are often evaluated solely as replicas of today's conventional one-way-ticket materials. Contemporary mainstream aesthetics reflect a production process in which the product itself can be endlessly replicated in sameness—but only until the resources are depleted. Nature shows a different approach, there is neither resource depletion, nor sameness. *The Growing Pavilion* communicates a future-proof approach to beauty, where everything is unique in texture and color. The walls are grown out of locally harvested plants and mycelium, forming a kind of organic skin instead of an evenly white wall. The creators have reinforced the new aesthetics of growing with the exhibition of unique pieces by Aniela Hoitink, Christien Meindertsma, Diana Scherer, Eric Klarenbeek, Martijn Straatman and HuisVeendam. The core idea of growing instead of manufacturing is seen as a very promising pathway into a sustainable future.

The Living Light
Nova Innova

Microbial Fuel Cell technology (MFC), the idea of using microbes to produce electricity, has been known since 1911, when Michael Cressé Potter made the subject public. In Pop Culture, the banana fed time machine was able to send mad scientists 'Back to the Future.' But *The Living Light* is different—it is a practical approach to literally illuminate the mutual dependence between nature and mankind. *The Living Light* is about to implement Plant Microbial Fuel Cell technology in our day-to-day lives—reaching from your indoor plant providing light at home to illumination in urban parks, powered by the organisms in the soil. *The Living Light* is a beautifully crafted beacon into a future, where life itself can contribute to our civilization, replacing endless numbers of batteries. Especially interesting for STARTS is *The Living Light* as an eye opener for the engineers of the sensory based Internet of Things, where many small devices will need weak energy sources that cannot be maintained by a complicated energy network or batteries.

The Tides Within Us
Marshmallow Laser Feast, Fraunhofer MEVIS, Natan Sinigaglia

The Tides Within Us is a unique trip into the human body, following real blood flow heart data captured by an MR scanner that amplify our perception of the body and its boundaries. Where does the human body begin, and where does it end? What's the relationship between humans and nature? An immersive scientific exploration with interactive screens that allow the audience to explore the fluidity of the human ecosystem, mapping the flow of oxygen through the cardiovascular system, thus challenging the boundary between our bodies and our environment, beyond the limit of our perception. This arts–science partnership between the Marshmallow Laser Feast (MLF) and pioneers in medical image computing Fraunhofer Institute for Digital Medicine MEVIS, shows that everything is connected and that we share a similar structure to nature. The expertise of Fraunhofer Institute in digital medicine and the MR-Lab research made possible the artistic exploration of MLF using scientific medical data sets and advanced capturing techniques at scale, to create a human 600 feet tall. In a moment of strong evolution and transformation of digital medicine, this work opens up our imagination and perception: at this scale, lungs look like trees, arteries like river deltas, and neural pathways like thunderstorms, opening novel ways of experiencing our bodies, and changing the way people learn and think about the body in relation to the environment. *The Tides Within Us* is an ongoing science–arts collaboration that will continue to evolve and expand.

STARTS Prize '21
Nominations

An Olfactory Biopolitics Nairobi
Coltrane McDowell

Constructing Connectivity
Jessica Smarsch

Extendable Ears
Sheng-Wen Lo

Face Lab
Håkan Lidbo

Genetics Gym
Adam Peacock

Glacier's Lament
Jiabao Li

In a Small Room
KyungJin Jeong

In Event of Moon Disaster
Halsey Burgund, Francesca Panetta

Lovewear
Ivan Parati, Emanuela Corti, Witsense

MyComythologies
Saša Spačal

Para-optic-8
Anastasia Alekhina

Shapes and Ladders: Battles of Bias and Bureaucracy
Ani Liu, Michelle Lim, John Ahloy, Andrea Li

Silencing The Virus
Lily Hunter Green

So far the Skies are silent
A Series of Audiovisual Performances for Radio Telescopes and Artificial Intelligence
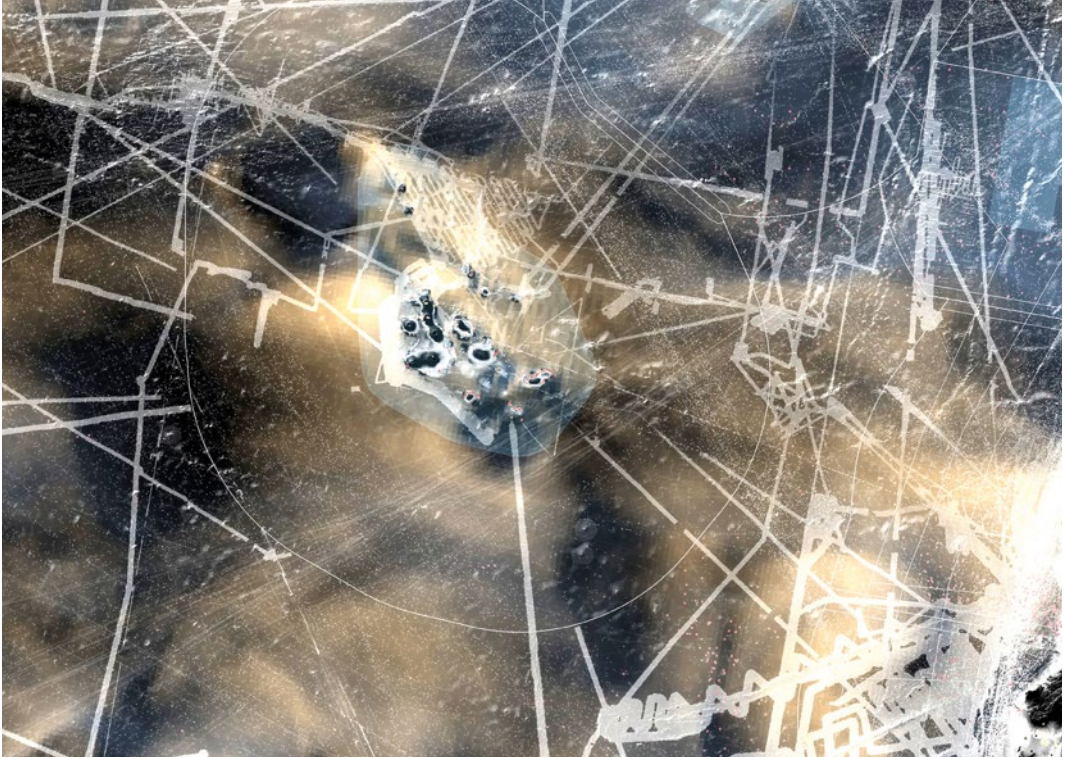Quadrature

Symbiosia
Thijs Biersteker

The [Uncertain] Four Seasons
AKQA, Jung von Matt

The Cleanroom Paradox
Felix Lenz, Angela Neubauer, Eszter Zwickl

TheirTube
Tomo Kihara

Oceans in Transformation

Territorial Agency—John Palmesino and Ann-Sofi Rönnskog

Galapagos archipelago with high resolution bathymetry fishing and shipping data of Marine Protected Area EEZ.

© Territorial Agency

Oceans in Transformation investigates the impact of human activity on the world ocean. The global ocean is changing its circulations, energies, interactions, and ecologies. It is the most dynamic and sensitive component of our living planet. The ocean is in a new phase of its dynamic history, shaped by intensifications of the impact of human activities on planetary systems—the Anthropocene.

Territorial Agency uses extensively geospatial and remote sensing data to produce public settings—exhibitions, seminars, workshops and online—to guide discussions between multidisciplinary expert groups, scientists, policy makers, activists, conservationists, and to build capacity to act on complex environmental issues.

Oceans in Transformation is a project that addresses the challenges linked to multi-scalar data, multi-temporal data, and dynamic environmental data,

in direct connection with contemporary arts, architecture, and environmental settings.

The ocean is a sensorium, an aesthetic device: it records in its complex dynamics the transformations of the Earth, and it inscribes back its cycles in the dynamics of life-forms. *Oceans in Transformation* is an aesthetic and conceptual setting, where different ways of being sensitive to the complex events of climate change are brought into close proximity. It investigates two systems of knowledge developing alongside each other, often with little contacts between them.

On one side Earth System science is developing rapidly and widening our understanding of the Earth as a living entity. The ocean is a key element of the Earth System—yet one of the least known. *Oceans in Transformation* is organized by large dynamic compositions of remote sensing images

Gulf Current meeting the Labrador Current, with the Grand Banks off the coast of New Foundland.

where the gaps between different knowledge components, areas with no data and areas with contradictory and ambiguous understanding are highlighted and brought to the forefront. The dynamic compositions of Earth System science data offer in this sense no overview, rather a multiplicity of areas of research, each one attempting to find more focus and calibration.

On the other side we have the complex unfolding of world-systems analysis, the long-term forms of coherence of human societies, with an emphasis on datasets and narratives that unfold the complex ways in which we are starting to exit the modern world-views of globalization and the long echo of imperialism and the subjugation of nature to extractivist practices.

Oceans in Transformation proposes an innovative viewpoint on the transformation processes that are shaping contemporary societies and the territorial narratives that underpin them. By investigating through complex spatial and environmental images the material character of the spaces that specific polities inhabit, *Oceans in Transformation* indicates the magnitude of contemporary human activity. It indicates the coherence of long-term forms of inhabitation practices, as they unfold in time and across space, often shaping quasi-stable levels of coherence with dimensions that are interacting with the cycles of the Earth.

With *Oceans in Transformation,* Territorial Agency has developed an active way to engage and inquire into the knowledge systems of Earth System and world-system analysis, that rarely connect. There is a world beside each one of them, with interlocking elements of insight, and interwoven transformation processes that range from acidification of

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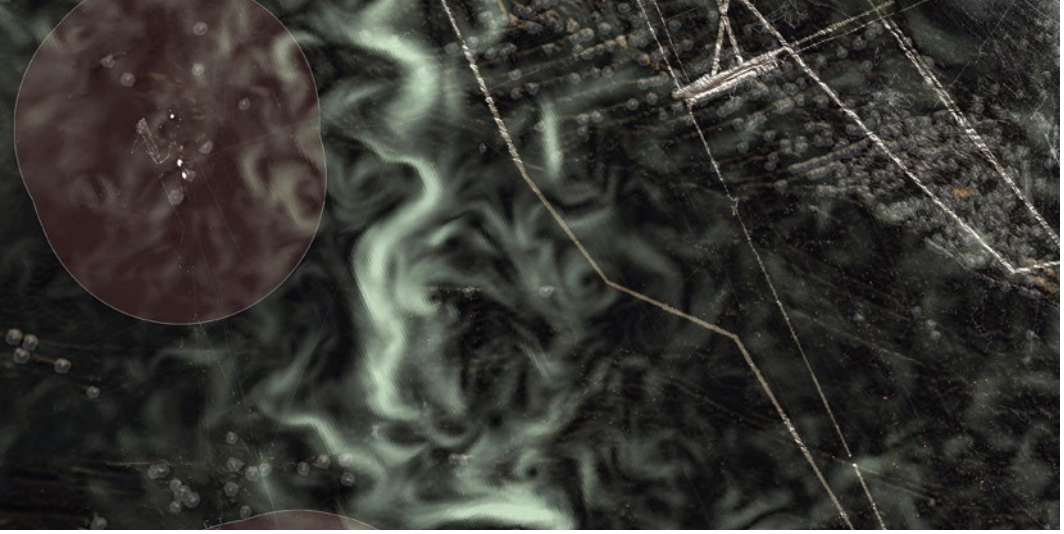
Indian Gyre, with the Antarctic Circumpolar Current, marine protected areas, areas of deep-sea mining exploration, maritime traffic data.

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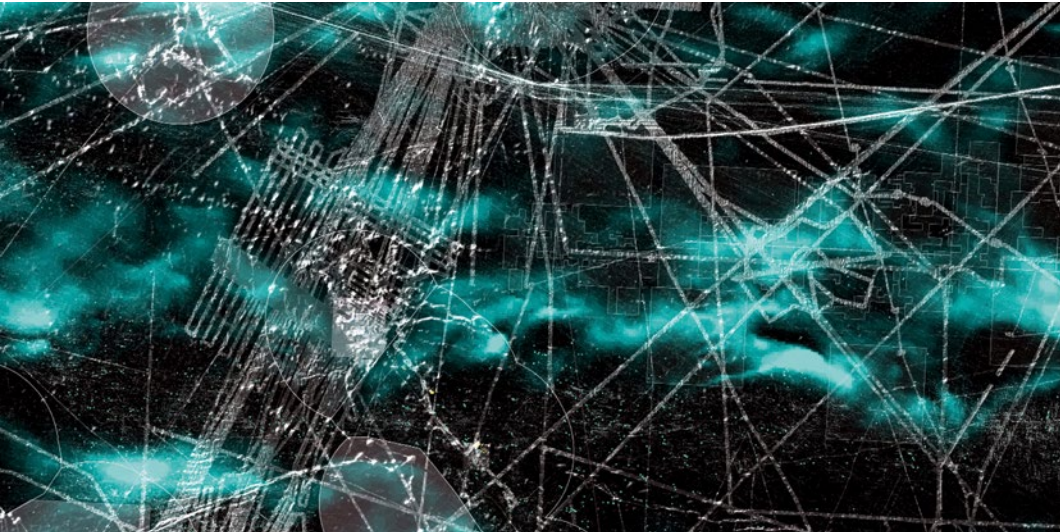
Equatorial Pacific, with the Clarion-Clipperton areas for deep sea mining exploration, maritime shipping routes.

the seas to depletion of forests in native lands, from overfishing to ocean warming, from intensified use of natural resources in coastal areas to sea level rise, from the destruction of the cryosphere to loss of languages. As the world ocean is transforming, its vast, interconnected waters indicate that the ways of sensing them are plural. Over the last decades a wide range of new measurements and observations have increased the knowledge of the changing ocean and have also multiplied the number of different agents operating with them. *Oceans in Transformation* allows inquiry into both systems, and drawing up each one into the other's unfolding.

Territorial Agency's work focuses on the integration of science, architecture, and art in the challenges posed by climate change. The work of Territorial Agency is grounded in extensive spatial and territorial analysis through remote sensing technologies. Its focus is on complex representations of the transformations of the physical structures of contemporary inhabited territories. Through its work Territorial Agency engages different polities to re-evaluate the relations to the complex material, energy, and information fluxes that mark contemporary territories.

STARTS Prize '21
Grand Prize—Artistic Exploration

Territorial Agency: *Oceans in Transformation,* Ocean Space, Venice, Italy, 2021

Oceans in Transformation is a research project by Territorial Agency—John Palmesino and Ann-Sofi Rönnskog, commissioned by TBA21–Academy.

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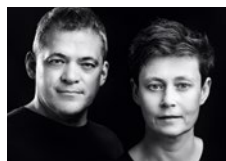
Territorial Agency—John Palmesino and **Ann-Sofi Rönnskog** (INT). Territorial Agency is a London-based independent organization that combines contemporary architecture, science, art, advocacy, and action, based on comprehensive spatial analysis and the formation of new settings for public diplomacy. Recent projects include *Oceans in Transformation* commissioned by TBA21–Academy, in collaboration with ZKM Critical Zones and Taipei Biennial 20; *Museum of Oil* with Greenpeace, ZKM Reset Modernity and Chicago Architecture Biennial; *Anthropocene Observatory* with Armin Linke and Anselm Franke at HKW Haus der Kulturen der Welt Berlin, BAK Utrecht and in the collection of Centraal Museum Utrecht; *Plan the Planet* with AA Architectural Association supported by Graham Foundation; *North anon* in *Kiruna Forever* at ArkDes; the Museum of Infrastructural Unconscious; and the integrated plan for the Zuiderzee region, *Unfinishable Markermeer.* John Palmesino (ITA) and Ann-Sofi Rönnskog (FIN) teach at the AA Architectural Association School of Architecture, London.

Remix el Barrio,
Food Waste Biomaterial Makers

Anastasia Pistofidou, Marion Real and The Remixers
at Fab Lab Barcelona, IaaC

KOFI: Making paper and packaging from coffee husks, by Dihue Miguens Ortiz

Over the last 30 years, plastic production has increased by 620%.

In Catalonia alone, every day, 720,000 kg of food is thrown away. This wasted food, totaling 260,000 tons per year, is equivalent to the food needs of 500,000 people for one year. *Remix el Barrio* was born with the ambition to propose a learning space to encourage and nurture new practices based on food-waste crafts. It is the result of a pilot program where various designers learn about biomaterial design and explore projects with food scraps using artisanal techniques and digital fabrication. *Remix El Barrio* was created in the regenerative district of Poblenou, more specifically in the ecosystem of Fab Lab Barcelona, where designers united to co-produce new forms of crafts from their individual aspirations, benefitting from regular peer-learning sessions, access to machines and tools, and learning from the maker open source

culture present all over the place. Each designer has initiated a creative design driven material innovation approach where they identify a recurrent local food waste case, learn about its characteristics, investigate how to best collect and process it, and imagine future applications and material life-cycle narratives.

Guided and mentored by experts from the field at Fab Lab Barcelona, experimented with different recipes for making materials with appropriate flexibility, strength, and esthetics, and tested diverse fabrication techniques, from molding to extrusion, laser cutting, CNC milling, and 3D printing. Each project could have entered into an iterative loop of prototyping, fed by intrinsic people creativity and interactions with peers, lab gurus, external experts, local providers, and future users. This resulted in a strong diversity of projects with outstanding circular narratives, materials, products, and services:

STARTS Prize '21
Grand Prize—Innovative Collaboration

EN(DES)USO: A poetic approach to materialities using eggshells and yerba mate for design artefacts, by Lara Campos

- *KOFI:* Making paper and packaging from coffee husks, by Dihue Miguens Ortiz
- *RE-OLIVAR:* Creating design objects such as lamps, chairs, and tiles from olive pits, by Silvana Catazine y Josean Vilar of Naifactory
- *EN(DES)USO:* A poetic approach to materialities using eggshells and yerba mate for design artefacts, by Lara Campos
- *SQUEEZE THE ORANGE:* A jacket made of vegan fruit leather based on orange peel, by Elisenda Jaquemot, Susana Jurado Gavino y Nuria Bonet Roca
- *COLORES,* Empowering natural dyes from avocado pits, by Giorgia Filippelli
- *DULCE DE PIEL,* Making Soaps from used oils, by Clara Davis
- *ORGANIC MATTER,* Designing a platform about regenerative circular design, by Laura Freixas
- *LOOK MA NO HANDS,* 3D printing cookies from fruit peel and skins, by Secil Asfar
- *CIRCULAR GOS,* Making snacks for pets from restaurant food leftovers with environmental awareness, by Arleny Medina of Leka Restaurant
- *BIOPANTONE,* a collaborative artwork of nature's color palette with natural dyes, by Anastasia Pistofidou and Fabricademy alumni 2019.

Beyond the pilot, *Remix* has transformed into a collective that experiences circularity, not only by creating materials with local food leftovers but also by exploring collaboration, inclusiveness, and self-management towards shared knowledge with local actors and global outreach.

The Remixers' leitmotiv:
"We are exploring new practices to stop wasting our time and our resources and act at a local scale to foster more social circular practices. We collaborate and involve local agents from the neighborhood such as restaurants, urban gardens, and neighborhood associations, to promote a local circular economy ecosystem. We affirm the potential of co-design, digital manufacturing, and crafts to reinvent our ways of producing, consuming, and living with awareness of the environmental ecosystem. We claim the need to imagine new models and techniques to innovate with what we commonly call 'waste'. We value innovative and artistic practices as a motor for social change. We are convinced that living shared design experiences can facilitate the empowerment of territories to implement a circular economy."

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SQUEEZE THE ORANGE: A jacket made of vegan fruit leather based on orange peel, by Elisenda Jaquemot, Susana Jurado Gavino y Nuria Bonet Roca
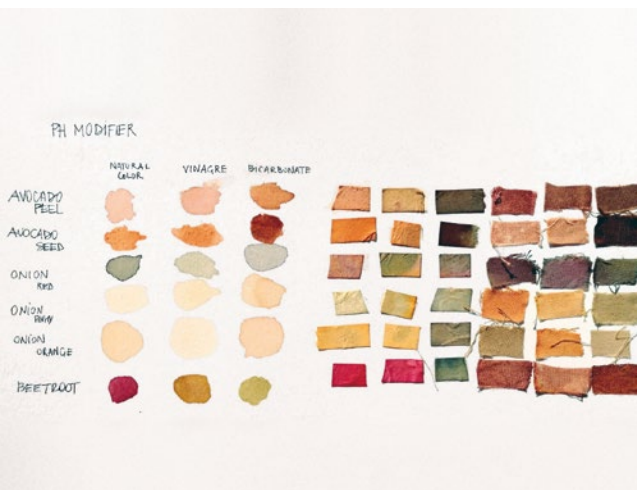

RE-OLIVAR: Creating design objects such as lamps, chairs, and tiles from olive pits, by Silvana Catazine y Josean Vilar of Naifactory

STARTS Prize '21
Grand Prize—Innovative Collaboration

BIOPANTONE, a collaborative artwork of nature's color palette with natural dyes, by Anastasia Pistofidou and Fabricademy alumni 2019.

COLORES, Empowering natural dyes from avocado pits, by Giorgia Filippelli

IaaC Fab Lab Barcelona is an innovation center rethinking the way we live, work, and play in cities. It is part of the Institute for Advanced Architecture of Catalonia. The institution supports contemporary educational and research programs related to the multiple scales of the human habitat. Fab Lab Barcelona is also the headquarters of the global coordination of the Fab Academy program in collaboration with the Fab Foundation and the MIT's Center for Bits and Atoms. Anastasia Pistofidou is a digital fabrication expert, wearables and e-textile practitioner, biomaterial maker, and educator. She incubated the Remixers in the technical and conceptual development of their biomaterial projects. She is the cofounder of FabTextiles experimental open source research lab and the cofounder of Fabricademy, Textile and Technology Academy. She also works as a content curator for FabFoundation. Marion Real is a systemic design researcher exploring co-creation processes in the territorial transformations toward circular economies and cosmopolitan localism. She is currently working at Fab Lab Barcelona where she has coordinated the 10 pilots in the *SISCODE* project, including *Remix El Barrio.* She is also associate researcher at Estia, Chaire Bali and Centre for Circular Design. The Remixers collective has emerged as a group incubated in IaaC Fab Lab Barcelona within the *SISCODE* EU project pilot. They experience the value of co-creation and open knowledge and formed a group of like-minded individuals who defend sustainability, cooperativism, shared infrastructures, and circular glocalism. They wish to further collaborate in establishing a space to experiment with local food waste and biofabrication with a goal to connect with local services, activate circularity, and scale up by collaborating with open-minded and visionary industries.

Remix el Barrio,
Food Waste Biomaterial Makers

A Lighter Delicacy
## Sorawut Kittibanthorn

A project that seeks to highlight the inefficiencies of our current food system, from its production methods to the way ingredients are being consumed. Over 2.3 million tons of feather waste are produced annually from poultry production in the EU. Traditionally, this feather waste is disposed of either through landfill or incineration. Massive waste streams have affected the planet and food industry, which needs to be refined and improved so that supply chains are more sustainable.

This project proposes an alternative way to manage feather waste from slaughterhouses by converting its nutrient composition into a new edible product. Chemically, chicken feathers are composed of approximately 91% protein (keratin), which contains up to eight types of the essential amino acids that we require as part of a healthy diet. It has been proved that keratin protein from feathers is safe for general consumption in our daily diet.

Chicken feathers could therefore be turned into a new delicacy that replicates the quality and aesthetics of high-quality food and is also a tender texture creation with a unique structure in food. The structure was constructed with non-animal products similar to a vegan meat-making technique. Consequently, all the ingredients and selected food binders could finally form a structure that gives this feather meat both firmness and flexibility . Under these circumstances, the physical and chemical aspects of the making result in a melt-in-the-mouth texture for an alternative meat eating experience. This new eating experience will trick our sensory perception of food into enjoying this healthier meat cut more.

I believe that if we are to continue rearing and slaughtering millions of birds daily, then at the very least we have a responsibility to ensure that we safely and sustainably make use of every part of them.
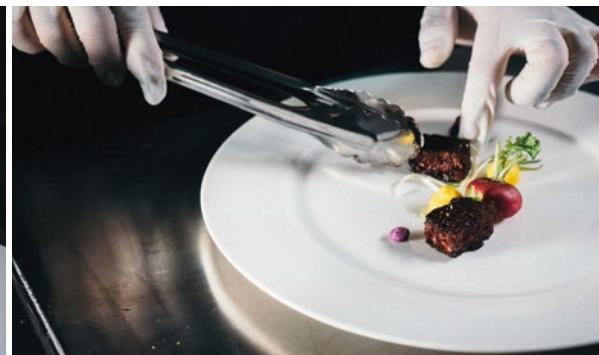
STARTS Prize '21
Honorary Mention

https://u.aec.at/172CD4DA

Sorawut Kittibanthorn (TH) is a material designer who is interested in applying science to investigate the physical and chemical transformation of materials that occur in food crafting processes. Exploring natural resources is a means of creating a closed-loop system with a zero-waste policy. Additionally, the bottom-up design approach with living materials is a key feature of the design work in order to enhance sustainable activities and encourage the potential usage of such designs in the real world.

Cloud Studies
Forensic Architecture
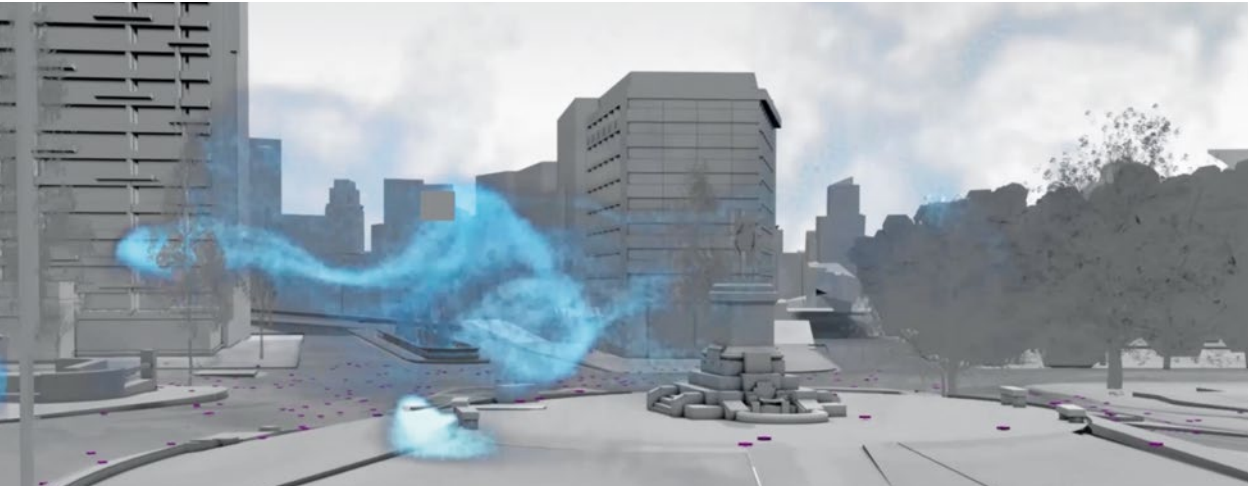
Still from *Tear Gas in Plaza de la Dignidad,* 2020 (Cloud Studies, 2020)
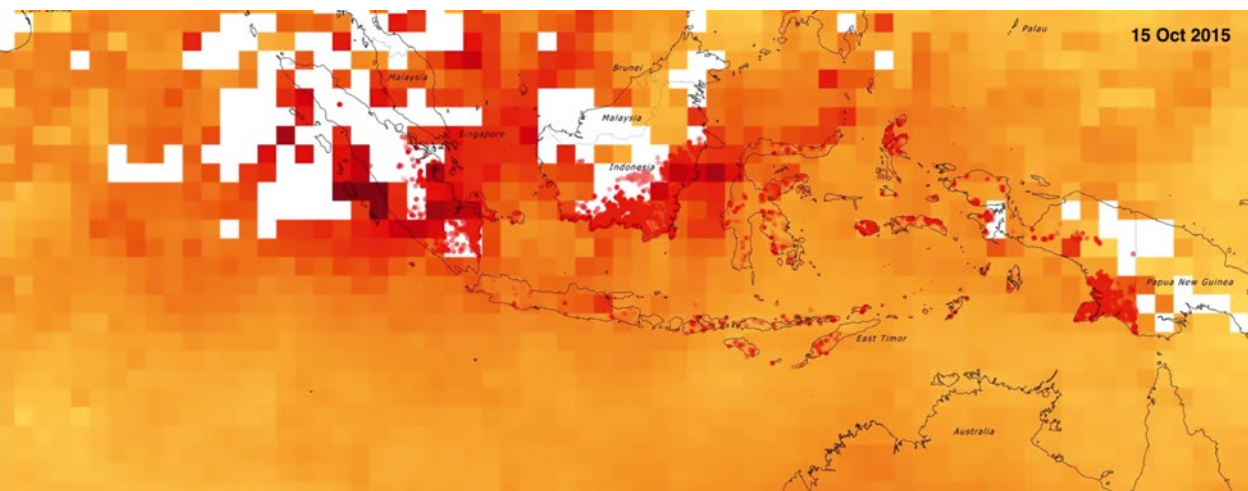
Forensic Architecture

Across the world, tear gas is deployed to disperse bodies gathering in democratic protest, white phosphorus and chlorine gas spread terror in cities under siege, aerial herbicides destroy arable land and ruin livelihoods, and large-scale arson eradicates forests for industrial plantations. Mobilized by state and corporate powers, toxic clouds colonize the air we breathe across different scales and durations, from city squares to continents, unique incidents to epochal latencies.

In the recent history of human rights, incidents of violence have been understood as momentary and kinetic: a gunshot or explosion, where "every contact leaves a trace." But contemporary airborne violence requires a different approach: clouds are transformative entities—their dynamics elusive and nonlinear; causality is hard to demonstrate, the 'contact' and the 'trace' drift apart, carried away by winds or ocean currents. Around these toxic fogs, contemporary political conditions breed doubt and lethal skepticism, and physical clouds become epistemological. When figures in power deny the realities of climate change or chemical attacks, those forced to inhabit the clouds must find new forms of resistance.

This work brings together eight recent investigations by Forensic Architecture, each examining different types of toxic clouds and the capacity of states and corporations to occupy airspace and create unliveable atmospheres. Combining digital modelling, machine learning, fluid dynamics, and mathematical simulation in the context of active casework, it serves as a platform for new human rights research practices directed at those increasingly prevalent modes of 'cloud-based,' airborne violence. Following a year marked by environmental catastrophe, a global pandemic, political protest, and an ongoing migrant crisis, *Cloud Studies* offers a new framework for considering the connectedness of global atmospheres, the porousness of state borders and what Achille Mbembe terms 'the universal right to breathe.'

Still from *Ecocide in Indonesia,* 2017 (Cloud Studies, 2020)

Forensic Architecture

Forensic Architecture Team:
Principal Investigator: Eyal Weizman
Researcher in Charge: Samaneh Moafi
Team: Robert Trafford, Martyna Marciniak,
Lola Conte, Lachlan Kermode, Mark Nieto,
Leigh Brown, Sarah Nankivell, Christina Varvia,
Amy Cheung, Shourideh C. Molavi.
Originally commissioned by ZKM Center for Art and
Media in Karlsruhe.

https://u.aec.at/88E117EF

Forensic Architecture (FA) (INT) is a research agency at Goldsmiths, University of London, investigating human rights violations by states and corporations using pioneering techniques in the fields of spatial analysis, open source investigation, modeling, and immersive technologies. FA works in partnership with institutions across civil society, from grassroots activists and legal teams to NGOs and media organizations, to carry out investigations with and on behalf of communities and individuals affected by conflict, police brutality, border regimes, and environmental violence.

Data Garden
Grow Your Own Cloud

Data Garden is an organism-based data center. This functional carbon negative data infrastructure is capable of storing and retrieving data from the DNA of plants. In stark contrast to the carbon emitting data cloud, *Data Garden* works with data in nature's way, storing data in plant DNA, within organisms that create their own energy. It uses Nanopore sequencers to retrieve data from the plants' DNA in almost real-time.

The project offers a vision of a world in which design is a collaboration between species, ecosystems, and technologies. As an interactive piece, developed for SXSW, it brings the public into contact with advanced biotechnology as well as critical issues of 'Data Warming' (a term coined by GYOC to describe the link between carbon emissions and data storage), genetic modification, and synthetic biology. These are presented through visualizations and a series of posters that accompany the installation.

Developed by Grow Your Own Cloud and scientist Jeff Nivala, principal researcher at MISL, University of Washington, the installation features tobacco plants and Arabidopsis encoded with curated data related to Data Warming using in vivo DNA data storage techniques. The encoding process involved converting computational data such as JPEGs and MP3s into DNA, using ATCG rather than binary. In order to retrieve the data, samples from the plants are taken to obtain droplets of liquid DNA, which are decoded using a nanopore sequencer. Decoded read-outs are then fed into TouchDesigner via Python, revealing the data stored within the plants. Working with nature to respond to the threat of Data Warming, *Data Garden* invites visitors to experience a new materiality around data, and explore a world in which data storage is truly green. This type of organism-based data centre is designed to inspire new models that bring principles of working with nature to data, creating regenerative data ecosystems.
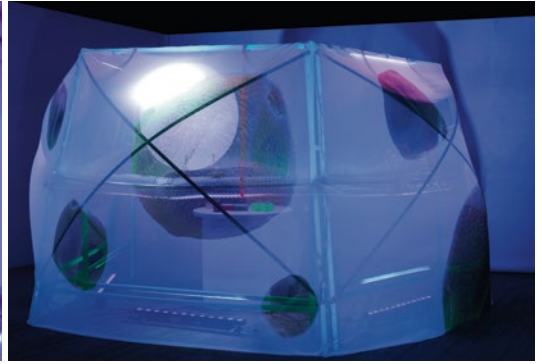
Created by: Cyrus Clarke, Monika Seyfried,
and Jeff Nivala
Architects: (ab)Normal
Graphic Design: Kuba Bogacki, Krzysztof Seyfried,
Olek Znosko
With support from: Unlisted Projects (US), The Museum
of Human Achievement (US), Statens Kunstfond (DK),
Roskilde Festival (DK), Catch (DK), and The Singer
Foundation (US).

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Grow Your Own Cloud (GYOC) explores alternative relationships with nature and technology through collaboration between the arts and science. By storing data in nature's way, in the DNA of plants, GYOC creates carbon absorbing data storage. Initiated by **Monika Seyfried** (PL) and **Cyrus Clarke** (UK), the research investigates data, living systems, and planetary issues such as 'Data Warming.' GYOC works with scientist **Jeff Nivala** (US) to re-imagine the cloud as a space for symbiosis between humans and other organisms. GYOC has been exhibited at SXSW, Primer NYC, and BIO26. They contributed to the agenda of the UN Climate Summit, COP25, and WEF Davos. In 2020 they were awarded the Ginkgo Creative Residency.

ELEVENPLAY x Rhizomatiks "border 2021"

MIKIKO, ELEVENPLAY, Daito Manabe, Motoi Ishibashi, Rhizomatiks, Takayuki Fujimoto, evala

STARTS Prize '21
Honorary Mention
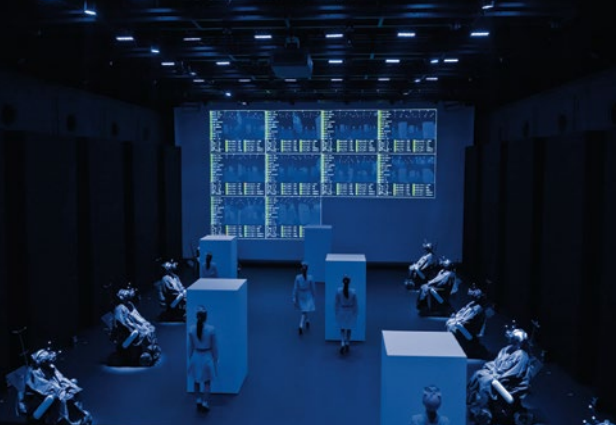
The dance company, ELEVENPLAY, the director-choreographer, MIKIKO, and the collective led by Daito Manabe and Motoi Ishibashi, Rhizomatiks, presented a dance piece *border* in 2015. We developed and updated our experiment of 2015 to establish a new expression model for both online and on-site experience for the post-COVID-19 era. Five years after the premiere, with *border 2021* the latest version has been made. *border 2021* challenges the 'evolution' of experience and expression.

From *border* to *border 2021*
After the premiere of *border* at Spiral Hall in Tokyo in 2015, the updated version was presented at the Yamaguchi Center for Arts and Media [YCAM]. *border* is a work that transforms the border of the virtual and the real world. The audience sit in a WHILL (by WHILL Inc.) personal mobility device and their movements are completely controlled by the program. They also wear a Virtual Reality headset display to move back and forth between the fictional world of VR/AR and the real world brought back by the dancers to confuse various boundaries. In 2015, there were no products or services yet, and we had to make our own devices. However, in the past few years, VR devices with higher resolution have become available and it is getting more immersive and realistic. The quality of both visual and sound in the 2021 version has been improved by making the most of these innovations with newly added choreography and direction.

The emergence of online viewing models
In addition to the on-site experience, online streaming was available to establish a new expression model of post COVID-19 times. In the online viewing, viewers can select the viewpoint from multiple perspectives, which were specialized for online viewing that cannot be seen at the venue, such as a bird's eye view of the entire venue and the control screen of the controlling software.

Agency for Cultural Affairs Visual Industry Promotion Organization (VIPO)

ELEVENPLAY: MIKIKO, SAYA, MARU, NANAKO, YU, MAI, KAORI, emmy, TOMO, MIKU, MAYU, Yoko Shiraiwa

Rhizomatiks: Daito Manabe, Motoi Ishibashi, Yuya Hanai, Satoshi Horii, Futa Kera, Katsuhiko Harada, Hideaki Tai, Toshitaka Mochizuki, Kyohei Mouri, Saki Ishikawa, Momoko Nishimoto, Naoki Ishizuka, Muryo Homma, Shintaro Kamijo, Hiroyasu Kimura, Kaori Fujii, Miku Maruno, Hirofumi Tsukamoto, Tatsuya Takemasa, Takahito Hosono, Momoko Aoyagi, Kahori Takemura, Takao Inoue

evala, Takayuki Fujimoto, mountposition, Kentaro Mito, So Ozaki, Kazuya Kushimoto, Ikumi Ijiri, Jiro Kubo, Kinya Takayanagi, 2bit, Kosaku Namikawa, Shino Higuchi, 1 inc, Crescent, Yae-pon, Gnzo, TOW

https://u.aec.at/84E0EDC2

hiroko hirota

mEat me
Theresa Schubert

Many thinkers of posthumanism stress a non-human-centered perspective on the world, that we should assume a more modest role in our dealings with nature and stop hierarchizing species. Theresa Schubert draws a radical consequence: if we treat humans the same as we treat animals, we should also be material and food. In her artistic research project and performance *mEat me,* Schubert demonstrates this provocative scenario as an alternative reality. With consequent fearless exploitation of her body, she creates aesthetic experiences beyond human exceptionalism. Making the human vulnerable can also be understood as a strategy for raising awareness of biopolitical issues and a more conscious dealing with nature and its living beings at large. It's also a critique of the ethical image presented by the cultured meat industry and how this idea per se is not solving environmental problems.

In the context of an atmospheric-intense performance consisting of video projections and spatial sound, *mEat me* shows the human meat-growing process and the consumption of her own flesh. The artificially developed corporeality of her own flesh engages in a dialogue with a voice generated by machine learning models. The exchanged information defines a level of abstraction which mirrors our disconnection regarding food supply. Schubert turns herself into a material and resource, breaking the societal taboo of cannibalism by misusing technology that was invented with the intention of capitalizing on it.

As an artistic research project, *mEat me* applies innovative biotechnological advancement beyond a scientific purpose or monetary intent. For the lab process, a serum, gained out of her own blood, was used to reproduce her muscle cells that had previously been extracted. The resulting cultured human meat shifts normative borders and dissolves the consumerist hierarchy between humans and animals. It engages with the urgent topic of food supply in times of meat mass production and its relevance not only for our consciousness but our planet.
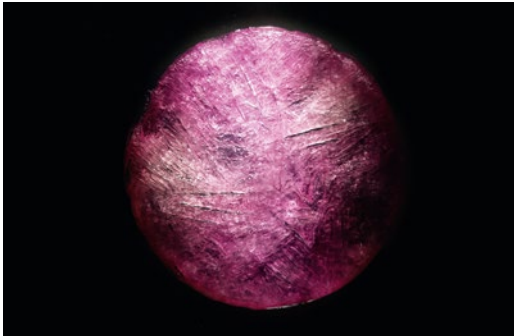
Text: Theresa Schubert / Helene Bosecker

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STARTS Prize '21
Honorary Mention

Theresa Schubert (DE) is a Berlin-based artist exploring unconventional visions of nature, technology, and the self. Her work combines audiovisual and biomedia with conceptual and immersive installations or performances. By means of interdisciplinary methods such as biohacking, theoretical analysis, performative interpretation, and material experimentation, her works question the relation of humans to their environment and the evolvement of matter and meaning beyond the Anthropos. More recently, she has worked with UHD video environments and 3D Laser Scanning to challenge modes of perception and question the human-machine-nature relationship in hypertech societies.
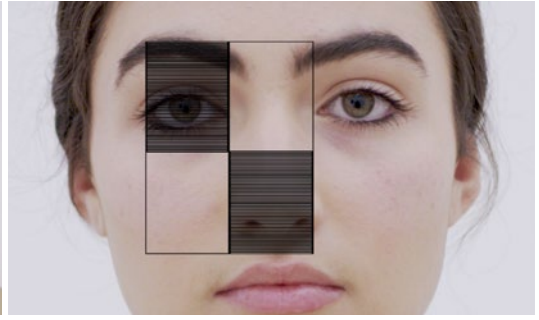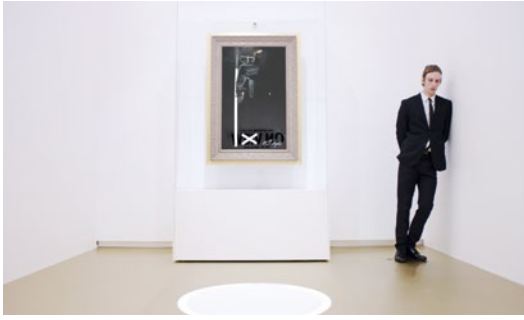
On View

Ania Catherine, Dejha Ti

Djeneba Aduayom

Ania Catherine and Dejha Ti's seminal interactive performance installation *On View* (2019), commissioned by the SCAD Museum of Art, examines the generational desire to be the subject of an art experience and that phenomenon's relationship to addictive interfaces, surveillance capitalism, and data privacy in modern society. Equally a socio-political critique and an experiment in art and technology, *On View* offers audience-participants a way into the critical conversation on the digital architectures we inhabit, illuminating the underlying forces shaping our everyday realities through experiential art. Tech literacy is imperative—especially as technology becomes increasingly invisible. The artists harness their fleshy approach to human-computer interaction and immersive art to create a world that speaks to feeling states—eliciting dimensions of knowing that imprints a physical memory. *On View* manifests as mixed reality, allowing audience-participants to interact with a virtual world with no virtual layer as they move through the installation's three spaces: Terms & Condition, Stages Gallery, Golden Gallery. While the installation appears to be non-digital, it relies on a ubiquitous network of technology, using TouchDesigner as a mainbrain integrating real-time facial recognition (AI subsets: computer vision & machine learning), voice commands, microprocessor devices/objects, environment-embedded sensors, kinetics, and guest profile generation. The technology is embedded both conceptually and technically into the backdrop of the experience—a critical nod to the misuse of pervasive computing and IoT. Using hyperbole, the piece demonstrates

Holden-Ramage

how small and frequent choices in our daily lives make us extremely vulnerable—like unknowingly training facial recognition systems or clicking 'I agree' to a T&C we never read. *On View* won an ADC Award 2020 for Experiential Design (Digital Experiences/Responsive Environments) and was shortlisted for Lumen Prize 2020 for 3D/interactive.

Artists and technologists: Ania Catherine and Dejha Ti
Curator: Storm Janse van Rensburg
Commissioned by SCAD Museum of Art

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Ania Catherine and **Dejha Ti** (US) are an LA-based experiential artist duo whose practice merges environments, technology, and performance art. Rooted in the understanding that immersion is not only a physical state but also an emotional one, their approach employs nuance in scale, producing a feeling instead of a spectacle. Their expertise collide—Ti's extensive background in immersive art and human-computer interaction, and Catherine an established choreographer, performance artist, and gender scholar—in large-scale conceptual works recognizable for their signature poetic approach to technology.

Project Habitate

Yuning Chan, Tom Hartley, Yishan Qin

STARTS Prize '21
Honorary Mention
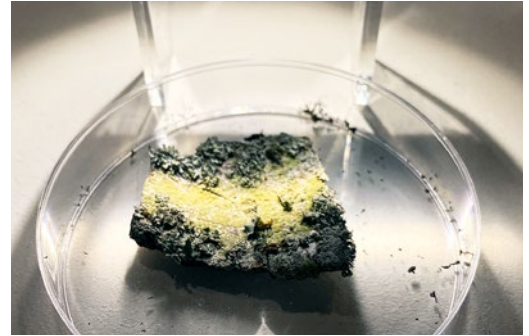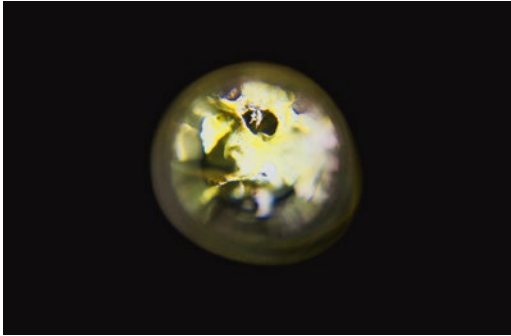
What if humans can be the medium of nature? What if humans can also provide ecological services? *Project Habitate* is a provocation that challenges the anthropocentric perspective of ecological values and cultivates kinship between human and nonhuman organisms.

We designed a living wearable that enables people to become the hosts for endangered organisms, which in return gives them a sense of companionship and belonging, advocating a new concept of participatory conservation.

The background of the project is ash dieback, a disease that is eradicating the majority of the ash tree population in Europe. Fortunately, the ash won't be gone forever, but the new population will take decades to grow. In the intervening years, hundreds of species of moss, lichen, and fungi that depend on the ash are losing their habitat and risk secondary extinction.

Traditional conservation methods for these unassuming species can't cope with this scale of habitat loss. To thrive and reproduce, the species need a specialised habitat and access to a diverse population, normally provided by a forest.

Our material mimics the ash tree's bark texture, light level, porosity, and pH and leverages human movement to support guest species' spore dispersal. The wearable provides a temporary home for these tiny species and allows us to play an active role in maintaining biodiversity and breaking the cycle of conservation and destruction by creating a pattern of human-nature coexistence.

In an era of social distancing, this living wearable can be a vibrant indicator of ecological-social connectivity, reminding us that no species is an island.

Artists: Yuning Chan, Yishan Qin, Tom Hartley
With support from: Royal College of Art, Imperial College London, The James Hutton Institute, Robert Koch Institute, The Millennium Wood

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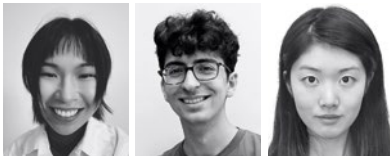
Yuning Chan (CN) comes from an environmental science background and has always been driven by working with nature. She sees design as a powerful tool to influence how people perceive and interact with their environment. She is very much inspired by kin-centric ecology and flat ontology. Her main interest lies in using design fiction to expand imaginations of human-nature coexistences. **Tom Hartley** (GB) is an innovation designer with a drive to tackle complex issues in meaningful and creative ways. His background in Electronic and Information Engineering has lent him deep understanding of the technologies that underpin our lives. This is complemented by a keen familiarity with the design process, gained during his masters degree at the Royal College of Art. **Yishan Qin** (CN). Starting with product design in her bachelor's degree, Yishan then dived into Innovation Design Engineering at the Royal College of Art and Imperial College London. At the same time, she has been pursuing her exploration of UX design and fine art. Yishan really enjoys merging insights from scientific contexts into creative solutions with a can–do mind and curiosity.

The Growing Pavilion
Company New Heroes / Biobased Creations

The Growing Pavilion is an ode to biobased materials. It stands as a necessary and viable solution for reducing the rising impacts of climate change and the use of fossil resources. We show the possibilities and the new aesthetic of biobased materials to trigger a turnaround in thinking and acting. By combining research and art, we brought our vision to life.

The pavilion is made up of five grown core raw materials: wood, residual flows from the agricultural sector, mycelium, bulrush, and cotton. With every material we use, we show the natural raw material as much as possible. We use them in a way to emphasize their own, distinctive identity. In this way, the pavilion acquires a unique, organic texture, color, and experience. Besides showing the beauty and strength in the construction of the pavilion itself, we fill the interior of the pavilion with grown design objects to show how beautiful biobased furniture, lamps, cabinets, and other objects are.

The Growing Pavilion was built on many years of research. We have documented and showcased our research process in different ways, aiming for full transparency. For example, in the Materials Atlas, we share the collection of all materials found and used. Through this, we want to show how far we can currently go, with the ambition to reach fully biobased creations. But also what the near future will bring. However, it takes more than good materials to make large-scale applications possible. Think of sufficient raw materials, appropriate regulations, innovative designers, and open minded consumers. With The Growing Pavilion we also put this conversation on the agenda and facilitate this conversation, because this is essential to achieve the desired change in thinking and doing. The Growing Pavilion could be visited in the beating heart of Dutch Design Week 2019. More than 75,000 people—professionals and daily visitors—visited the pavilion there already.

Design: Pascal Leboucq, Biobased Creations / Company New Heroes
Concept: Pascal Leboucq, Lucas De Man, Biobased Creations / Company New Heroes; Eric Klarenbeek, Klarenbeek & Dros

https://u.aec.at/3F1140F9

Company New Heroes / Biobased Creations. In 2019 Creative Company New Heroes started Biobased Creations to inspire and activate both professionals and the general public through imagination and storytelling about the possibilities, benefits, and beauty of biobased materials. With our installations and stories we want to contribute to the transition to a biobased economy. We stimulate the demand for materials by making people more aware of the quality of biobased materials. We offer designers a platform and stimulate further development to improve the range of biobased materials. The Growing Pavilion was our first major project.

The Living Light
Nova Innova

There is a ground-breaking technology, called Microbial Fuel Cell (MFC) technology. This technology enables us to generate energy from organic waste: from compost to mud, from urine to plants. All organic waste streams are turned into sustainable energy sources thanks to this innovative technology.

MFC technology was included in the European Commission's '100 radical innovation breakthroughs for the future' report in 2019, acknowledging the importance of the development of this sustainable technology. The *Living Light* project is there to give this promising technology the attention it deserves and is the living proof that this technology can already provide us with enough energy to design practical applications.

Up until now MFC technology has been investigated in laboratories all over the world but attempts to implement this promising technology in the real world have been limited. The *Living Light* indoor design lamp and the outdoor park modules are the first light applications making use of this technology to provide you with energy. Microbial Fuel Cells for the *Living Light* collaborate with the naturally occurring microbes in the soil to generate energy. MFC technology is comparable with the solar cell of twenty years ago, standing on the brink of becoming a welcome contribution to the renewable energy mix. *The Living Light* is there to inspire others to develop this technology to the fullest and to tell the story of MFC technology in a magical way.

Before the *Living Light* project, people were skeptical about the use of this sustainable energy source for practical applications. Now our 'Park of Tomorrow'—the *Living Light* Park—and our indoor *Living Light* lamps are the first global example that we can already use this promising technology to light up houses and parks. We want to make sure that the *Living Light* project is just the beginning of this impactful technology to change our energy systems and the way we think about and take care of nature.

With the *Living Light* project we collaborate across industries: design, science, and biology are being combined in order to create the *Living Light.* Credits go to our scientific partner Plant-e, who developed the microbial fuel cell over the past ten years.
Credits go to the Nova Innova team who turned the *Living Light* lamp into a practical and powerful storytelling object: softly stroking the leaves transforms this ordinary plant into a *Living Light.* If you provide the plant of the *Living Light* design lamp with love, you receive love from the plant in terms of light.
Credits go to our early adopters who are there to advise, guide and support us, even when working on an innovation that combines design, nature, and science becomes quite challenging. Credits go to all the professionals and individuals who believe as much in this circular way of creating energy as we do.

https://u.aec.at/B8EB3907

Nova Innova (NL) is a creative start-up based in Rotterdam that combines nature, science, and design to generate crucial, sustainable breakthroughs. There are many interesting things happening in laboratories all over the world, which remain invisible to the general public. The team of Nova Innova aims to bridge the gap between science and everyday life, by developing sustainable applications in the shape of a powerful design. Nova Innova's aim is to inspire others by their collaboration with nature, and to develop important technologies that contribute to clean and sustainable water, air and energy systems with their practical applications.

Nova Innova

The Tides Within Us

Marshmallow Laser Feast, Fraunhofer MEVIS , Natan Sinigaglia

A cross-sectoral project centered on utilizing high-end MR research results, *The Tides Within Us* is an ongoing exploration into the world beyond the limits of our senses at the intersection of art, science, and technology. To create this project, Marshmallow Laser Feast (MLF)—one of the world's leading immersive art collectives—partnered with Fraunhofer Institute for Digital Medicine MEVIS— pioneers in digital transformation of health care. Scientific data sets that peer deep into the human body formed the starting point of this unique and ambitious collaboration. The Institute's expertise in digital medicine and the MR-Lab research has enabled MLF to work with medical data acquired from a modern clinical MR-scanner.

The result is a series of stunning interactive screens that allow the audience to explore the human ecosystem, investigating the flow of oxygen through the cardiovascular system, with cutting edge tracking technology—painting a picture of a
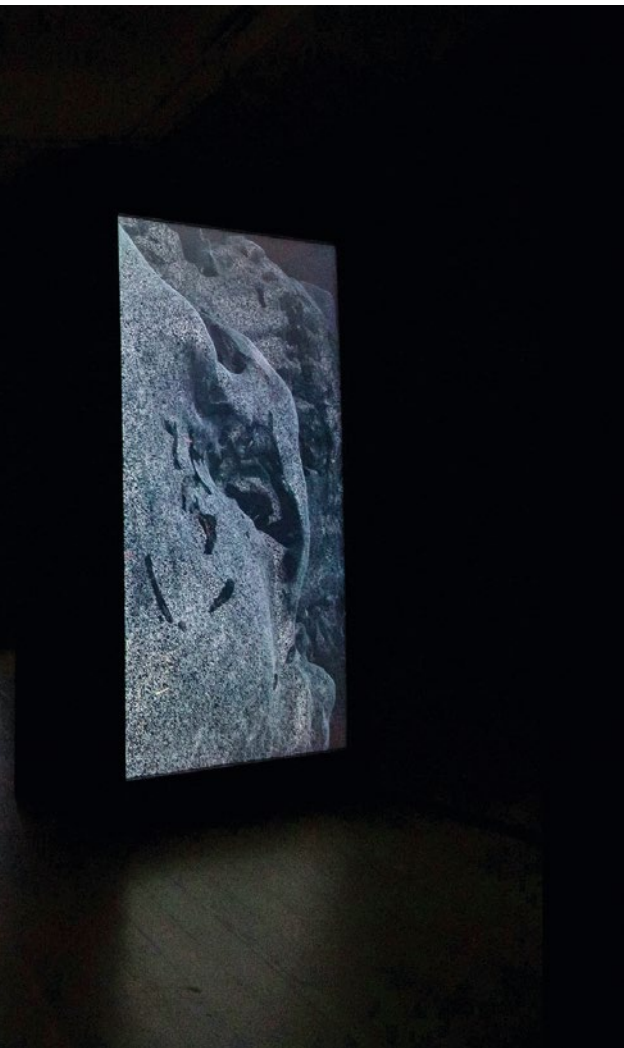
human body as a fluid event. This collaboration has opened new ways of seeing and experiencing our bodies. As immersive technology continues to evolve, offering new platforms for experiential and embodied learning, the potential for this collaboration grows too. The ultimate goal of the project is to change the way people learn and think about themselves in relation to the environment. Where does the human body end, and where does it begin?

The work was first presented as part of the new media art exhibition, Human Nature, which opened at York Art Gallery in October 2020. In the summer of 2021, *The Tides Within Us* will be presented as part of *Observations on Being*—a series of awe-inspiring immersive audio-visual artworks across Coventry's Charterhouse Heritage Park for the UK's Coventry City of Culture 2021, featuring high-profile collaborations with international experts in the fields of music, nature, science, and technology.

Concept: Marshmallow Laser Feast
Directed by: Barnaby Steel, Ersin Han Ersin,
Robin McNicholas
In collaboration with Natan Sinigaglia
Scientific partner: Fraunhofer Institute for Digital
Medicine MEVIS
Co-Commissioned by York Mediale, York Museums Trust
and Coventry City of Culture 2021

https://u.aec.at/FF7DFE9D

Marshmallow Laser Feast (MLF) create immersive experiences, expanding perception and exploring our connection with the natural world. Fusing architectural tools, contemporary imaging techniques, and performance with tactile forms, MLF sculpt spaces that lay dormant until animated by curiosity and exploration. Informed as much by playfulness as research, MLF break the boundaries to worlds beyond our senses. Fraunhofer MEVIS Embedded in a worldwide network of clinical and academic partners, Fraunhofer MEVIS develops real-world software solutions for image and data-supported early detection, diagnosis, and therapy. **Natan Sinigaglia** (IT) is a sound and visual artist based in Varese, Italy. With a strong background in music, contemporary dance, and real-time graphics, he creates canvases where languages lose their boundaries and share forms and meanings.

An Olfactory Biopolitics Nairobi

Coltrane McDowell

An Olfactory Biopolitics Nairobi spans the Netherlands to Kenya, linking these geopolitical locations through the thread of scent. The interaction of scent in public space became a means to examine hidden power structures of inequality, using the case study of my home country, Kenya.

The project gained meaning from numerous collaborations. Interactions with chemists enabled a series of gas chromatograph tests of the atmosphere of Nairobi. Through this experiment I became aware of the illicit industry of alcohol distillation, which acts as a major driver of the informal economy in Kenya. I collaborated with distillers in the community of Mathare to distil essential oils. This culminated in the production of a contraband perfume company that required a steady supply of aromatic materials.

Kenya is a major supplier of flowers to Europe, in particular to the Netherlands. 2020 was the year the global flower industry was hit hard by the economic impacts of COVID-19. I collaborated with the Tambuzi luxury scented rose farm and set up a distillation site. Over several months I was able to salvage some of the economic losses accrued by the pandemic in the form of valuable rose oil that amounted to 70,000 roses distilled, this was the total amount of roses that would be bound for the Netherlands from the farm in a single day.

Social Design Advisor: Henriette Waal
Chromafrica
Tambuzi Farm
Ghetto Foundation
Mathare Social Justice Centre

https://u.aec.at/4985405C

Coltrane McDowell (CA). Designer, artist, and writer, Coltrane McDowell has lived an international life that has informed his ways of seeing places, people, and culture. McDowell's work is preoccupied with context and how the designer's point-of-view can be deconstructed. His projects often take the form of poetic visual stories and are the results of sensitive community engagement. McDowell graduated cum laude from the Social Design course at the Design Academy Eindhoven. McDowell was featured in the Design Indaba Antenna Best Design Graduates of 2020 and nominated for the Gjis Bakker award in Eindhoven. He is currently based in Basel.

STARTS Prize '21
An Olfactory Biopolitics Nairobi

Nomination

Constructing Connectivity

Jessica Smarsch

Gabriele Mariotti

Lisa Klappe

Constructing Connectivity is a person-centered stroke rehabilitation method that addresses the need to quicken and improve recovery, motivate the patient, and provide connection to support systems. It combines 1) a comfortable shirt that captures body movement and 2) an app that inspires creativity, interprets data into visual patterns and written reports, quantifies and tracks progress, and connects the patient to the community. The system incorporates environmental and economic sustainability. It recycles and reuses the technological components of the garment and provides a stylish accompanying shirt that can be worn long past rehabilitation. Healthcare costs are reduced when patients return home sooner. The patient's experience is the most important part of *Constructing Connectivity* and this is reflected in the design sensitivity of all its components. The aim is to improve the rehabilitation experience, and therefore improve therapy adherence. The system blends creativity with goal setting and uses rhythmic multi-sensory stimulation to help create more synaptic connections in the brain (Raymond van Ee, et al. *The Journal of Neuroscience,* September 16, 2009 • 29(37):11641–11649).

https://u.aec.at/9A89640F

Jessica Smarsch (US) is an internationally recognized designer who collaborates cross-sector to bring beauty, creativity and enhanced user experience to technological, scientific and industrial innovations. She is passionate about systemic and disruptive innovation design that enhances well-being, quality of life, user experience, community connection, and circularity. She is inspired by subject-behavior relationships that create mindful experiences in connection with whole-body health and well-being, and she is motivated by the unique outcomes that unexpected collaborations produce.

Extendable Ears
Sheng-Wen Lo

Audio visual installation, documents

While living with friends, I realized 'noise' is subjective: what's music for me may torture others. Likewise, noise is species-dependent: animals including dogs, cats, bats, and insects can hear ultrasound (> 20 KHz) beyond our hearing perception. However, the fact that we cannot hear ultrasound does not prevent us from producing it: we use appliances, tools, and vehicles—the manufactures of which only measure operation noises in 'audible' frequency range.

I wondered—Am I unintentionally producing ultrasound noises that annoy other species?[1] Am I living in ultrasound-rich societies? To find out, I made a wearable device which transforms ultrasound (20~70 KHz) to audible ranges, allowing my ears to register sound frequencies similar to cats'.[2] I decided to wear this device for one month (24/7),[3] feeding ultrasound noise to my ears to see if I would go crazy. Surprisingly, I found myself starting to have bizarre dreams; I recorded them in a diary.

1   Sales, G. D., et al. *Laboratory Animals 22.4* (1988): 369–375.
2   Cats can hear higher-pitched sounds than humans (55Hz–79kHz).
3   In the Netherlands and Taiwan.

https://u.aec.at/8FE21A09

Sheng-Wen Lo

Sheng-Wen Lo (TW) has been investigating the relationships between non-humans and contemporary society, often taking daily experiences as points of departure and playfully engaging with them. As a maker, his practice comprises installations, video games, and escape rooms, as well as still and moving images. He received an MA in Photography from AKV|St.Joost in the Netherlands, and an MSc in Computer Science from the Computer Music Lab at National Taiwan University. Sheng is currently an Artist in Residence at the Rijksakademie (2019-2021) in Amsterdam.

STARTS Prize '21
Extendable Ears

Nomination

Face Lab
Håkan Lidbo

A series of projects exploring the outer limits of how we use our face as an interpreter of our environment—or for the surroundings to find out what is going on in our minds.

A face analyzing a person's emotions, pixelating your real face in real life, bringing your digital avatar into the physical world, becoming a musical instrument, a hat that helps you keep 1,5 meter distance to others—or faces that block human senses and replace them with non-human super senses.

Face projects by Håkan Lidbo, assisted by Simone Giertz, Farzaneh Farkish, Tiziano Leonardi, Sven Olsson, Magnus Frenning, and Mikael Sjosten.

https://u.aec.at/EC25F207

Håkan Lidbo (SE) Following a career in electronic music with more than 350 records released, Hakan Lidbo explores new ideas within interactive art, music, robotics, games, urban planning, and design fiction. He is also the founder of Rumtiden Idea Lab in Stockholm Sweden.

Genetics Gym

Adam Peacock
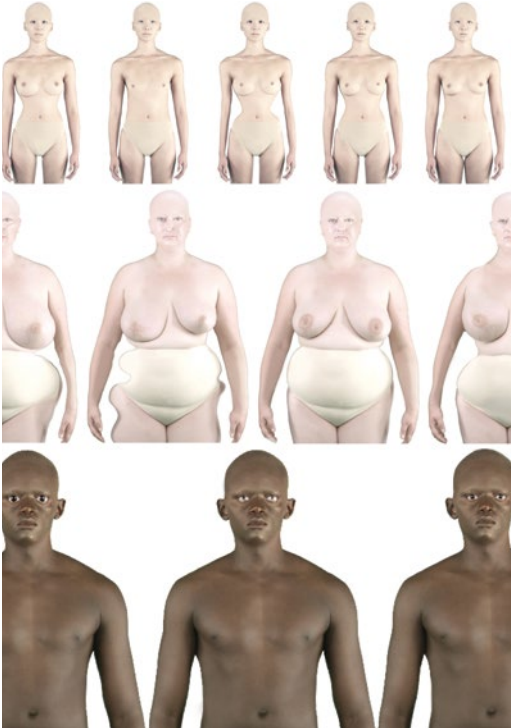
The *Genetics Gym* is an ongoing research project, depicting a calculated fiction of modified bodies, edited with hypothetical new and emerging genetic technologies, allowing in-depth exploration to question how the internet is affecting human behavior. The project, spanning 5 years, is built upon the Darwinian construct that what an evolutionary biologist might term perception of genetic strength, we might term appeal, attraction, or 'sexiness,' now playing out in a vastly complex new media age. The ongoing project is designed to engage varied audiences and perspectives into a multi-layered conversation on the effects of new media today, with emphasis upon queer and marginalized identities, homogenization, and non-binary, observing the link between cognitive perception of genes and visual appeal. The project is built upon Marshall McLuhan's theories on electric circuitry as an extension of the central nervous system, Norbert Wiener's Cybernetic theories, and evolutionary psychology. The initial project outcome was an installation that went on to be toured, exhibited, and published internationally, and has led to Phase II that will take place in Oslo, Norway in summer 2021.

Creative & strategic direction: Adam Peacock
Project management: Fashion Space Gallery Team
Applied psychology consultant: Prof. Carolyn Mair
Genetic technology consultant: Dr. Helen C. O'Neill UCL
Genetic research: Prof. Joyce Harper UCL, Liane Stein, Ashley Campbell
Project assistants: Isabella Branca Gygax, Dian-Jen Lin, Lara Gill, Celia Tang
Makeup artist: Tamara Dickson-Jones
Sound artist: Timothy Wang aka TWANG

https://u.aec.at/4E3905DC

Adam Peacock (UK) is a London-based artist and designer. Adam's practice exists between architecture, consumer psychology, computer science, fine art and body design and seeks to interrogate the reality of human behaviors today. His work has been recognized with awards including the 2018 Robert Garland Treseder Fellowship at Melbourne School of Design, The University of Melbourne (2018), 2016 Designer in Residence at the Fashion Space Gallery at London College of Fashion (2016–17), and Artist in Residence at the Visible Futures Lab at the School of Visual Arts in NYC (2015–16).

John Duff

Glacier's Lament
Jiabao Li

Jiabao Li

Glaciers are sentinels of climate change. They are the most visible evidence of global warming today. This series of works embodies the stunning beauty, rapid change, fragility, and magnificence of glaciers. In *Glacier's Lament,* we used data from glacier melting in the past 60 years to compose music and dance with local musicians who have witnessed the recession of the Mendenhall glacier over their lifetimes. We filmed the artists performing the piece on the glacier, in collaboration with the glacier's own sounds. As glaciers are disappearing, the unique blue is also disappearing. The color in the hanging tube was sampled with melted glacier rivers by the artist from glaciers in Alaska. When one glacier calving happens in the world, one tube falls. At the end of the exhibition, all 60 tubes fell, forming a painting on the canvas beneath. In *Reflect on Glaciers,* we created a one-day-long installation with mirrors reflecting the glaciers from the river that they disappeared into. As if they were saying: "This was me." Placing the mirror on the glacier, facing the lake: "This is my future." They challenge the audience with the dramatic, irreversible ecological damages from climate change.

Glacier's Lament by Jiabao Li
Dance video: Artist and director: Jiabao Li
Team: Cooper Galvin, Ryan Cortes Perez, Anouk Otsea, Lindsay Clark, James Cheng

https://u.aec.at/F7AFC96D

Jiabao Li (CN) works across nature, humans' designed environment, and belief structures and creates works addressing climate change, humane technology, and a just, sustainable future. Her mediums include wearable, robot, AR/VR, projection, performance, and installation. Jiabao's TED Talk reveals how technology frames reality. She is the recipient of numerous awards, including IF, NEA, Fast Company, Core77, and AACYF 30 Under 30. Her work has been exhibited in Ars Electronica, SIGGRAPH, Milan and Dubai Design Week, ISEA, and Donghu Shan Museum. She graduated from Harvard University with Distinction.

In a Small Room
KyungJin Jeong

In a Small Room focuses on two social issues, the first being the problem of poor living conditions in modern metropolitan areas, such as London and Seoul. The demand for housing in large cities, such as London, has greatly increased, but supply has not caught up with demand, a problem that has given rise to a cramped, prison-like residential environment.

The second issue is the dazzling advertising designed to inspire in potential consumers the wish to buy a service. The advertising medium disguises poor living conditions by creating false images to bolster profits. I explore the gap between advertising and reality, producing work intended to have an impact in the real world.

This project uses artificial intelligence, virtual reality, film, a literature review, interviews, and experiments to study how existing images are transformed into visual advertising images. The work has four components: an interactive web application (CycleGAN), films, a VR installation, and a research paper.

https://u.aec.at/E02A01DE

KyungJin Jeong (KR) is a designer, artist, and researcher with an interest in the social concerns people face in daily life. She believes that artists, designers, and researchers can reveal such concerns to the public through their work and offer feasible solutions to them. KyungJin earned a master's degree with distinction in Information Experience Design from the Royal College of Art. She holds dual Bachelor degrees in Media Interaction Design and Convergence Design from Ewha Womans University.

In Event of Moon Disaster

Halsey Burgund, Francesca Panetta

In July 1969, much of the world celebrated the 'giant leap for mankind' of the successful moon landing. Fifty years later, nothing is quite so straightforward. *In Event of Moon Disaster* illustrates the possibilities of deepfake technologies by reimagining this seminal event. What if the Apollo 11 mission had gone wrong and the astronauts had not been able to return home? A contingency speech for this possibility was prepared, but never delivered, by President Nixon—until now.

In Event of Moon Disaster invites you into this alternative history and asks us all to consider how new technologies can bend, redirect, and obfuscate the truth around us. The project has a physical installation as well as an online component. The installation version consists of a 1960s American living room set allowing viewers to step back in time to watch the coverage of the Apollo 11 mission live on a vintage TV. The film journeys from blast off all the way to the moon where something goes terribly wrong and Neil Armstrong and Buzz Aldrin are stranded, prompting President Nixon to deliver the elegiac contingency speech to a mourning world.

The website contains both the film and accompanying educational materials as well as a quiz used to evaluate the effectiveness of the awareness campaign.

Directors: Francesca Panetta,
Halsey Burgund
An MIT Center for Advanced
Virtuality production

https://u.aec.at/FDD20529

Halsey Burgund (US) is a sound artist and technologist whose work focuses on the combination of modern technologies—from mobile phones to artificial intelligence—with fundamentally human 'technologies,' primarily language, music, and the spoken voice. He is the creator of Roundware, the open source contributory audio AR platform, which has been used to create art and educational installations for cultural organizations internationally. Halsey is currently a fellow in the MIT Open Documentary Lab and has formerly held artist research positions in the MIT Media Lab as well as the Smithsonian Institution. **Francesca Panetta** (GB) is an independent artist and storyteller. Formerly, she was a Creative Director in the MIT Center for Advanced Virtuality. As an immersive artist and journalist, she uses emerging technologies to innovate new forms of storytelling that have social impact. Previous to MIT, she worked at *The Guardian* for over a decade where she pioneered new forms of journalism including interactive features, location-based augmented reality, and most recently virtual reality, where she led *The Guardian*'s in-house VR studio. Her works have won critical acclaim—receiving awards around the world.

Lovewear

Ivan Parati, Emanuela Corti, Witsense

Lovewear is smart underwear that helps people of all abilities to self-explore and enhance their own intimacy and sexuality. *Lovewear* wants to empower the wearer through a tactile experience achieved by soft robotics, through the interaction with a connected 'console' pillow. The wearer can hug, cuddle, caress, press this interface as a surrogate for human contact, or just explore its surface as they would explore their own body, facilitating gestures.

One of the main features of *Lovewear* is the integration of soft robotics, inflatable pockets embedded into the garment. A variety of professionals have been involved at different levels.

The co-design phase was supported by a psychologist. A questionnaire was prepared, translated into several languages and distributed. Feedback was collected, and some of the participants joined focus groups. The main objective of the collaboration was to understand how people with disabilities perceive and experience sex toys, their view on the use of new technologies in relation to intimacy, pleasure, and sex, and especially to understand the user needs and scenarios.

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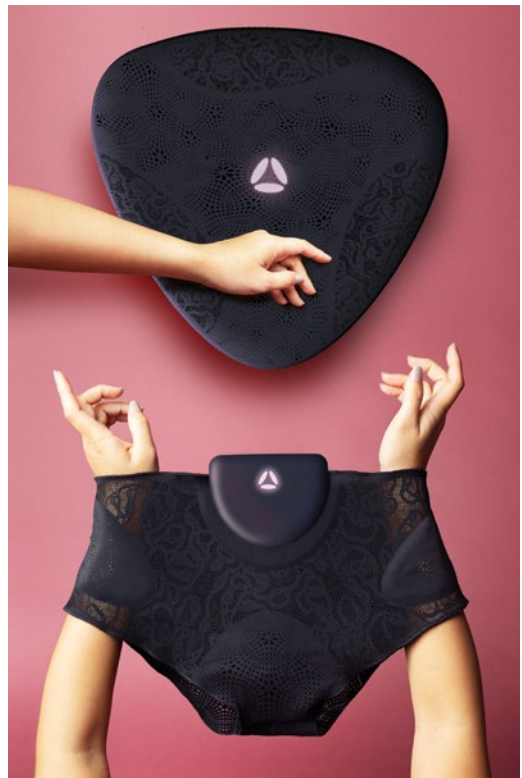
Ivan Parati (IT) is an industrial designer and educator; his research focus on modularity, geometric tessellation, and digital fabrication. His vision on design and innovation is to offer everyone better living conditions, aiming at a cohesive and integrated multicultural society. **Emanuela Corti** (IT) is a researcher, product designer, and educator; her research encourages exploration at the intersection of product design and fashion. She believes in a user-centered approach and sees design as a problem-solving process that has the power to improve lives. In 2017 Emanuela and Ivan co-founded Witsense with Alessia Moltani. They design and manufacture sensible innovative products and services with high technological content such as sensory objects and tools, design elements to improve the lives of people with or without disabilities and promote social inclusion through the application of developmental, behavioral, and learning methodologies.

MycoMythologies
Saša Spačal
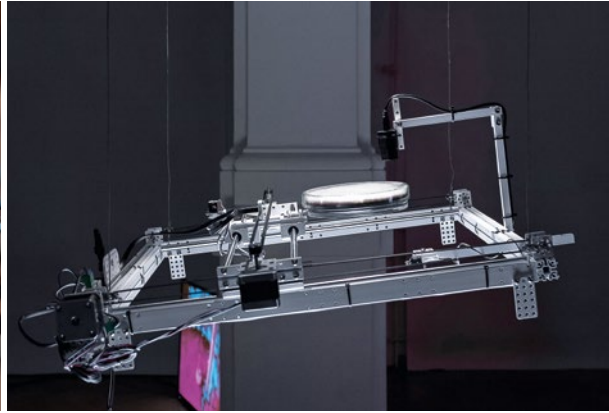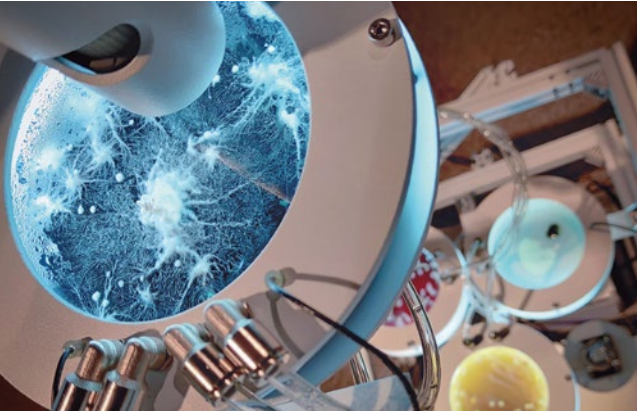
KIBLA Janez Klenovsek

MycoMythologies is a series researching how fungal ontologies could help humans think, learn, and practice multispecies survival through practices of inclusion and caring. As a series of ontogenetic mythological stories and machines it researches the multilayered question of how mushrooms can help humans think about the possibilities of entangled life in capitalist ruins. As a speculative artistic research, *MycoMythologies* thinks not only about how fungal underground networks can inform humans, but also about how technologies define the teachings that humans receive.

The series includes two biotechnological installations: *MycoMythologies: Rupture* and *MycoMythologies: Patterning,* which mark two nodes in the mythological planetary institution of the World Networks Entanglement. The biotechnological installations, together with the accompanying myths, function as storytelling objects, nodes in the World Networks Entanglement, that experience disruptions.

MycoMythologies: Rupture is uttering the need for change erupting in mycocentric networks, a need for different stories and tools that disturb existing looping mythologies.

MycoMythologies: Patterning is an infrastructural node for acceptance of change which braids artist's blood, sweat, and tears into fungal ecology and draws sonified cartographies for the Atlas of Collaborative Contamination.

MycoMythologies: Rupture and Patterning [2020, 2021]
Artist: Saša Spačal
Programming, computer vision: Matic Potočnik
Sound, software design: Pim Boreel
Microbiology: Mirjan Švagelj
Construction: Scenart
Video footage: Tilen Sepič
Mycelium micrographs: Toby Kiers Laboratory [Vrije Universiteit Amsterdam]
Production and support: Projekt Atol, PIF Camp, ACE Kibla, Zone2Source, Ministry of Culture of Republic of Slovenia, Municipality of Ljubljana, Municipality of Maribor, Amsterdams Fonds voor de Kunst [AFK].
MycoMythologies series expresses admiration for the work of Lion's Mane *Hericium erinaceus,* Octavia E. Butler, Oyster mushroom *Pleurotus ostreatus,* and Ursula K. Le Guin.

https://u.aec.at/68718E72

Saša Spačal (SI) researches living systems at the intersection of contemporary and sound art. Her work focuses on entanglements of environment-culture continuum and planetary metabolisms by developing interfaces and relations with soil critters. She addresses the posthuman condition which involves mechanical, digital and organic logic within biopolitics and necropolitics. Her works have been exhibited at venues such as Ars Electronica, National Art Museum of China, Perm Museum of Contemporary Art, and Transmediale. Her works have received awards and nominations at Prix Ars Electronica, Japan Media Art Award, Prix Cube, New Technology Art Award, and New Aesthetica Prize.

Tadey Causevic

Para-optic-8
Anastasia Alekhina

In the functional sense, the fingertips of a person are in numerous ways similar to that of the retina. For example, if the visual perception is impaired, a human being begins to develop a sense of vision with their fingers. Thus, based on skin-kinesthetic sensations, compensation for impaired vision is possible. Intuitively, humanity often linked these two perceptual mechanisms together.

In this sense, an interesting example would be the 'Skin-optical perception'—an alternative (kind of?) vision with the aid of the skin of the hands. In the second half of the 20th century in the USSR, a number of works were published in which researchers tried to detect the existence of special light—or heat—sensitive skin receptors. During the Cold War, interest in the parapsychic capabilities of the human mind mainly came from the military. However, no reliable data has been found that would favor these hypotheses. It is interesting to take this further and use technology to forcefully assign a physiological relationship between the retina and the fingertips.

The *Para-optic 8* project offers a visual experience that literally reproduces the idea of vision through fingers. First, you need to go through fingerprinting, scan a fingerprint and, in accordance with the scan, visual abilities will be assigned. Then you need to put a special device on your eyes and hands.

The work was created especially for the I.P. Pavlov Institute of Physiology of the Russian Academy of Sciences, within the framework of the art&science project *New Anthropology.*

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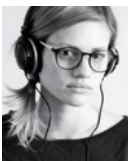
Anastasia Alekhina (RU), born 1989, is an interdisciplinary artist and teacher, working in the technological genres of art. Graduated from The Rodchenko Art School (Moscow) in photography and multimedia (Faculty of Interactive, Communicative and Mixed Media, 2015). Participant in Russian and international exhibitions and festivals. Based in Moscow. Through artistic practices Alekhina explores the aesthetic and existential issues of contemporaneity, human identity, the future of wearable devices, and corporeality. She works with sound in experimental directions, using self-made analog instruments, computer algorithms, and 'found sounds.'

Shapes and Ladders:
Battles of Bias and Bureaucracy

Ani Liu, Michelle Lim, John Ahloy, Andrea Li

Shapes and Ladders is a video game that shows how systemic racism and sexism can exist through the metaphor of climbing a career ladder. Players can play as a circle, square, or triangle, for which game mechanics have been designed to reflect real life inequalities different populations face. For example, a circle is more likely to encounter work-place sexual assault, has access to fewer coins, and performs a second shift in childcare. Some shapes are more likely to contract COVID or have a deadly encounter with the police. All the while, players must find health insurance, earn enough coins to maintain quality of life, and pay off student loans. Players do not choose their shape—they are born into it. The video game is designed to allow players to cultivate empathy through a first person simulation of structural inequality. It is my hope that these insights can inspire players to spark change in real life.
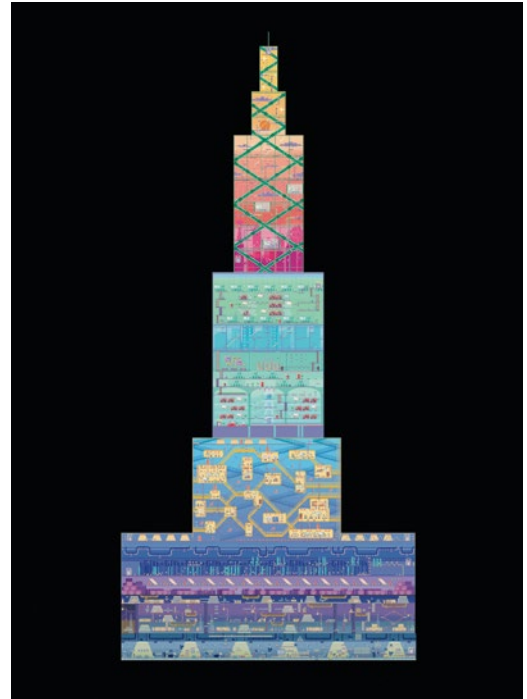
Creator: Ani Liu
Art director: Andrea Li
Art director: Michelle Lim
Technical director: John Ahloy
Intern: Anoushka Mariwala

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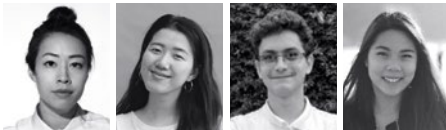
Ani Liu (US) is a research-based artist working at the intersection of art & science. Her work examines the reciprocal relationships between science, technology, and their influence on human sub-jectivity, culture, and identity. In her project-oriented practice, each work involves a deep dive into a new body of research, result-ing in new modalities of thinking and making. Reoccurring themes in her work include gender politics, biopolitics, labor, nostalgia, and sexuality. **Michelle Lim** (MY) is an experiential designer based in London that co-founded liim studio with Andrea Li. Together, they design engaging online and offline experiences that bring people together in the present. **John Ahloy** (TT) is a student at Princeton studying mathematics and computer science. He is a hobbyist game developer that has worked on personal projects for over 4 years. **Andrea Li** (HK) is an experiential designer based in London that co-founded liim studio with Michelle Lim. Together, they design engaging online and offline experiences that bring people together in the present.

Silencing The Virus

Lily Hunter Green

Zoe Coldham

Silencing The Virus is an immersive Sci Art installation that mixes a virtual virus environment with performance, science, ecology, and digital arts. It has two key objectives. One, to raise awareness of the decline in global honeybee populations and the impact on human societies. Two, to examine the intricate social systems of the honeybee; how the hive works as a collective to repel aggressors, specifically viruses, and what can be learnt from their social immunity mechanisms. One of the major causes of the decline in honeybee populations is disease. This includes the Israeli Acute Paralysis Virus (IAPV): an RNA virus that leaves honeybees paralyzed and that can result in the death of entire colonies. Drawing on research by molecular scientist Dr Maori (Cambridge University), *Silencing*

The Virus mimics the spread of IAPV via an interactive sound installation or collective listening experience: an LED visualization of a digital honeycomb and music composition both infected with a converted sample of the virus' genome. As participants orbit and infect the virtual hive, it becomes apparent that only by working as a collective, akin to the honeybees, will they be able to *Silence The Virus.*

Artist: Lily Hunter Green
Collaborators: Karun Matharu,
Dr Eyal Maori, and Tom Moore
With support from Arts Council
England

https://u.aec.at/BE42B35A

Lily Hunter Green (GB) is an interactive design artist. She has extensive experience making multi-component immersive works based on the science of the hive under the banner of *BEE COMPOSED:* an interdisciplinary more-than-human 'hive' project that uses digital media, coding, and performance to communicate rapidly changing ecologies, and humans' role in that process. An Associate Research Fellow at Birkbeck College (London) and an Artist-in-Residence at the Maori Lab, Cambridge University, Lily's work has been exhibited nationally and internationally.

So far the Skies are silent.
Quadrature

A series of audiovisual performances for radio telescopes and artificial intelligence

What happens if artificial intelligences try to find an answer to one of the oldest mysteries of mankind? Combining data from (self-built) radio telescopes with various A.I. trained on human communication and aesthetics, a series of audiovisual performances and installations emerged, revolving around the ultimate question: Are we alone in the universe?

Using electromagnetic radio waves from the universe as input data for audio-based neural networks, the works create the utmost alien—a fusion of artificial intelligence and outer space. The various formats, with and without human performer, investigate different aspects of the same notions: How do contemporary methods of data handling respond to these extraterrestrial frequencies? Will neural networks recognize familiar elements in these archaic, foreign frequencies? Can they find meaning within the noise of the universe?

The process of searching for significance, for patterns, and for rhythms is at the core of the works, in all its original uncensored A.I. beauty, with all its potential promises and flaws. Unfortunately the only reliable training data for intelligent communication systems stems from human civilizations...

https://u.aec.at/85967DD0

Quadrature (DE), a Berlin-based duo, understands technology as a means to read and write realities, with data as their main material. Various art and science collaborations have led the two members Juliane Götz and Sebastian Neitsch further and further into outer space, fusing the objective views of science with their very own subjective truth as artists. Their latest series of artworks was realized with Christian Losert, sound artist, composer, and creative technologist, and Sebastian Müllauer, a creator working at the intersection of design, art, technology, and nature.

Symbiosia
Thijs Biersteker
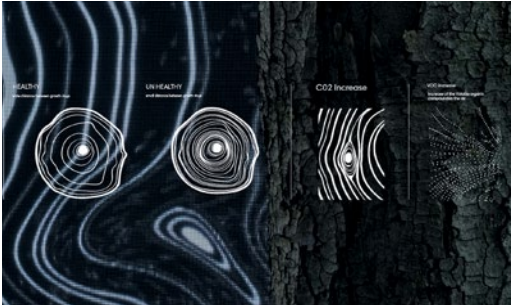
Plant Neurobiologist Stefano Mancuso and artist Thijs Biersteker created an artwork that uncovers the invisible tree-to-tree communication in real time to start a conversation about the effects of climate change. With a series of sensors attached to two living trees, *Symbiosia* creates a generative animation of the growth patterns of the two trees. The volatile organic compound measurements indicate the increase of warning signals in the communication between the trees as their surroundings change. When watching the trees grow and 'talk' to each other, the work hopes to start a conversation about the real-time impact of environmental changes, like climate change and pollution, on nature. Next to this, sensors capture the light spectrum, soil moist, rain, dendrometer, and other weather data. This is combined in an algorithm that uses 12,000 data points to create one single tree growth-ring every second, instead of every year. The distance between the rings, every bending curve, every sprouting knot, reveals how the tree was reacting in real time to the changes in its environment—uncovering the hidden liveliness of trees and the environmental impact we have on nature on a daily basis.

Symbiosia, 2019, by Thijs Biersteker in collaboration with Professor Stefano Mancuso

https://u.aec.at/9055E68E

Ecological artist **Thijs Biersteker** (NL) creates interactive awareness installations about the world's most pressing environmental issues. In his work he fluidly merges scientific research with esthetics to deliver an empowering experience on topics like climate change, ecosystems, air pollution, ocean plastics, and biodiversity loss. His collaborations with top scientists and universities around the world lead to a fluid mixture of data, sensors, living trees, kinetic motion, big data visualization, and recycled plastics that make people feel the facts again. Next to creating art in his Woven Studio, Biersteker holds a teaching position at Delft University of Technology (NL) and a Fellowship at VU University Amsterdam. His work can be found in museums around the world and in documentaries. In his TED talk he speaks about the urgent need for science and art to come together in times of climate crisis.

The [Uncertain] Four Seasons
Tim Devine

In 2019 we set about reflecting the effects of global warming to date in Vivaldi's *Four Seasons,* using historical data to inform a musical system that transposed climate changes upon the original score. The result was the *Four Seasons,* which was performed by the NDR Elbphilharmonie Orchestra, led by conductor Alan Gilbert.

In 2020, working with the Monash Climate Change Communications Research Hub, we developed a series of new variations of the composition. This time, we situated Vivaldi's score in the future, using Shared Socioeconomic Pathways (SSPs) data from the UN's latest Intergovernmental Panel on Climate Change report to project future climate outcomes in a worst-case climate future.

Using geospatial data, we created unique and wildly different variations for every orchestra on the planet. The result is nearly 1,000 new versions of *The Four Seasons,* which form a collection that we call *The [Uncertain] Four Seasons.*

The Sydney variation of *The [Uncertain] Four Seasons* was performed in January 2021 by the Sydney Symphony Orchestra, led by concertmaster Andrew Haveron. It was a great success and featured in the scientific journal *Nature.*

The [Uncertain] Four Seasons by: Tim Devine, Joachim Kortlepel, Adam Grant, Gerard Mason, Melanie Huang, Dr. Jaehyun Shin, Dr. James Goldie, and Assoc. Professor David Holmes
With support from: AKQA, Sydney Symphony Orchestra, Jung von Matt, NDR Elbphilharmonie Orchestra, Kling Klang Klong, Monash Climate Change Communications Research Hub

https://u.aec.at/C91EF4C2

La Primavera
I. Allegro

Festive Spring has arrived,
The birds salute it with their happy song.
And the brooks, caressed by little Zephyrs,
Flow with a sweet murmur.
The sky is covered with a black mantle,
And thunder, and lightning, announce a storm.
When they are silent, the birds
Return to sing their lovely song.

Yaya Stempler

Tim Devine (AU), **Adam Grant** (AU), **Gerard Mason** (AU), **Mel Huang** (AU), **Hugh Crosthwaite** (AU), **Dr. Jaehyun Shin** (KR), **Joachim Kortlepel** (DE), **Assoc. Professor David Holmes** (AU) collaborated to bring this work to the world. They are a collective of designers, developers, scientists, and composers.

The Cleanroom Paradox

Felix Lenz, Angela Neubauer, Eszter Zwickl
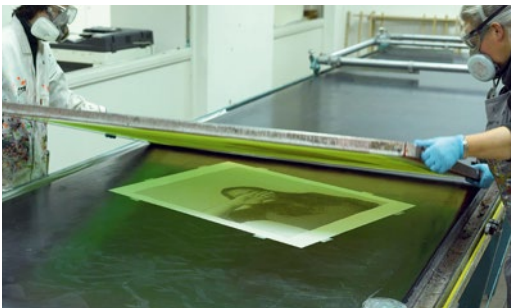
Dismantling the deceptively pristine image of the high-tech industry, *The Cleanroom Paradox* unveils the systemic suppression of information on occupational and toxic hazards at semiconductor production sites. A gradually disintegrating, screen-printed photograph of former Samsung factory worker Jin and a video documenting its creation are being superimposed with her and other industry experts' stories of inadequate health measures at work. Jin was diagnosed with kidney cancer. Interweaving stories and fibers, the used ink is corrosive and made of chemically dissolved smartphones. Analogous to the industry's etching processes, the ink will disintegrate the print over time, skinning a surface to reveal Jin's story, which is already inscribed in the lower layers. The toxicity hidden behind the many steps in semiconductor manufacturing and the effect of the labor necessary to shape our high-tech products shifts focus towards the middle-west.

Jin's fate is not an isolated case but one of many that can be traced far across the industry.

A project by: Felix Lenz, Angela Neubauer, Eszter Zwickl
Produced at and supported by: Design Investigations (ID2) University of Applied Arts Vienna

https://u.aec.at/DD5AA933

Felix Lenz (AT) is a research-led artist, designer, and filmmaker based in Vienna. His work analytically explores geopolitical, ecological, and technological matters and can be found at *https://felixlenz.at*. **Angela Neubauer** (AT) is a young Viennese creative, exploring her interests in social and natural sciences through her artistic work. She is currently studying at the University of Applied Arts Vienna. **Eszter Noémi Zwickl** (HU) mostly focuses on social and cultural issues through art and design. Her writings, drawings, and designs have been exhibited in Labor Galerie (Budapest).

TheirTube

Tomo Kihara
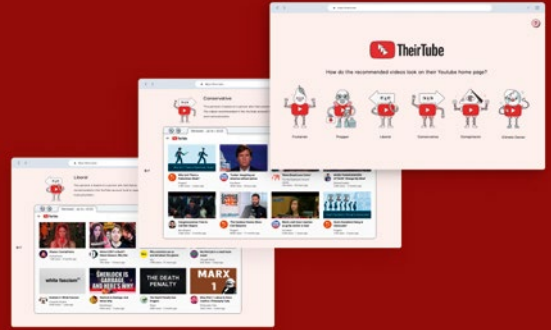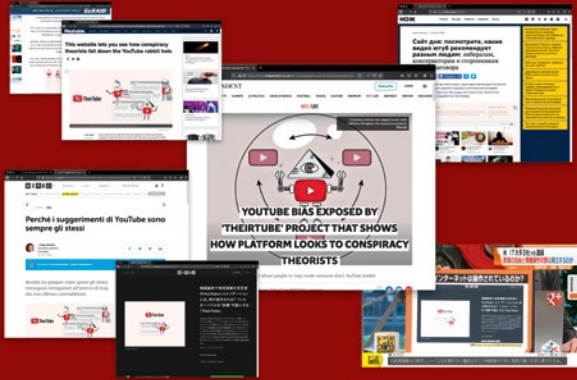
TheirTube is an open-source web service that provides a look into how videos are recommended on other people's YouTube. Users can experience how the YouTube starting page would look for six different personas: Conspiracist, Climate Denier, Conservative, Liberal, Prepper, and Fruitarian.

On an average day, people around the world watch one billion hours of video on YouTube. 70% of these videos are recommended by an AI, making every YouTube experience unique. By offering a tool to understand what the other recommendation bubbles look like, *TheirTube* shows how YouTube's recommendations can drastically shape someone's experience on the platform and, as a result, shape their worldview.

Each of these *TheirTube* personas is informed by interviews with real YouTube users who experienced similar recommendation bubbles. Six YouTube accounts were created in order to simulate the interviewees' experiences. These accounts subscribe to the channels that the interviewees followed and watches videos from these channels to reproduce a similar viewing history and a recommendation bubble. The code is open source meaning, anyone can make their own version of *TheirTube.*

Concept, design, development: Tomo Kihara
Character illustration: Polina Alexeenko
With support from Mozilla Foundation

https://u.aec.at/EE4DB156

Tomo Kihara (JP/NL) works at the intersection of play, technology, and society, as a researcher, designer, and developer. He uses code as a medium to create playful interventions that provide a new perspective on complex socio-technical problems. Tomo holds an MSc in Interaction Design from TU Delft (NL). He has collaborated with organizations like Waag and Mozilla Foundation on several design projects that have been exhibited at places like the Red Dot Design Museum in Xiamen and the Victoria & Albert Museum in London.

S+T+ARTS PRIZE '21 Jury 2021

All nominations are judged by a jury to decide on the two prize-winning projects and up to ten Honorary Mentions.

Alexandra Deschamps-Sonsino (GB) is an Internet of things author, consultant, public speaker, and entrepreneur with a background in industrial and interaction design. She wrote *Smarter Homes: how technology will change your home life* and *Creating a Culture of Innovation* (Apress, 2018-2020), was the first UK distributor of the Arduino and is the founder of the Good Night Lamp, which is in the permanent collection of the London Design Museum. She was named 1st in a list of 100 Internet of Things Influencers (Postscapes, 2016) and 2nd in Top 100 Internet of Things Thought Leaders (Onalytica, 2014).

Nicola Triscott (GB) PhD is a curator, researcher and writer, specializing in the intersections between art, science, technology and society. Since 2019, Nicola has been Director/CEO of FACT (Centre for Film, Art & Creative Technology) in Liverpool, UK, where she curated the exhibition And Say the Animal Responded? in 2020. Previously, she was the founding Artistic Director/CEO of Arts Catalyst (from 1994 to 2019) and Principal Research Fellow at University of Westminster (2017-19). Over 25 years Nicola has built Arts Catalyst into one of the UK's most distinctive and respected art and research organizations, distinguished by ambitious artists' commissions, including notable projects by Tomás Saraceno, Otolith Group, Ashok Sukumaran, Marko Peljhan, Ariel Guzik, and Critical Art Ensemble. Nicola lectures and publishes internationally.

Alexander Mankowsky (DE), born 1957 in Berlin, studied Social Science, Philosophy and Psychology at Freie Universität Berlin. In 1989 he started working in the Daimler research institute in Berlin. The multidisciplinary approach in the institute integrated a wide array of disciplines, from social sciences to artificial intelligence. His current working topics are Futures Studies, focusing on the ever-changing culture of mobility, the interdependency of social and technological innovation, and other aspects of envisioning paths into the future.

Francesca Bria (IT) is the President of the Italian National Innovation Fund and Honorary Professor at the UCL Institute for Innovation and Public Purpose in London. She is Senior Adviser to the United Nations Human Settlements Programme (UN-Habitat) on digital cities and digital rights. Francesca Bria is leading the *DECODE* project on data sovereignty in Europe and is a member of the European Commission high level expert group, Economic and Societal Impact of Research and Innovation (ESIR). Francesca has a PhD in Innovation and Entrepreneurship from Imperial College London and an MSc in Digital Economy from Birbeck, University of London. She has been teaching in several universities in the UK and Italy and she has advised governments and public and private organizations on technology and innovation policy and its socio-economic and environmental impact.

Fumi Yamazaki (JP), Senior Marketing Manager, APAC, Niantic Japan. Fumi joined Niantic in February 2018, working on marketing for Ingress, Pokémon GO, and Harry Potter: Wizards Unite, and Niantic Developer Platform in the APAC market. In 2010 she joined Google as Developer Relations country lead for Japan, then joined Google Social Impact team working on Google Crisis Response helping the community hit by natural disasters, and Civic Innovation working with the citizens to make society a better place using technology, then moved to Google Advanced Technology and Projects team working on Project Soli creating radar-based gesture sensors and Project Jacquard developing interactive textile using conductive yarn, as program manager and developer relations manager. Prior to joining Google, she worked on corporate sales at Nippon Telegraph and Telephone Corporation (NTT), Internet marketing research at Interscope, marketing, event management, new business development and investment at Digital Garage, DG Incubation, and Technorati Japan.

S+T+ARTS PRIZE '21 International Advisors

The advisors are renowned international consultants with expertise in this field. They recommend projects and encourage a wide range of potential participants to submit proposals. In addition, they ensure a balance in terms of gender and geographical origin of the participants.

Amanda Masha Caminals (ES) is co-director and curator of the Mutant Institute of Environmental Narratives (IMNA), the laboratory of Matadero Madrid that fosters artistic practices in connection with journalism, science, and technology as a response to the challenges of the climate crisis. Previous to that she directed the CITY STATION of the Environmental Health Clinic by artist Natalie Jeremijenko at the Centre for Contemporary Culture of Barcelona (CCCB). She is founder of the organization Translocalia, a network of artists, curators, and designers to plan for the future through art. She holds a BA in Humanities, a degree in History of Art and an MA Hons in Curating Contemporary Art from the Royal College of Art in London.

Andy Cotgreave (UK) is co-author of *The Big Book of Dashboards,* and Technical Evangelist at Tableau. He is the host of *If Data Could Talk,* co-host of *Chart Chat* and columnist for *Information Age.* He is also on the 2021 DataIQ 100 most influential people in data. With over 15 years' experience in the industry, he has inspired thousands of people with technical advice and ideas on how to identify trends in visual analytics and develop their own data-discovery skills. Keep in touch with Andy by subscribing to his Sweet Spot newsletter with curated stories of how data intersects with the world, or follow him on Twitter and LinkedIn.

Jennifer Heier (DE) is an Industrial Designer at heart who specializes in User and Customer Research. She studied Industrial Design in Darmstadt (Diploma), did her Bachelor of Arts in San Francisco and her Master of Science in User Research in Edinburgh. She loves to work in a diverse and cross-disciplinary team close to new technology topics, contributing her passion for human-centric-innovation and continuously questioning the status quo. She is currently working at Siemens Digital Industries data lab as Head of UX driven AI, bringing the human factor into the B2B context. Besides, she is working on her PhD at Bauhaus University in Weimar, investigating how the creative community should and could positively influence AI development. She believes in the power of her profession to contribute and add value to the challenges, as well as opportunities, of the digital age.

Nana Radenković (RS) is one of the co-founders of Nova Iskra, where she focuses on creating mentoring programs, trainings and workshops for individuals, organizations and companies interested in taking an active role in the processes of transformation—not only of their projects and businesses but also through the creation of new ways in which we could learn, live, and work in the future. She holds an MA in Management in Culture, Interculturalism and Mediation in the Balkans from the University of the Arts Belgrade, and has extensive experience in working in the private, public, and civil sectors. She is a professor at the Faculty of Media and Communications in Belgrade, and a mentor within the Nelt Educational Program and Creative Mentorship.

Lining Yao (CN) Lining Yao is an Assistant Professor of Human-Computer Interaction Institute (HCII) at Carnegie Mellon University, School of Computer Science, directing the Morphing Matter Lab *(https://morphingmatter.cs.cmu.edu).* Morphing Matter Lab develops materials, tools, and applications of adaptive, dynamic, and intelligent morphing matter from nano to macro scales. Research often combines material science, computational fabrication, and creative art and design practices. Lining and her lab work anti-disciplinarily, publishing and exhibiting across science, engineering, design and art. Lining gained her PhD at MIT Media Lab in 2017.

Fiona Zisch (AT), architect and experimental psychologist with experience in film production design and designing for extreme environments. Fiona Zisch researches the cognition, experience, and reciprocity of architectural space, bodies, and movement. She works between the Institute of Behavioural Neuroscience at UCL and the Bartlett School of Architecture. She also teaches undergraduate Experimental Psychology at UCL. Fiona speaks at and organizes international architecture and neuroscience conferences and festivals, has collaborated on a number of multidisciplinary research projects, and acts as a consultant for architecture and technology companies. She has published papers and book chapters in an array of research fields.

Patrick van der Smagt (NL) is director of AI research at Volkswagen Group, and leads its Machine Learning Research Lab in Munich *(argmax.ai).* The lab focuses on probabilistic deep learning for time series modeling, optimal control, robotics, and quantum machine learning. He is also a faculty member of the LMU Graduate School of Systemic Neurosciences and research professor at Eötvös Loránd University Budapest. He is the founding head of a European industry initiative on certification of ethics in AI applications (etami). Patrick previously directed a lab as professor for machine learning and biomimetic robotics at the Technical University of Munich, while leading the machine learning group at the research institute fortiss. He founded and headed the Assistive Robotics and Bionics Lab at the DLR Oberpfaffenhofen. Ages ago he did his PhD and MSc at Amsterdam's universities on neural networks in robotics and vision. Besides publishing numerous papers and patents on machine learning, robotics, and motor control, he has won a number of awards, including the 2013 Helmholtz-Association Erwin Schrödinger Award, the 2014 King-Sun Fu Memorial Award, the 2013 Harvard Medical School/MGH Martin Research Prize, and best-paper awards at machine learning and robotics conferences and journals. He was founding chairman of a non-for-profit organization for Assistive Robotics for tetraplegics and co-founder of various tech companies.

ARS ELECTRONICA 2021
Festival for Art, Technology & Society

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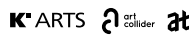
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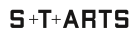
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