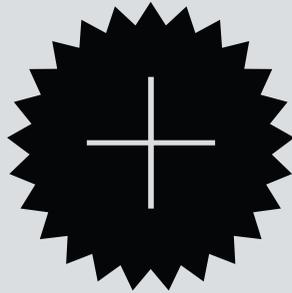


S + T + ARTS



A Journey into
a New Culture
of Collaborations

Prize 2016-20

S+T+ARTS Prize 16-20



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A Journey into a New Culture of Collaborations

Imprint

S+T+ARTS Prize 16–20
A Journey into a New Culture of Collaborations

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

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Contents

- 7 Preface
- 9 Five Years of S+T+ARTS Prize
- 12 **A Theory of Change**
S+T+ARTS Prize, Evaluation 2017–2019
Anne Nigten
- 28 **S+T+ARTS Prize'16**
Jury Statement
In Search of a New Landscape and Mindset
- 38 **S+T+ARTS Prize'17**
Jury Statement
Earth to Space: Blue Future
- 50 **S+T+ARTS Prize'18**
Jury Statement
Anticipatory Art Sci Futurists
- 62 **S+T+ARTS Prize'19**
Jury Statement
Poesis into Praxis: Hybrid Creative Activisms
- 74 **S+T+ARTS Prize'20**
Jury Statement
Reimagining Growth and Decay:
Artistic Research in Service of the Circular Economy
- 88 **S+T+ARTS Prize**
at a Glance

Preface

Five years ago, the European Commission set up, in its Directorate General for Communication Networks, Content and Technology, the S+T+ARTS program—innovation at the nexus of Science, Technology and the ARTS. This program has the ambition to promote art-driven innovation in technology by immersing artists into R&D teams in industry and academia. It has various strands, among them, the STARTS Prize that has become the crown jewel of the STARTS program.

In its first five years of existence, the STARTS Prize has honored many inspiring collaborations between artists and engineers that gave precious insights into how artistic thinking can become part of technology development and help design tomorrow's technologies based on appreciation of human values and the environment. The arts can help make technology more human-centered and develop novel forms of interaction between humans and machines. STARTS Prizewinners and nominees have pushed the limits of engineering with unconventional methods, as with *ROCKPRINT* or *Amsterdam's 3D Printed Steel Bridge*, that have opened new venues for material engineering. Often, they have launched reflections on technology, in particular on Artificial Intelligence, such as *Anatomy of an AI system* that critically explores the whole value chain of voice-assistant devices and their social and environmental consequences.

I am more convinced than ever that a European approach to digital innovation must be rooted in our strength in the arts and in culture. In its next five years, the STARTS Prize will continue to shed light on many new collaborations between the art and the digital, collaborations that will help shape new living and working conditions in a post-COVID-19 world.

Roberto Viola

Director General of Communications Networks,
Content and Technology, European Commission



Residencies: *BigTorrent*, Liledesmorts, Benjamin Nuel; photo: Bipolar



Re-FREAM: *Marinero*, Jef Montes; photo: Jef Montes



Re-FREAM: *Constructing Connectivity*, Jessica Smarsch; photo: Jessica Smarsch



Re-FREAM: *Leather for Vegetarians*, Fabio Molinas; photo: Fabio Molinas



Mindspaces: *Latent Being*; Refik Anadol, 2019. LAS Light Art Space at Kraftwerk Berlin; photo: Camille Blake. Courtesy of LAS.

Five Years of S+T+ARTS Prize

We are living with an unprecedented level of interconnection and interdependence on a global scale. As the business world rapidly changes and grows more complex, creativity and innovation have become key resources for societal and economic development.¹ Not only has our interconnectedness brought us new forms of media, linked closely to technological trends, it has also significantly impacted the role of their users, who have gone from being mostly consumers to becoming active producers, actors, prescribers, and influencers.

STARTS is an initiative of the European Commission to foster alliances in technology, science, and artistic practice that effectively implement European policymaking to nurture innovation and benefit the art world. Science, Technology and the Arts (STARTS) limn a nexus where observers have identified extraordinarily high innovative potential. And innovation is precisely what's called for if we're to master the social, ecological, and economic challenges Europe is facing.

There are five pillars to the STARTS Ecosystem:

- **STARTS Prize** is issuing open calls to highlight collaborations at the intersection of science and technology with the arts.
- The **Regional STARTS Centers** intend to expand the STARTS initiative on a local level towards a number of European regions.
- **STARTS Residencies** fund longer-term artist residencies in technology. 45 residencies have been/are being supported between 2017 and 2020.
- **STARTS Lighthouse Pilots** are projects tackling concrete challenges in industry and society by operationally including artists in them. Two new projects were started in 2019: **MindSpaces** (for more emotionally attractive urban design), and **Re-FREAM** (for the artistic exploration of technologies in fashion).
- **STARTS Academy** unites scientists, engineers, and artists to teach digital skills to citizens in a playful way.

STARTS Prize

The STARTS Prize initiative focuses on the most forward looking collaborations at the crossroads of art, science, media, technology, industry, and society. It showcases achievements, honors the inspiring individuals and teams behind them, and encourages further collaboration. Art is assigned the role of a catalyst that propagates scientific and technological knowledge and skills among the general public, while triggering innovative processes. Accordingly, the STARTS Prize emphasizes, on the one hand, artistic works that influence or change the way we look at ICT & media technology, and, on the other, very promising forms of collaboration between the science & technology sectors and the world of art and culture.

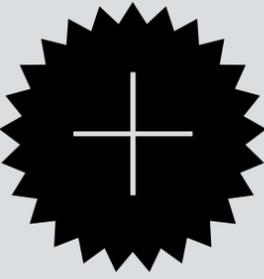
From 2016 to 2020, Ars Electronica, BOZAR and Waag conceptualized and organized the STARTS Prize of the European Commission with great success. Having linked the Prize to the annually held Prix Ars Electronica, the world's most prestigious media arts competition, guaranteed more than 2,000 annual submissions and a diverse and outstanding spectrum of STARTS Prize winners. Strong community activation measures, more than 70 highly visible dissemination events and extensive communication have built a STARTS Prize brand, perceived to be the strongest in the STARTS field. Strong community activation measures, more than 70 highly visible dissemination events and extensive communication have built a STARTS Prize brand, perceived to be the strongest in the STARTS field.

As an overview of these first STARTS Prize years, this brochure assembles a study of STARTS Prize projects following their selection, with short overviews of almost 150 projects honored, comprising the 10 Grand Prizes, Honorary Mentions, and Nominations by our esteemed STARTS Prize juries, including the statements given by each jury on their decision.

¹ Sandberg, B. 'Art Hacking for Business Innovation: An Exploratory Case Study on Applied Artistic Strategies.' J. Open Innov. Technol. Mark. Complex. 2019, 5, 20.



S+T+ARTS

Prize 

Evaluation

2017-2019

A Theory of Change

S+T+ARTS Prize, Evaluation 2017–2019

Anne Nigten

The STARTS Prize is an annual European prize for innovative projects at the interface of Science, Technology, and the ARTS. This article reflects on the most striking outcomes of a study that was conducted in the spring of 2020, to evaluate the first three STARTS Prize editions. The STARTS Prize aims to promote art as a catalyst for change and innovation in the fields of technology, science and the social sphere. It has mobilized an impressive number of artists, designers and engineers and built a strong brand in recent years. This study was conducted to reflect upon its results so far, as the prize's first life cycle has come to an end.

This article has three distinct sections: The first part deals with the design of the study and the STARTS Prize premise. After this more or less formal part, it continues with the findings and insights from the study. The last part summarizes the indicators, offers some concluding thoughts and presents the most common recommendations from STARTS Prize winners.

Design of the Study

This qualitative study was conducted as an alternative to a formal quantitative impact study. The study comprised a compact literature study (previous ICT ART Connect research reports and other relevant literature from the field, STARTS and STARTS Prize web texts, jury statements), a survey (questionnaire) of winners, honorary mentions, and nominees of the STARTS Prize 2017, 2018, and 2019. The questionnaire contained closed and open questions. This was followed up by an in-depth assessment through conversational interviews with a representative selection of STARTS Prize winners, honorary mentions, and nominees (referred to in short hereafter as STARTS Prize winners). One could say that the premise of the STARTS Prize served as a *Theory of Change*, the STARTS Prize as its intervention, and the key findings from the previous ICT ART Connect research reports as indicators to assess this *Theory of Change*.

The study reflects a multi stakeholders' view by combining literature studies, jury reports, statements and questionnaires, and interviews. The questionnaires addressed, among other things, the correlation between the intervention and its immediate results. It should be noted that it was virtually impossible to assess the long-term results as the prize is relatively new, so there are mainly short-term or immediate results available so far. Furthermore, there was no base line measure available. To compensate for this, the open questions and the interviews provided space for respondents to question, expand on, or give new meaning to the STARTS Prize as an intervention, as well as to its indicators. This study uses indicators to inform us about the relevance of the prize today. Furthermore, the interviewees brought along critical notes and suggestions for future editions of the STARTS Prize or its future equivalents. The design of this study thus provided space for critical reflection, gave a voice to the prize winners and contextualized some of the most outstanding and pressing issues. In particular, the interviews with the STARTS prize winners revealed valuable insights into their practice, their innovative and creative ambitions, and how these relate to the STARTS Prize's premise.

About STARTS

The STARTS Prize is part of S+T+ARTS = STARTS—Innovation at the Nexus of Science, Technology, and the ARTS, an initiative of the European Commission, launched under the Horizon 2020 research and innovation program. STARTS' purpose is to support collaboration between artists, scientists, engineers, and researchers to develop more creative, inclusive, and sustainable technologies.¹

Premise and Key Finding of STARTS Prize

The premise of the STARTS Prize states that *“Science, Technology and Arts (STARTS) form a nexus with an extraordinarily high potential for creative innovation. And such innovation is considered to be precisely what's needed if we're to master the social, ecological and economic challenges that Europe will be facing in the near future.”*²

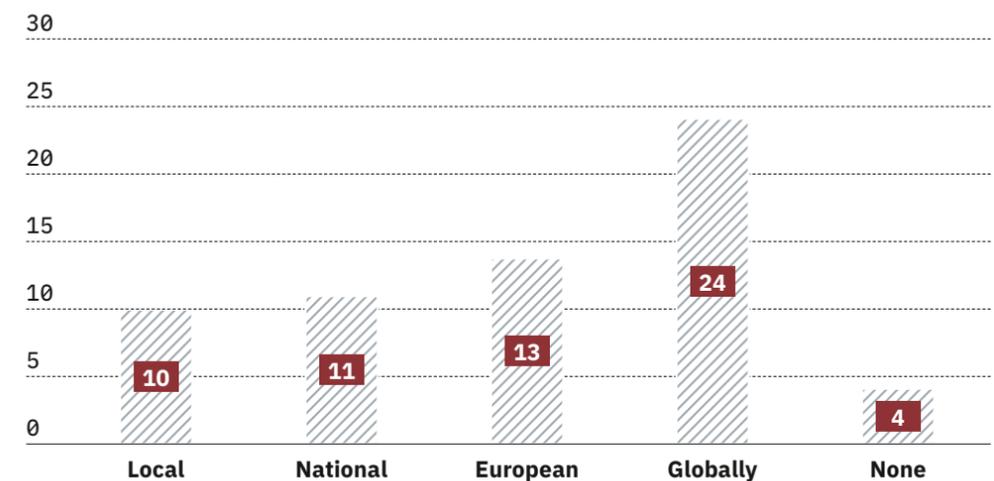
*“The role of artists thus is no longer seen to be just about propagating scientific and technological knowledge and skills among the general public, but much more as a kind of catalyst that can inspire and trigger innovative processes.[...] STARTS Prize gives visibility to collaborations between artists and industry for new pathways to innovation, and to artistic exploration of technology altering the use, deployment and perception of technology.”*³

Visibility

In the following paragraphs, you can read how STARTS Prize winners made this broad vision concrete and tangible. Their response is grouped around the key findings from the ICT Art Connect report that were used in this study as indicators for assessing the STARTS Prize premise. But first, we'll look briefly at the STARTS Prize's ambition to give visibility to the innovative creative potential of Science, Technology and the Arts with artists as catalysts for innovation in society and industry. After the initial pilot edition in 2016, the STARTS Prize gradually gained recognition and an international audience and attracted an impressive number of applicants from 2017 onwards through its annual call, promotion, award ceremony, and exhibition. (7,873 entries between 2017 and 2019). It is thus expected to grant visibility to and raise awareness

of this emerging field of innovative practice. In order to fully assess this, more data and extensive research in the wider field of Science, Technology and the ARTS would be needed. However, within the scope of this study we have the opportunity to assess the STARTS Prize promotional outreach from the prize winners' perspective. A vast majority (88.6%) of the respondents stated that the STARTS Prize did indeed have promotional value for them and increased their name or studio recognition. When it comes to the geographic spread of its promotional outreach, the responses showed a very broad picture: from local name / brand awareness, to appearances on national television, gaining access to the worldwide academic network, entering global exchange programs and participating in international art and technology exhibitions. This confirms an earlier study⁴ stating that the Science, Technology and ARTS field is nomadic and international by nature. According to the respondents, the STARTS Prize's contribution to global promotional outreach was by far its most important asset. This was followed by European, national, and local outreach. The STARTS Prize has catapulted up to 60 practicing ambassadors (individuals and teams) into the international Science, Technology and Arts arena.

STARTS Prize Promotion Reach Among Respondents



The collection of key findings from ICT Art Connect study (2014) and ICT Art Connect report (2015) that were used as indicators for this study:

- CRITICAL APPROACH TO TECHNOLOGY
- SOCIAL INNOVATION
- CREATING NEW TECHNOLOGIES
- NEW ORGANISMS FOR EDUCATION
- INFORMATION VISUALISATION
- SCIENCE COMMUNICATION
- INNOVATION IN RESEARCH
- INNOVATING ARTISTIC PRACTICES IN A GROWING DIGITAL SINGLE MARKET
- CLOSE-TO-MARKET OUTPUTS

Artists as a Catalyst of Change and Innovation: A Reasonable Claim?

• **Indicator:**
CRITICAL APPROACH TO TECHNOLOGY

“The role of artists thus is no longer seen to be just about propagating scientific and technological knowledge and skills among the general public but much more as a kind of catalyst that can inspire and trigger innovative processes. The artistic practice of creative exploration and experimental appropriation of new technologies has a wide-reaching potential to contribute to the development of new products and new economic, social and business models.”

(STARTS Prize website, 2020)⁵

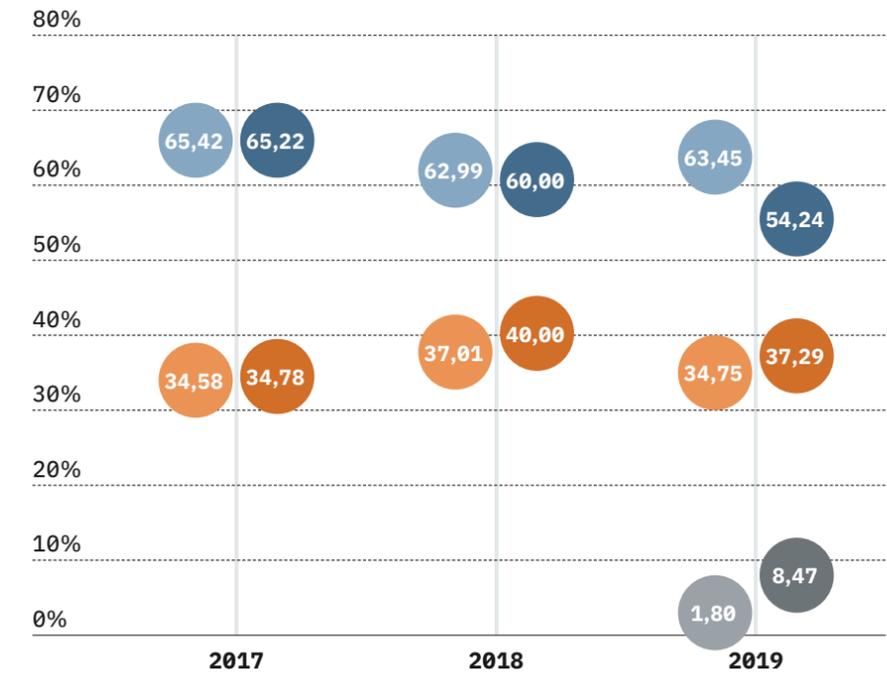
In the last three editions of the STARTS Prize, we see that the artist’s role as catalyst reflects a critical approach towards technology. We have not encountered any simple scientific or technical propaganda among the surveyed and interviewed prize-winners. In all cases, scientific and technical knowledge has been creatively contested, appropriated, or given a different perspective by artists, as we will see later in this study. Most prize winners (89%) consider themselves to be a catalyst of social change or innovation. This might seem obvious, so more details were gathered in two specific directions: social innovation and innovation paths for European industry. These two strands are represented in nearly equal proportions. Though it is worth mentioning that most prize winners identified more strongly as either social innovators or innovators for European industry, just under a third (28%) of respondents thought of themselves as both. Most catalysts who consider themselves both agents of social change / social innovation and innovators for industry are found in the Grand Prize and Honorary Mentions categories.

Let’s zoom in on the work of one such prize winner. Giulia Tomasello, Grand Prize winner for Artistic Exploration in 2018, acts as one of those dual catalysts: she considers herself a **SOCIAL** change agent and **INNOVATOR FOR INDUSTRY**. Her awarded project *Future Flora*⁶ is a har-

vesting kit designed for women to treat and prevent vaginal infections. *Future Flora* suggests wearing probiotics to keep the female body healthy. As a catalyst for social change, Tomasello emphasizes that the aspect of empowerment is of crucial importance to break social taboos in women’s intimate health. In Tomasello’s workshops, the participating women act as co-designers and so become citizen scientists who could use biotechnology at home, growing and nurturing living organisms. Furthermore, Tomasello uses surveys to set up knowledge transfers after her workshops. Tomasello’s work is an informed, speculative design that encourages women to familiarize themselves with biotechnology and then wear it as a second layer of their panties. In the meantime, Tomasello is also raising awareness in industry, as her long-term goal is to realize an innovative biodegradable system that connects the well-being industry with the wearable fashion industry. We can see that, on a social level, the *Future Flora* project contributed to female empowerment, and Tomasello’s appropriation of microbiome is a wake-up call to the medical industry for considering these pharmaceuticals for women, as the jury stated.



Future Flora, Giulia Tomasello



Individual Applicants STARTS Prize by Gender

Female Male Other

Individual STARTS Prize Winners by Gender

Female Male Other

Giulia Tomasello also draws our attention to the gender balance among the START Prize applicants and winners. Further investigation of the jury reports and conversation with the STARTS production team informs us that, through the years, there was a rising awareness about gender balance. The male dominance experienced for decades in the field of art and technology serves as a reference point here. In 2017, 2018, and 2019 we see a steady trend of around 35% female and 64% male STARTS Prize applicants among the entries by individuals. In 2017 and 2018, Female / Male were the only gender boxes the applicants could tick. In 2019, when the ‘other’ box appeared on the application form, almost 2% checked this. There is no gender data available for those who applied with a group. The average over these three years shows a gender spread among the winners that is roughly in balance with the entries. Consequently, there are fewer female than male winners and this is a point of concern regarding the image of the STARTS Prize.

Let’s look at the **CRITICAL APPROACH TO TECHNOLOGY** indicator in more detail. Most (77%) of all surveyed prize winners state that their work contributed to the critical debate about technology (in our daily life). Their work is a vehicle to catalyze a critical debate about the implications of a broad range of technologies. All self-employed interviewed prize winners underline the importance of their independence as a critically engaged innovator.

One might wonder what kind of technology is discussed or repurposed. As we read earlier, Giulia Tomasello aims to contribute to the critical discourse around synthetic biology and underexposed topics around female well-being in science. Among all prize winners, we meet a wide and diverse field of topics that are connected to emerging and re-visited technologies. Some of the frequently occurring critical contributions deal with technology literacy in many creative forms such as grassroots technology, altering or hacking technology, and citizen’s science. Many projects promote an agency shift from industry to consumers, especially for so-called smart products and privacy. Other frequent subjects for critical debate deal with ecological issues and digital humanism. The latter refers to a new way of addressing problems and how Artificial Intelligence relates to human values.

Alex Braga’s work *A-MINT*,⁷ nominated in 2019, is an example of a **CRITICAL APPROACH TO TECHNOLOGY** dealing with digital humanism. *A-MINT* is a new adaptive Artificial Music INTElligence, capable of cracking the improvisation code of musicians in real time and improvising with them. It creates music and video as it works, without any pre-set pattern, pitch, or bpm. With *A-MINT*, Braga introduces a **NEW TECHNOLOGICAL INSTRUMENT** that is used at conservatories and musical institutions alongside the traditional ones. Braga’s work adds a new perspective to the often binary public

opinion about the use of technology. According to Braga, this black-and-white thinking can, for example, be found back in two main streams arguing that either the capability of a single artist is enhanced by AI or the artists are being replaced by AI. In *A-MINT* however, (wo)men and machines work together to enhance human creativity, not replace humans. With this work, Braga suggests a form of collective creativity among robots and humans. He thus

- **Indicator:**
SOCIAL INNOVATION
... “artistic practice can lie at the basis of later technological developments with a tangible economic and societal impact.” [...] “This increases the probability of the creation of new products and services and contributes to socially driven innovation processes which distinguish the EU from other players in the global markets.”

(ICT ART connect, study 2014)⁸



A-MINT, Alex Braga

challenges the long-maintained view of creativity as one of the last remaining ‘human-exclusive’ skills. With this new artificial intelligence perspective, Braga positions himself as **CATALYST FOR INNOVATION IN** the art and music **INDUSTRY**. He uses *A-MINT* in his performances and teaching practice. Braga is a touring artist and, so far, has given masterclasses in Conservatorio Santa Cecilia in Rome, University Pompeu Fabre in Barcelona, and Conservatorium in Brussels.

More than half (54%) of the surveyed prize winners’ work deals with **SOCIAL INNOVATION**. All these social change catalysts connect their social innovation directly to one or more of the aforementioned topics of the critical debate. The routes they take to arrive at social innovation and their interpretation of same, however, show interesting differences. Some of the STARTS Prize works start from emerging technology and focus on providing access through appropriation for novel application fields that might have been overlooked by industry, as we saw in Giulia Tomasello’s biohacking. Others, such as BeAnotherLab, start with the end-users and their societal challenges.

BeAnotherLab⁹ deals with **SOCIAL INNOVATION**, novel technology applications, and education in *Library of Ourselves*, which received an Honorary Mention in 2017. With *Library of Ourselves*, BeAnotherLab catalyzes social change in local communities around issues of migration and marginalization. *Library of Ourselves* is a novel and replicable Virtual Reality embodiment structure that allows users to literally exchange perspectives, bodies, and stories. It runs on BeAnotherLab’s The Machine To Be Another, a flexible Open Source system that combines cognitive science and virtual reality. *Library of Ourselves* fosters and investigates empathy. The jury mentioned that by “changing gender, age, race, or origin we potentially change somebody’s perspective and view of the ‘others’ and of themselves.” *Library of Ourselves* works

as a gateway to the perspective of others, designed to bridge cultures and to promote mutual understanding. BeAnotherLab co-develops applications for this empathy machine with social and cultural institutions and academic researchers. Their collaborative approach was instrumental for establishing co-ownership and agency among all participants.

- **Indicator:**
NEW ORGANISMS FOR EDUCATION
“Artists have been developing new methods of education, to which they prefer to refer to as learning, that allow for a better implementation of ideas such as transdisciplinarity, hybridity of competences, and holistic approaches.”

(ICT Art Connect Report, 2015)



Library of Ourselves, BeAnotherLab



See Like A Pony (SLAP), Sabine Engelhardt

According to BeAnotherLab, their project is a typical example of artistic and open idea-based education innovation where all participants learn with and from one another over the course of the project. As we just read, BeAnotherLab started their **SOCIAL INNOVATION** process from its participants' perspective and introduced novel applications of technology and new holistic learning concepts based on practical artistic research during their creative voyage of discovery. With this artistic approach, they created a transdisciplinary learning environment for personal and professional development (or in policy terms, Lifelong Learning). In *Library of Ourselves*, BeAnotherLab combines **SOCIAL INNOVATION** with another indicator: **NEW ORGANISMS FOR EDUCATION**. BeAnotherLab explored the open-ended and iterative artistic way of learning through making as an approach for their identity-based education programs. Besides the aforementioned social outcomes, *Library of Ourselves* has contributed to the development of a new research tool for cognitive science, in addition to a labelling system for documentary making, and thus **INNOVATED FOR INDUSTRY** as well.

Let's go back to **SOCIAL INNOVATION** for a moment. Other catalysts informed us about how their social innovation perspective starts in industry, while their social innovation process starts with innovative technologies, and how to connect these to the general public. With the STARTS Prize 2019 Honorary Mention project *See Like A*

*Pony (SLAP)*¹⁰, Sabine Engelhardt catalyzes a 'European' human-centered approach to the car industry to counter-balance the industry's technology-driven approach. Her aim is to make a positive contribution to the perception of Automated Vehicles in society. Engelhardt looked for intuitive ways of interaction to push **INNOVATION IN** the car **INDUSTRY** and found a model in her communication with her own ponies. Engelhardt found that a five-hundred kilogram cuddly pony was a trustworthy car stand-in. She experimented in a novel way with perception-prediction-action feedback loops with her ponies. These feedback loops were visualized by four cameras: one on each of three ponies and one on herself. The jury report stated that the ponies' clear communication modalities, such as the direction of their ears, help to shape our understanding of the interaction and empathy between animal and human and how this might be applied to emergent Automated Vehicle technologies. The results of this experiment proved to be very helpful for the engineers and designers of robotic interaction. In addition to benefiting industry, Engelhardt contributed to the public debate around safety and the effect of autonomous driving in future living. Her earlier reference to human-centric design could even be extended towards the interactions of humans and nature or biomimicry design, as *SLAP* informs us about learning from animals. Some of the insights from *SLAP* were transferred to the so-called 'Cooperative Car.'

Video Stills, Video: Markus Werner

Ars Electronica, Jürgen Grünwald

Future Orientation

Sabine Engelhardt's *SLAP* focuses on Automated Vehicles, which are expected to enter our public arena in the near future. We'll encounter this orientation towards the near or distant future among many respondents (71%). Most of these prize-winning projects reflect integrated views where (social) innovation is inextricably linked with a **CRITICAL APPROACH TO TECHNOLOGY** (96%) and one or more sustainable development goals (80%). Similar to the diversity we found in the critical debate topics, the awarded projects refer to a grand diversity of overlapping Sustainable Development Goals (SDG) and ecological issues. The sustainability topics they address cover almost the full spectrum of peace and prosperity for people and the planet, with two significant exceptions: Goal #1. End poverty in all its forms everywhere and Goal #2. End hunger, achieve food security, improve nutrition, and promote sustainable agriculture. The prize winners connect and move between topics from all other SDGs from re-designing systems to our problematic relation with the biosphere: what we eat and breathe. Many respondents also informed us that their work relates to several SDGs, confirming that an integrated approach is common. Several others approach the SDGs from a cyclical view by pointing out how our consumption is directly related to current production and manufacturing systems and materials, their emissions and waste. In their critical making process, these prize winners render an abstract phenomenon such as climate change as a personal, concrete and tangible objective.

*This is grown.*¹¹ by Jen Keane, Honorary Mention 2019, is a good example of a work that is fully focused on future life. It is based on one of the Sustainable Development Goals; # 12: Responsible Consumption and Production practices. *This is grown.* is a bio material design project motivated by Keane's frustration with plastics. She was inspired by the material quality of bacterial cellulose and how it is grown. Advised by biologists and material scientists, she cultured the bacteria and crafted new tools to manipulate its natural growing process. Keane introduced 'microbial weaving' as a multi-species fabrication process; she wove the warp and the bacteria grew the weft. This resulted in an incredibly light, transparent new form of textile with strength in multiple directions, which means she also **CREATED A NEW TECHNOLOGY**. To demonstrate *This is grown.*'s disruptive potential to mass industry, Keane grew a shoe upper. This shoe upper was designed and grown as a single piece. Keane informs us that it was made as "one continuous yarn held in place by the cellulose produced by the bacteria." *This is grown.* could transform future industry and the way we make things; as is shown in Keane's shoe upper, where no material was wasted.

"This is grown. allows us not only to imagine, but also to shape the future of production."

(STARTS Jury statement 2019)



This is grown., Jen Keane

Keane sees herself as a catalyst for both sustainable **SOCIAL CHANGE** and system **INNOVATION IN INDUSTRY**. To achieve the latter, she focuses on how biodesign could alternate manufacturing systems that put an emphasis on customization, minimizing waste, and employing biology to produce biodegradable materials that also have interesting material properties. Keane is currently in the process of launching her company in the UK. She is planning to partner with European fashion companies to transform their material practices through biodesign.

Before moving on to the next indicator, I'll briefly summarize how the respondents relate to the **SOCIAL INNOVATION** indicator. Tomasello hacked biotechnology for female empowerment and to raise awareness in industry. BeAnotherLab approached social innovation from an artistic and participatory learning-through-making perspective. They developed *Library of Ourselves*, a **NEW ORGANISM FOR EDUCATION** (collaborative learning) approach, while novel VR technology was appropriated for new purposes and **NEW TOOLS** were developed. We met a large number of prize winners in this social innovation section whose work relates to one or more Sustainable Development Goals. Some, like Jen Keane, developed a **NEW TECHNOLOGY** that focuses on consumerism and catalyzes a sustainable production line, one that could lead to a system change in industry. Others, like Sabine Engelhardt, pave the way for new technologies from **INDUSTRY** that will enter our lives in the near or distant future. The interviewed prize winners, whose work includes social innovation aspects, all show how to combine social innovation with novel creative approaches that point ahead to the future. In the examples provided, this future concerned education, sustainable production lines, and Autonomous Vehicles.

- **Indicator:**
INFORMATION VISUALIZATION

"The area of information visualization is a growing one and helps us to better understand this exponentially growing amount of data. In this way, artists can also contribute to research and development."

(ICT Art Connect Report, 2015)

There was no specific example of **INFORMATION VISUALIZATION**, as described above, among the responders. **INFORMATION VISUALIZATION** helps us to convey exponentially growing data streams in more intuitive ways. Data analysis is an indispensable part of information visualization. In the late 20th and early 21st century, scientific and artistic data analyses (mapping) and data visualization attracted a lot of attention. This was, in general terms, partly understood as a method to get a grip on the virtual environment (Dodge & Kitchin, 2001)¹² and partly due to its attractive graphical aesthetics.

(Ars Electronica Festival, 2004^{13 14}; Dutch Electronic Art Festival, 2003¹⁵). Today's examples of innovative interpretations of information visualization and data analysis can be found among the STARTS Prize winners whose work extends visualization towards experience.

Silk,¹⁶ a robotic and sound machine sculpture by ::vtol:: (Dmitry Morozov, nominated 2017), tracks and shows the extreme fluctuations on the cryptocurrency market and how this relates to other 'real world' currencies that are directly coupled with oil and fossil fuel pricing. The data streams work as fuel for the *Silk* algorithm. The constantly changing currency rate of Bitcoin and Litecoin against five major world currencies is influencing the tension of the installation's strings and the way its picks are plucking them. *Silk* is experienced as a living sound sculpture. ::vtol:: brings e-finance and the 'real world' economic system, which is based on the fossil mining industry, together. One can imagine the dramatic sounds produced by *Silk* when the crash of the Russian Ruble coincided with the extreme Bitcoin and Litecoin fluctuations. The installation was developed as a catalyzing artwork with a sharp sense of urgency showing us how cryptography, mathematics, and computer science influence the 'real-world' financial system. It would be an oversimplification to call *Silk* only an **INFORMATION VISUALIZATION** work. *Silk* is an artistic expression that lets us experience the impact of technology on our society in a poetic way. The installation confronts us, in its own poetic way, with an important layer of the 'hidden' dark web. *Silk* shows two colliding economic systems and bitcoin's influence on today's global economy. It also draws a parallel between the cryptocurrencies' extreme fluctuations and the Russian Ruble's rollercoaster. The latter is caused by its direct connection to the price of oil. *Silk* was acquired, right at its vernissage, by a Russian entrepreneur, philosopher, art collector, and famous philanthropist. This confirms Morozov's position as an **INNOVATING ARTIST** whose research output is close to the market.



Silk, ::vtol::



Who Wants to Be a Self-Driving Car? (WWBSDC), Move Lab

When we stretch the **INFORMATION VISUALIZATION** indicator even a bit further, we arrive at *Who Wants to Be a Self-Driving Car?* (WWBSDC) by Move Lab (formerly known as moovel lab¹⁷), which was nominated in 2018. The project shows us the world as a stream of sensor information. WWBSDC is a trust exercise that tries to establish empathy between humans and self-driving cars or Autonomous Vehicles. Move Lab built an unconventional single person go-kart type car on which you lie in a forward leaning position. Move Lab gives the driver, who transforms into the car via a Virtual Reality headset, access to the massive data streams that the car's decisions rely upon. The car's three-dimensional mapping and object recognition is displayed in real-time by the VR goggles. The stakeholder's buy-in and engagement with the self-driving car is thus based on navigating the world through the car's 'eyes,' i.e. its sensor's information.

Move Lab is a research lab that operates in a corporate environment; they see themselves as a **CATALYST** or change agent for their mother company **IN** the car **INDUSTRY**. They inform us that this project worked well as food for thought and debate around future developments of Autonomous Vehicles across divisions in their mother company.

Both examples relating to **INFORMATION VISUALIZATION** show a novel angle that shifts from visualization towards exploring and experiencing information. Both prize winning projects give access to hidden parts of our daily digital life. These projects invite their audiences to experience the maker's views of specific data streams. It is clear that the motives for these works, and what they aim to establish, are very different. However, they both

make the collisions between the digital and real worlds tangible and thus inform us and encourage a critical debate in society and in their company.

- **Indicator:**
SCIENCE COMMUNICATION

"The context of science museums is where a relevant number of art, science and technology collaborations have been taking place. These projects join scientists and artists in order to better communicate scientific achievements."

(ICT ART connect, study 2014)

The interviews above show us that the indicator **SCIENCE COMMUNICATION** is omni-present. One could label almost all examples from surveyed and interviewed prize winners as freestyle or critical variations on the **SCIENCE COMMUNICATION** indicator. We note, however, that this cannot be separated from a **CRITICAL APPROACH TO TECHNOLOGY**. In terms of science outreach, we can conclude that formal science education is underrepresented. However, several projects, especially those dealing with **SOCIAL INNOVATION**, show us hands-on approaches, such as Giulia Tomasello's participative biohacking workshops and BeAnotherLab's learning through making as **EDUCATION INNOVATION**. These projects foster agency, empowerment, and literacy in science and technology, fueling the debate over expanding Science Technology Engineering Mathematics (STEM) education with the A of ART to STEAM.¹⁸ The STARTS Prize looks at innovative artworks as research outcomes and not at accompanying papers, publications, or references. It goes beyond this study to investigate

whether the winning projects find their way into academia. **SCIENCE COMMUNICATION** is further explored in collaborative projects between artists and scientists in another STARTS program, Vertigo STARTS.⁴⁹

- **Indicator:**
INNOVATION IN RESEARCH

“Artistic practices of research in technology demonstrate to be extremely effective in delivering concrete results. Experimentalism, as one of the characteristics of contemporary artistic practices, has a strong role in the catalyzing effect of the arts in innovation in ICT.”

(ICT Art Connect Report, 2015)

The above description might sound obvious when we read it through arts glasses, as it goes without saying that artworks must resonate with their audiences. In the context of the STARTS Prize, however, it is important to keep in mind that the submitted projects are the concrete outcomes of the makers’ practice-based research. Most (91%) of the respondents confirmed that they applied artistic or design research methods to their awarded works. Moreover, several interviewed STARTS Prize winners inform us that the specific art or design tools and techniques were chosen in line with the specific catalyzation process at hand. They also inform us that art and design research, tools, and techniques are frequently mixed up, adjusted, and improvised. Among the most often occurring approaches in projects dealing with social innovation were collaborative making and co-creation in workshop-like settings. BeAnotherLab took this open ended iterative artistic way of learning through making as the starting point for their novel learning approach. Overall, learning and researching mostly take place during the process of doing or making. Around 2000, I coined the term aRt&D to describe this intertwined artistic research and development process (Nigten, 2002; Brouwer et al 2005).^{20 21} Due to this intertwined aRt&D process, **INNOVATION IN RESEARCH** is a natural part of **INNOVATING ARTISTIC PRACTICES**.

- **Indicator:**
INNOVATING ARTISTIC PRACTICES IN A GROWING DIGITAL SINGLE MARKET

“A recent study found that the culture and creative industries (CCI) contributed with 4,2% of GDP of Europe in 2012. The majority of the total revenue is attributed to the visual arts, well above advertisement and TV. Innovation of these artistic practices can be instrumental to increase competitiveness transversely in the digital single market.”

(ICT Art connect study, 2014)

A closer investigation of **INNOVATING ART PRACTICES** brings us to another interesting finding: (97%) of the respondents see themselves as disciplinary border crossers. Among the interviewed artists, we met mostly hybrid artists with an additional education in fields such as engineering, biology, or artificial intelligence, or with talents that cross over to other fields. The specific fields or disciplines that are being crossed all related to the prize winners’ critical approach to technology and often to its impact on our daily life (now or in the future). The fields being crossed thus come from a grand diversity of community challenges such as social equality, education, healthcare, Autonomous Vehicles, climate change, and our biosphere. The (social) application domains, where the impact is felt most strongly, are crossed with science, technology and industry fields through the arts. The artists’ choice to select specific (sub-)disciplines and connect them is reflected in their innovative and refreshing outcomes. These disciplinary border crossings could best be looked at as interventions that alert us to issues, showing us confrontational, unexpected, and sometimes even holistic world views. Let me give some examples of fields that the surveyed prize winners crossed: blockchain and cryptocurrency, traditional religions, festivals; music, biology, quantum computing; engineering, technology, traditional craft and cultures, art, law, education, feminism, social equality; life sciences, design, and hardware innovation; tech, art, sustainability, society etc. This brief listing shows us an incredible richness and originality in how to deal with disruptive and complex technology-driven issues. The STARTS Prize border crossers show us plenty of examples of transdisciplinary and de-compartmentalized approaches to **RESEARCH**. Moreover, this border crossing is the most striking characteristic of their **INNOVATING ARTISTIC PRACTICES** as catalysts for transdisciplinary **INNOVATION**.

“Art has to innovate, otherwise it is craftsmanship.”

Alex Braga

One might wonder how these borders are being crossed? As mentioned earlier, a majority of the interviewed prize-winners switch between tools and techniques from the arts and design and other fields such as engineering, science, or the humanities. The interviewees confirm that they do this in a conscious, intentional way to cross borders or to set the desired tone for collaboration. For example, BeAnotherLab underlines the importance of their artistic horizontal approach, which contributes to an open atmosphere and paves the path to working together with the stakeholders on equal footing. For BeAnotherLab, the open atmosphere is essential to building the trust and respect needed for dialogue and agency among the

participants. It is the nourishing base for sharing their expertise during the practice, the making. Besides large-scale collaborative teams such as BeAnotherLab, we also met STARTS Prize winners who work in small teams, such as Alex Braga who works with two software engineers. There are also prize winners who embody multiple fields of expertise in one person. One of those all-in-one artists and engineers is ::vtol:: (Dmitry Morozov), who describes his discipline-crossing practice as ‘learning by doing’ when he combines DIY approaches and hacktivism with critical artistic approaches, music and engineering.

“For me, art is research.”

::vtol:: (Dmitry Morozov)

Giulia Tomasello uses design fiction as a method to sketch out future scenarios; this is combined with her own novice hands-on microbiome lab practice and workshops with her target group. She and Move Lab look at their role as hybrid connectors mediating between stakeholders and various specialists, a position loosely comparable with that of an interaction designer. Jen Keane, a hybrid material and bio-designer, brings us back to learning through making by drawing our attention to crafting as a tacit method to connect the dots.

“Design is connecting the dots; connecting a science vision with craft.”

Jen Keane

There is one last note to add to these two **INNOVATION IN RESEARCH** and **INNOVATING ARTISTIC PRACTICES** paragraphs. It is important to underline that many of the interviewed hybrid artists and designers who cross disciplinary borders are a bit of both: they embody skills from multiple disciplines and they collaborate with experts from various fields for in-depth knowledge. The latter also often provide training for the artists and access to facilities such as bio labs.

To summarize this section, the studied STARTS Prize projects confirm a range of **NOVEL ARTISTIC PRACTICES** and show how these go hand in hand with **INNOVATIVE RESEARCH APPROACHES**. The most striking outcome is the crossing of multiple disciplines through the arts. Another characteristic that all interviewees share, is that their research is inseparable from the making process. This highlights the importance of research through making and brings us to learning through making. The projects that deal with social innovation often include the stakeholders in the collaborative making process and thus in their research. These shared tacit experiences also often support agency and were marked as ‘instrumental’ for communication among participants with different backgrounds.

- **Indicator:**
CLOSE-TO-MARKET OUTPUTS

“Results of art and technology research projects are in their majority in the form of proof of concept. Knowledge is materialized in concrete applications and very often including usability testing in their in early stages. Results are therefore closer to market.”

(ICT Art connect study, 2014)

The preceding paragraph ties in with another closely related indicator: **CLOSE-TO-MARKET OUTPUTS**. Several of the highlighted winning projects could be labelled as working prototypes while others might be best described as proof of concept, this of course depends on their purpose. We’ve read previously that the winner’s research is inseparable from the making process, concluding that all artworks could be seen as primary research outcomes. All interviewed prize winners found a cultural and creative market for their awarded works. As we read, ::vtol:: (Dmitry Morozov)’s *Silk* was very close to the market, as it was sold right away at its vernissage. In the interviews, several prize winners shared their considerations regarding upscaling and market activities with (some of) the secondary projects’ outcomes. Giulia Tomasello is clearly discovering a niche market and although her potential industrial partners, from medics to the well-being and fashion sectors, are positive and curious, they are not jumping on the production line just yet. Jen Keane is working on her own start-up company. One of her main challenges is to establish a laboratory as a bio-designer without institutional back-up. Alex Braga is also reflecting upon the steps for launching his creativity-enhancing *A-MINT* software for the music industry. As a company of one, he now uses the software for his own performing and teaching practice and has recently been contracted by a renowned record label. BeAnotherLab considers their community work as the main outcome of their research. However, besides this ground-breaking art project, they also have several secondary research outcomes; innovative VR products, a labelling tool for documentaries, and their artistic learning model. Like Alex Braga, Giulia Tomasello and Jen Keane, they lack the time, resources, and expertise to bring these innovative by-products to the market. Both *SLAP* by Sabine Engelhardt and Move Lab’s *WWBDC* were part of their experimental research trajectories and in that capacity targeted internal use. Other surveyed respondents need more time to assess the long-term economic impact of their work in respected fields.

Several artists brought forward a shortage of human resources (or time constraints) as the main obstacle to bring their secondary projects or spin-offs to the market. To understand this, we should look at the STARTS Prize winners’ businesses. Most (83%) of the survey respon-

dents are self-employed or work at creative enterprises, creative labs, or studios. Especially for the self-employed artists (57%) the lack of time is a major issue. They need all their worktime to generate an income. The prize winners' research and development plus the dissemination of their primary research outcomes such as performances, exhibitions, and, in some cases, an additional teaching job at the university consume all their time. The prize winners who work at small non-profit creative labs or studios face similar challenges. So, on the one hand the self-employed status of these prize winners can assert their independence as critical innovators, as we read earlier in **A CRITICAL APPROACH TO TECHNOLOGY**. But on the other hand, their self-employment it is a limited basis for earning their income. At the time that the interviews were taking place, the Corona / Covid-19 restrictions for performances and exhibitions revealed the vulnerability of these members of the sector, which contributed 5.3% of Europe's GDP in 2016, according to a recent EU-commissioned report.²²

Summary of the Indicators' Outcomes

In the next paragraph, we'll briefly assess all indicators: **A CRITICAL APPROACH TO TECHNOLOGY** is recognized by more than two thirds of all surveyed and interviewed prize winners, who state that their work contributed to the critical debate about technology (in our daily life). More than half of the respondent's work deals with **SOCIAL INNOVATION** and this is always related to the critical debate about technology and often aims to establish agency and empowerment. Almost all prize winners look at themselves as disciplinary border crossers. In these **INNOVATING ART PRACTICES** the selected disciplines and themes that are crossed or patched together come from their intrinsic **CRITICAL APPROACH TO TECHNOLOGY**. Most of the respondents use artistic or design research methods. Their artworks are the outcomes of an open and integrated research and making process, referred to as aRt&D. The hands-on border crossing is a de-compartmentalized **INNOVATION IN RESEARCH** that is relevant to complex issues of technology's impact on our daily life. Often stakeholders are actively involved as co-creators in these aRt&D processes. The prize winners are **CREATING NEW TECHNOLOGIES**, appropriating emerging technologies for new purposes, and developing several application-driven innovative tools. **INNOVATIVE ART PRACTICES** and the aRt&D process have been identified as a key to empowerment and learning through co-creation and participation. This **INNOVATION IN EDUCATION** through the arts emphasizes the importance of expanding Science Technology Engineering Mathematics (STEM) education with the A of ART to STEAM. **SCIENCE COMMUNICATION** is combined

with **CRITICAL APPROACHES TO TECHNOLOGY, SOCIAL INNOVATION**, and **EDUCATION INNOVATION** through artistic approaches that foster agency, empowerment, and literacy in science and technology. The meaning of **INFORMATION VISUALIZATION** is reimagined and made tangible to create engaging experiences that reflect the collision between the (often invisible) digital world and real world. The primary research outcomes, the awarded art projects, are indeed **CLOSE TO THE MARKET** and frequently exhibited or performed. Upscaling the prize winners' (secondary) research outcomes for the market is difficult due to the lack of time (human resources), expertise, or facilities. The latter was discussed in the light of the vulnerable economic position of artists working in the STARTS field.

Concluding Thoughts & Suggestions

Our change theory, the STARTS Prize premise, includes several bold statements—or assumptions if you like—that were instrumental for this STARTS Prize assessment. Several lofty phrases caught our special attention, as these were widely recognized by the respondents and appeared frequently in this article. Besides the indicators, we assessed the STARTS ambition to showcase the innovative creative potential of Science, Technology and the Arts, with artists as catalysts for innovation in society and industry and the “catalyst function of artists that can inspire and trigger innovations.” Whilst unpacking this, almost all participants confirmed that visibility is a major asset of the prize. Catalyzing turned out to be the most commonly shared activity among all responding STARTS Prize winners. We distinguished two kinds of catalysts: those whose work focuses on **SOCIAL INNOVATION** and those whose work is directed to **INNOVATION FOR OR IN INDUSTRY**. Among the Grand Prize winners and Honorary Mentions, we met several artists / groups who combined these two directions. The interviewees from industry informed us that their catalyzing process is often directed towards the organization's own research as a means to accelerate radical insights for long-term innovations. In contrast, for many independent artists and designers, their personal catalyzing drive is about innovating their own art practice and / or contributing to a better world. Following the above summary, I propose a revision of the **INFORMATION VISUALIZATION** indicator towards a description that encompasses multisensory **INFORMATION AND DATA EXPERIENCES**. After revisiting the indicators and bold statements of the STARTS Prize as a *Theory of Change*, I conclude that the outcome of this study as laid out above underlines the relevance of the prize and could be used as a base for the STARTS PRIZE as a *Theory of Change*. The study and its indicators could be used to understand shifts in results and impact over the long-term.

And I'll conclude with the survey respondents' most frequent recommendations for improving the STARTS Prize:

1. There were many suggestions to show the STARTS Prize exhibition elsewhere, as a traveling exhibition or in the-matically curated small exhibitions. In this way, targeted audiences could become familiar with the novel STARTS practices. Among the suggestions were fairs for the car industry or specific sites that relate to the themes addressed by the artworks.

2. The STARTS Prize is encouraged to stay alert and consider additional actions to balance the gender among the applicants.

3. In the interviews, the need for additional support to strengthen the vulnerable economic position of artists working in the STARTS field was voiced many times. This could be realized, for example, through additional support for marketing the artists' secondary research outcomes to generate another income stream. Moreover, this could increase STARTS' impact on an economic level.

I would like to thank all artists and the STARTS Prize team for their contributions and cooperation.

1 Source: <https://www.starts.eu/> accessed 2020/01/05

2 Source: <https://starts-prize.aec.at/en/> accessed 2020/01/05

3 Source: <https://www.starts.eu> accessed 2020/01/05

4 ICT ART Connect, Activities linking ICT and Art: Past Experience— Future Activities, 2015, iMinds for European Commission, page 15

5 Source: <https://starts-prize.aec.at/en/> accessed 2020/01/05

6 Designer and creator: Giulia Tomasello, external expert, science communicator, founder at The A Level Biologist: Arian Mirzarafie-Ahi <https://gitomasello.com/Future-Flora>

7 Concept: Alex Braga, Coding: Francesco Riganti Fulginei, Antonino Laudani <https://www.a-mint.it>

8 ICT Art Connect Activities Linking ICT and Art: Past Experience – Future Activities, ICT Art Connect Study, 2014, iMinds, Art Share for the European commission

9 BeAnotherLab: Philippe Bertrand (FR/BR), Christian Cherene (UK), Norma Deseke (DE), JJ Devereaux (IE), Daniel Gonzalez Franco (CO), Daanish Masood (SA), Marte Roel (MX), Arthur Tres (FR), Alessandra Vidotti (IT/BR) <http://beanotherlab.org/home/work/library-of-ourselves>

10 SLAP by Sabine Engelhardt <http://seelikeapony.blogspot.com> <https://www.youtube.com/watch?v=2ZLkWtaCDu0>

11 Designer: Jen Keane, Footwear design contributor: Markus Westerberg, Scientific advisors: Imperial College London: Dr. Tom Ellis, Dr. Koon-Yang Lee, Marcus Walker (PHD candidate), Dr. Martin Hervy Cornell University: Dr. Juan Hinestroza, Photography: Tom Mannion, Adam Toth, Vita Larvo <https://www.jenkeane.com>

12 Dodge M. & Kitchin R., *Mapping Cyberspace*, 2001, Routledge London & New York

13 Stocker, G., Schopf, C. (eds.) *Ars Electronica 2004, Timeshift, Language of Networks*, p. 210-253, various authors, Hatje Cantz, 2004

14 Niederer, S., *Visualization of Networks*, Institute of Network Cultures, 2004 <https://networkcultures.org/blog/2004/10/04/ars-electronica-2004/>

15 Dataperception, Dutch Electronic Art Festival 2003, V2_Lab <https://v2.nl/events/data-perception?searchterm=datavisualis>

16 The project is co-commissioned by Laboratoria Art&Science Space and Lykke AG <https://vtol.cc/filter/works/silk>

17 Move Lab: Joey Lee, Benedikt Groß, Raphael Reimann, MESO Digital Interiors and David Leonard <https://www.move-lab.com>

18 ICT ART Connect, Activities linking ICT and Art: Past Experience—Future Activities, 2015, iMinds for European Commission, page 5–6

19 Vertigo STARTS: <https://vertigo.starts.eu/vertigo-project/about> Accessed: May15, 2020

20 Nigten A., 2002, Schemes, diagrams and flowcharts by artists, engineers and computer scientists in software based interdisciplinary collaborations, ISEA 2002

21 Brouwer J., Mulder A., Nigten A., (2005) *aRt&D: Research and Development in Art*, V2 / NAI Publishers Rotterdam

22 *Boosting the competitiveness of cultural and creative industries for growth and jobs* (2016) Austrian Institute for SME Research and VVA Europe, European Commission

Anne Nigten, Ph.D., (NL) is the initiator and director of The Patching Zone, a transdisciplinary non-profit media laboratory for innovation in Rotterdam (NL). Over the last years she was guest researcher and research professor at HKU University of the Arts Utrecht, Rotterdam University of Applied Science and Hanze University of Applied Sciences in the Netherlands. Prior to her current positions she was director of V2_Lab, the aRt&D department of V2_, Institute for the Unstable Media in Rotterdam and chair of the Dutch Media Art Association, in the Netherlands. She is lecturing on research and development in the transdisciplinary field from a creatively engaged perspective. She is board member of ISEA international, an international non-profit organisation fostering interdisciplinary academic discourse in art, science and technology. She is advisor for several cultural organisations in the Netherlands and abroad. Anne Nigten completed her PhD at Smartlab, Central Saint Martins, University of the Arts London (UK), and frequently publishes papers on (social) innovation as the outcome from collaboration between art, design, engineering and science. She is a guest professor at Linz Art University, Department of Media, Interface Culture Master Program. patchingzone.net

S+T+ARTS Prize Jury Statements 2016–2020

S+T+ARTS Prize'16 Jury Statement

In Search of a New Landscape and Mindset

Joint statement of the STARTS Nomination Committee (Yamina Aouina, Alexander Mankowsky, Filip Višnjić, Luis Miguel Girão), and the STARTS Jury (Yamina Aouina, Ian Banerjee, Chiaki Hayashi, Alexander Mankowsky, Erick Oh, Victoria Vesna)

It is almost 50 years since E.A.T. (Experiments in Art and Technology) was officially launched with the goal of promoting collaborations between artists and engineers and expanding the artist's role in developments of new technology. Although influential, it took many attempts, with various degrees of success, for artists working with engineers and scientists to stand on equal footing or even be credited for ideas that ended up in industry and influencing society. But, even in 2016, the two-culture divide remains a challenge, albeit as a ghost that is perpetuated by old systems still firmly in place.

With this in mind, the two evaluation groups recognized the importance of this newly established prize as a special moment for nurturing a direct connection of art, science and technology with a particular recognition of the artist's role in industry. This Grand Prize of the European Commission legitimizes the collaborative process that has been steadily emerging over the years on the fringes of established industry funding models. Initiated at this important historical juncture, the Grand Prize potentially opens an opportunity for small companies, specifically for those that reside in between technologies and creative output, to compete for available research funding. To date, if a company lists its services as artistic, it would not have the opportunity to apply for funds that are available to scientific and technological institutions and companies. The hope is, that the STARTS prize will set a precedent and pave the way for this to finally change.

An impressive number of submissions came from a wide spectrum of research areas—from freelance individuals to

large companies and institutions. Practically every field was represented: architecture, installation art, science and data visualization, product design, citizen platforms, theater, industrial design, animation, performance, environmental actions, sound art and sonification, interactive art, 3D printing, sculpture, bio-art, kinetic art, robotics, drone projects, bio-materials, mechanical engineering, mobile applications, DIY practice, medicine, wearables, film and computer science.

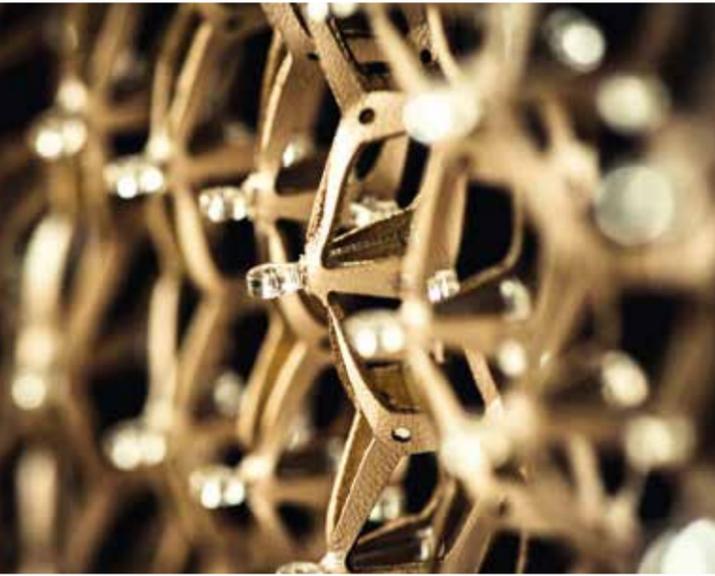
STARTS truly emerged as an open non-defined award competition with the center of interest being innovation and visionary ideas for the future that look to practical applications which could have an impact on existing models of production and by extension on society in general. The STARTS nomination group agreed that the most important aspect of the projects to be selected would have a paradigmatic model of collaborations between artists, scientists, and technologists. This type of trans-disciplinary practice and development of projects would inform, inspire, and show the potential of transferring innovative ideas / prototypes to industry. The ultimate question asked was whether the project pushes the known boundaries and reflects high technological and aesthetic sophistication as well as excellence in research. The STARTS jury awarded two Grand Prizes of the European Commission honoring Innovation in Technology, Industry and Society stimulated by the *Arts to Magnetic Motion* by Iris van Herpen for Artistic Exploration and to the *Artificial Skins and Bones project* for Innovative Collaborations.

S+T+ARTS Prize'16 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.

Jury Statement

Jury Statement



Magnetic Motion Iris van Herpen ^{BE}

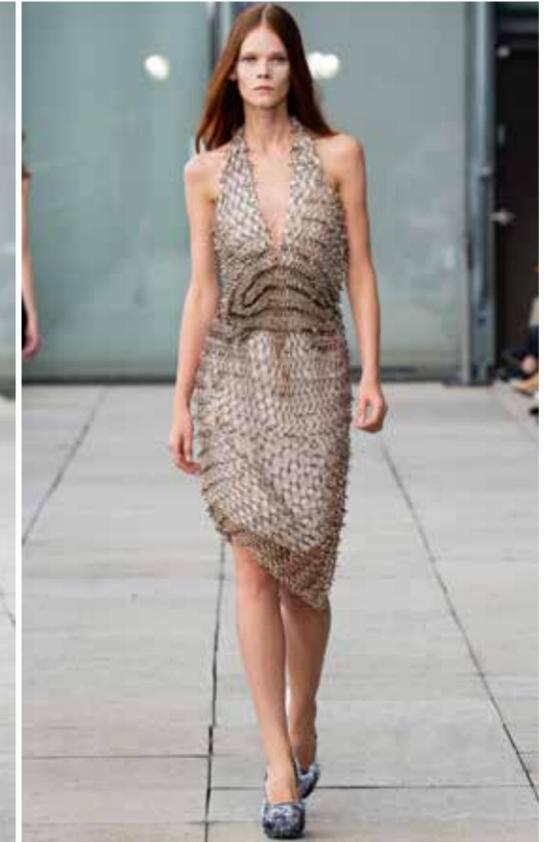
Iris van Herpen is one of the first fashion designers to combine 3D printing and other cutting edge technologies into fashion design. She started as an intern for Alexander McQueen in London and Claudy Jongstra in Amsterdam and soon after launched her own label in 2007. Working with a large interdisciplinary collaborative group is part of her process, she often includes traditional crafts as well as the most advanced technologies in her designs. Much of her interest is in the development of new materials as well as inventing novel ways of treating materials utilized in fashion design. Indeed, among others, she collaborated with Philip Beesley and Neri Oxman who were also nominated for the STARTS prize. Van Herpen's work is sculptural and reaches out to latest technologies, as is evident in her most recent collections, *Magnetic Motion*, inspired and informed by her visit to the Large Hadron Collider at CERN, and Hacking

Infinity, which explores the idea of terra-forming, i.e. modifying the biosphere of another planet to make it resemble that of the Earth.

For many European countries such as France, Italy, and Switzerland, the luxury industry is an important pillar of the economy and plays a key role in the artistic and cultural fields. Some of its brands have been around for several centuries in which manufacturers have built a unique heritage of creation and know-how of excellence. Writing tomorrow's history by preserving its heritage goes through the multidisciplinary innovation that brings together technology, art and science. Artists and designers who move off the beaten path to explore new ways enrich the luxury industry and inject new energy with a mindset of experimentation and renewal. This is what Iris van Herpen embodies with her pioneering work.

Iris van Herpen (BE), born in 1984, is a fashion designer. She studied Fashion Design at ArtEZ Institute of the Arts Arnhem and interned at Alexander McQueen in London and Claudy Jongstra in Amsterdam. Van Herpen immediately caught the eye with notable shows. In 2007, she started her own fashion label. Iris van Herpen creates women's wear collections. Her designs require every time a unique treatment of material or the creation of complete new materials. For this reason, Van Herpen prefers interdisciplinary research and collaborations with artists from various disciplines, often on a recurring basis. Since July 2011, she is a guest member of the prestigious Parisian Chambre Syndicale de la Haute Couture, which is part of the Fédération Française de la Couture. She participates in many international exhibitions and creates two collections a year. Her work has been recognized through awards, exhibitions, publications, and the mentioned guest membership.

Morgan O'Donovan



Yannis Vlamos

Magnetic Motion Collection in collaboration with the artist's Philip Beesley, Niccolo Casas, and Jolan van der Wiel.

**S+T+ARTS Prize'16
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.**

Jury Statement

Bernardo Aviles-Busch



**Artificial Skins and Bones
Artificial Skins and Bones Group^{DE}**

The *Artificial Skins and Bones* project brings a new kind of innovation to medium-sized industries and a fresh spirit to the collaborative process. Wolf Jeschonnek, founder of Fab Lab Berlin, worked with a group of students while he was a Visiting Professor at the Product, Fashion, Textile and Research Department at Weißensee Kunsthochschule Berlin. He brought the group to Ottobock, a private SME, and together with the Fab Lab Berlin team, they came up with a new prototype. The jury believes that their collaborative process is a good example that other companies could emulate in the future. Clearly formulated and engineered examples such as this are needed to inspire and pave the way for smaller new and established companies to implement new methodologies and ways of working.



Visible Strength by Lisa Stohn and Jhu-Ting Yang proposes a flexible, creature-like textile surface that, like an octopus, changes its color and pattern in various ways through muscle stimuli.

Artificial Skins and Bones Group

Course Instructors: Wolf Jeschonnek, Mika Satomi
Participating Students: Bernardo Aviles-Busch, Carmina Blank, Hans Illiger, David Kaltenbach, Maximilian Mahal, Stephanie Natrass, Natalie Peter, Lucas Rex, Agnes, Rosengren, Nina Rossow, Sandra Stark, Lisa Stohn, Babette Wiezorek, Karina Wirth, Jhuting Yang

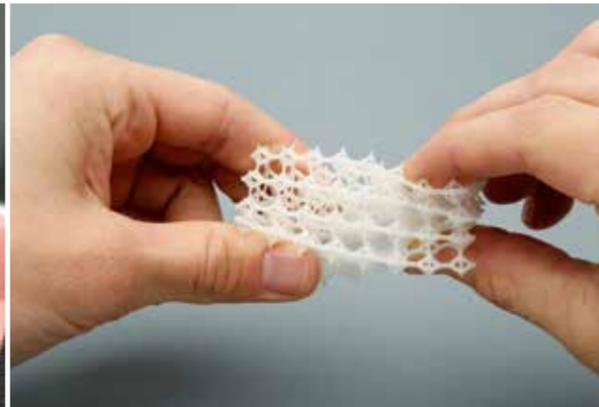
Main project partners

Weißensee Kunsthochschule Berlin
Fab Lab Berlin
Ottobock Healthcare GmbH
Makea Industries GmbH

Bernardo Aviles-Busch



Trans.fur by Karina Wirth and Natalie Peter is the development of intelligent textiles, capable of altering moisture permeability by adjusting their surface structures. Inspiration for this project was the most versatile organ in the human body: skin.



Naturanslation by Babette Wiezorek explores the nature and potential of organically inspired 3D grid structures by applying algorithmic design and 3D printing to microstructures.

Bernardo Aviles-Busch

Bernardo Aviles-Busch

Jury Statement

Bernardo Aviles-Busch



Audio Gait by Agnes Rosengren and Bernardo Aviles-Busch sonifies movements to aid the understanding of body balance while walking. The portable system is an easy learning aid for shin prosthetics training, which translates walking movements into auditory feedback.



Technology, Temperature, and Textiles by Stephanie Natrass is an e-textiles material research project that embeds sensing and actuation into textile surface constructions.

Bernardo Aviles-Busch

Bernardo Aviles-Busch



Active by Hans Illiger looks into the rehabilitation process of lower limb amputees, and proposes a service design concept as well as a hardware solution for gathering movement data.



Tactile Sensation by Nina Rossow explores two possibilities of displaying information through tactile feedback: Sens_mat allows passive tactile recognition of materials when direct contact is not possible. Sens_dia simplifies descriptions in pain diagnostics and offers a non-verbal and body specific communication.

Bernardo Aviles-Busch

Bernardo Aviles-Busch



One of the most heated discussions during the ideation period was about the concept of Uncanny Valley. *The Aesthetics of the Uncanny* by Carmina Blank and Sandra Stark explores the delicate balance between familiar prosthesis design standards and uncanniness. The team researched how targeted material conception can help to understand and control this phenomenon, and can be taken into conscious consideration during the design process.



Shortcut by David Kaltenbach, Maximilian Mahal, and Lucas Rex is a customizable Human Interface Device (HID) for upper limb amputees. The bracelet detects sensory muscular impulses in the phantom hand, translating them into contactless and intuitive computer controlling.

Bernardo Aviles-Busch

The Artificial Skins and Bones Group (DE) is an interdisciplinary group of young designers from Weißensee Kunsthochschule Berlin. Their expertise ranges from textile, surface and product design to fashion and visual communications. In the Artificial Skins and Bones project the group freely explored the design of, and interaction with, artificial bodies and body parts. The projects presented illustrate a great variety of possible starting points, prototyping techniques, and application scenarios. We hope that the outcome is a valuable contribution to the future exploration of artificial bodies and prosthetic designs.

Amsterdam Smart Citizens Lab
Waag Society

In the heated debates around “smart cities,” it has not been until recently that their inhabitants, the so-called “smart citizens,” have come into the limelight. At the *Amsterdam Smart Citizen Lab*, citizens are not seen merely as consumers and clients of smart technologies, but as critical, hands-on creators of socio-technical change. They believe that there are no technological panaceas for social ills, but that only governments and citizens can adequately respond to the challenges of cities. Creating collaborative infrastructures potentially opens up possibilities of exchange between citizens coming from a broad variety of disciplines—social, technical, artistic or political—and this creates the space for experimentation with citizen-led methods in how to sense, organize, and innovate in cities of the 21st century.



Waag Society



Bionic Partition: Generative Design for Aerospace

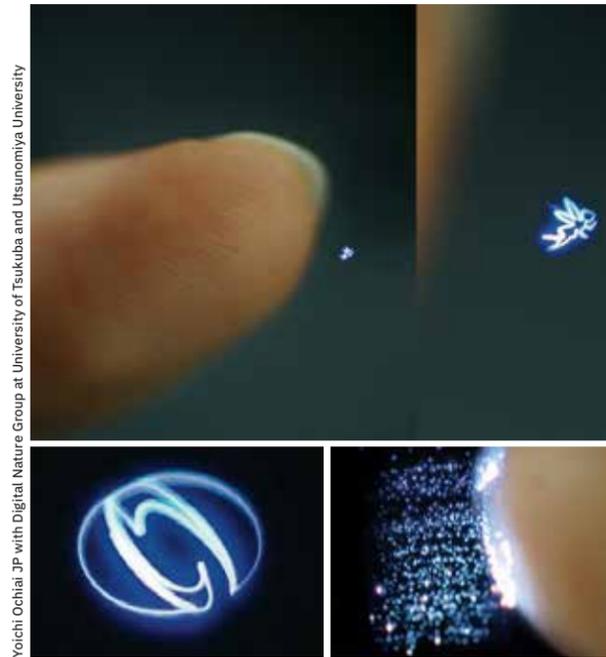
Airbus^{DE}, APWorks^{DE}, Autodesk^{US}, The Living^{US}

Applying generative design, biology, and new materials to real built projects in the context of technology, culture, and the environment, The Living is no ordinary architectural studio. Having joined Autodesk in 2014, as a first-of-a-kind Autodesk Studio, they worked with Airbus to implement the world’s largest metal 3D printed airplane component. The *Bionic Partition* was created through a pioneering combination of generative design, 3D printing, and advanced materials, producing a lighter and stronger structural system. The jury felt that this collaboration exemplifies how new modes of design thinking can have a positive technological and ecological impact. Nature, through bio-mimicry, continues to reveal the most amazing secrets to help us to solve complex problems. Using this approach, these companies—in collaboration with universities—are working on air transportation of the future. Using cutting edge technologies—3D printing, generative design, and new materials—the project *Bionic Partition* is an impressive, innovative model that serves as a good example to be emulated.

Airbus, APWorks, Autodesk, The Living

Fairy Lights in Femtoseconds
Yoichi Ochiai^{JP} with Digital Nature Group at University of Tsukuba and Utsunomiya University

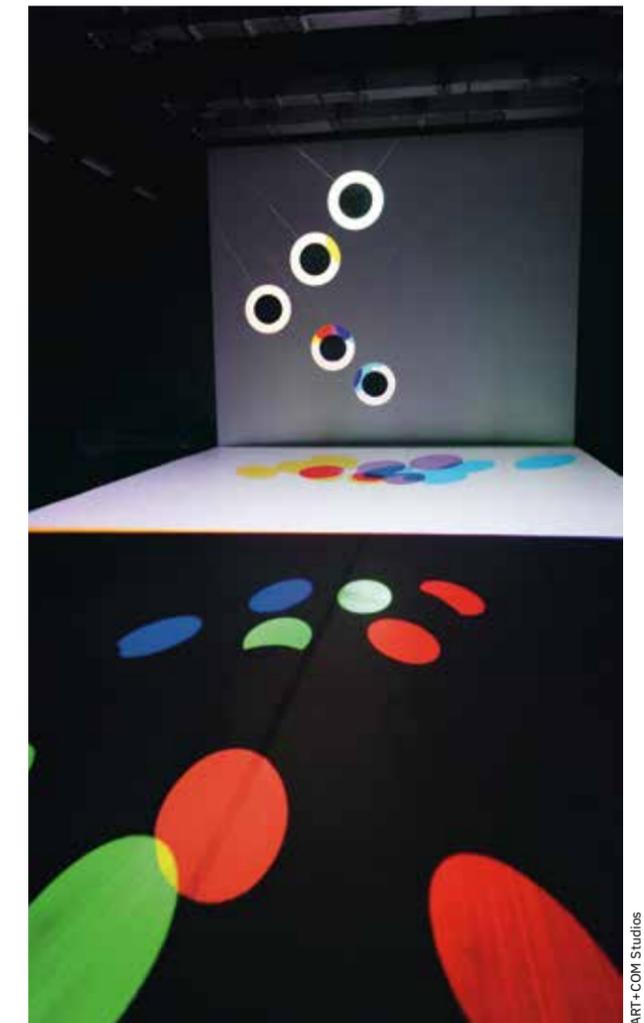
Known as a magician of the digital era, Yoichi Ochiai has been exploring new potential by integrating art and the latest science & technologies. In this project, he creates a work that impresses scientists and artists alike by engineering an ephemeral fairy floating in the air—a 3-dimensional holograph made by high-intensity femtosecond lasers that focus on one spot to change the air into plasma that functions as a plasmatic display. This exciting project allows us to imagine the blurring of boundaries between objects and holography, and we experience and gain a better understanding of another kind of mixed reality—a true fusion of the virtual and material worlds.



Yoichi Ochiai JP with Digital Nature Group at University of Tsukuba and Utsunomiya University

RGB|CMYK Kinetic
ART+COM Studios^{DE}

Renowned Berlin ART+COM Studios create a beautiful harmony of nature and technology from ordinary elements—lights, sound, and mirrors—immersing the audience in this extraordinary balance. Five circle mirrors are floating, slowly moving, and cascading red, green, and blue (RGB) light onto the entire space, and the finely tuned kinetic controlled motion of the five mirrors turns the environment into an amazing installation of lights and sound. This artwork exemplifies how public spaces can be transformed, providing a space for inspiration that goes beyond strictly aesthetic interventions.



ART+COM Studios



SPARKED: A Live Interaction between Humans and Quadcopters
Verity Studios, ETH Zurich, and Cirque du Soleil

Sparked is a perfect example of the fusion of a great storytelling idea and emerging technology. Traditional musical performance meets cutting-edge drone technology to create a magical experience with a beautiful illusion. While watching this mesmerizing interactive choreography between the actor and a set of floating lampshades generated by drones, the audience gets pulled deeply into the whimsical narrative without a chance to question the technology behind it. Everything is organically blended in the story as one. In terms of technology, the detail of the computer controls in drones is mind-blowing, and this will certainly open the door for drone technology to many more applications in the future.

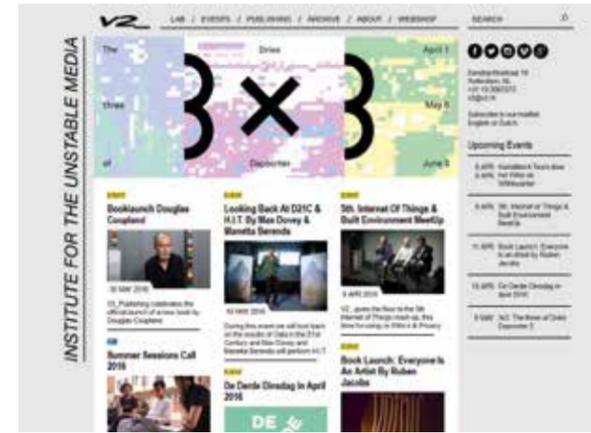
Verity Studios, ETH Zurich, and Cirque du Soleil

unfold
Ryoichi Kurokawa ^{JP}

Artists and scientists have been exploring data visualization for many years and diverse innovations have been made. We might feel that we are now very familiar with the development of data visualization, however, *unfold* takes it to another level due to recent research and discoveries about the formation and evolution of stars and the universe. The data includes the conditions of star birth and the history of galaxy life. The artist then translates this data and information to an immersive sensory installation with beautiful images and sounds. This project truly shows how effectively art can display the scientific discovery through an immersive technology.



Ryoichi Kurokawa



V2_Institute for the Unstable Media

V2_Institute for the Unstable Media
V2_Institute for the Unstable Media

Over the last 20 years the Rotterdam based transdisciplinary institute V2_Institute for the Unstable Media built up an international reputation through its innovative research at the intersection of art and technology. What makes it interesting for STARTS is how V2_ has been involved in developing technological tools for specific art projects. V2_ both produces art and also facilitates the production of art by offering technical support to interested artists and scientists. Their open platform helps to share, discuss, and disseminate their findings and knowledge. V2_ also explores the social impact of technology and advises universities, research institutes, art museums, and companies.

Water-based Digital Fabrication Platform
Mediated Matter Research Group, MIT Media Lab ^{US}

A robotically controlled 3D printing system is designed to shape constructions with biodegradable composites. The work foresees the emergence of direct digital fabrication that allows multi-material and multi-scale structured objects. It also questions the status quo of industrial manufacturing processes, that are generally characterized as wasteful and highly energy intensive. The *Water-based Digital Fabrication Platform* sends a clear message: it is time to design sustainable, environmentally conscious but functional processes from products to architecture.

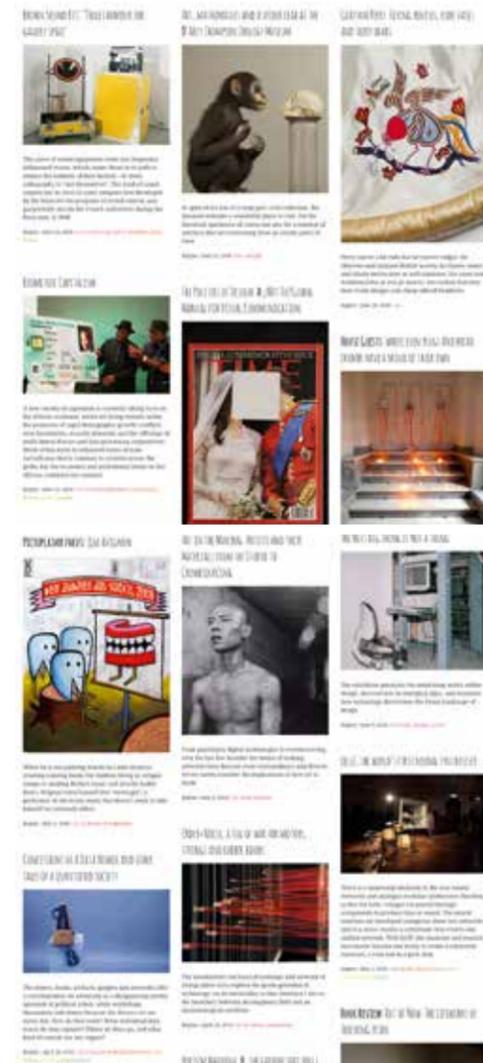


Mediated Matter Research Group, MIT Media Lab



WCMC Discovery Wall
Squint/Opera^{UK} and Hirsch & Mann^{UK}

Discovery Wall is a whole new kind of digital installation utilizing thousands of mini screens and lenses to provide two different experiences to the viewers. From a distance, we see a big projection screen of a beautiful visual and letters on the building wall. Then, up close, we realize that it consists of thousands of circular acrylic discs and we can look deeply into each of these. Inside, we get to learn about medical discoveries and scientific research by Weill Cornell Medical College. Not only is the idea and the concept brilliant, but the technology and experiments carried out by artists and engineers to make this possible are innovative and impressive for expert and lay audiences alike.



Régine Debatty

We Make Money Not Art
Régine Debatty^{BE}

Since 2004, *We Make Money Not Art* has been at the forefront of transdisciplinary art practice, reporting projects and capturing the diverse art practice in technology, science and culture. Triumphant in defying categorization, Régine Debatty's invaluable perspective continues to frame the ever-changing landscape of art and technology. A valuable resource for students, practitioners, curators, and educators globally, *We Make Money Not Art* drives critical discussion and sets agenda for arts professionals and newcomers alike. In a world that overwhelms us with data and information daily, to search and to find is not that easy, especially when it comes to the exponential area of new technologies and their applications. Régine Debatty has the instinct to find a unique style to share her vision of contemporary artists and their works that helps us discover technology in a new way. *We Make Money Not Art* is a platform for hidden gems of creativity and exploration and a source of inspiration for many of us.



MTFSJubliana

Ramiro Joly Mashceroni, Aline Sardine-Dalmasso

Manfred Hild, Mitsuru Muramatsu, Shunji Yamanaka

Antoni Abad

Team Casa Jasmina

Scifabric, <http://crowdcrafting.org>

<http://dcentproject.eu>

uh513 (María Castellanos & Alberto Valverde)

Hamill Industries, Junior Martínez

#FindingSomething-BondingSound
#WhiteMatter

Beyond Humans: Perception & Understanding of Actions of Others
Ramiro Martin Joly-Mascheroni^{IT}

Apostroph
Manfred Hild^{DE}, Mitsuru Muramatsu^{JP}, Shunji Yamanaka^{JP}

BlindWiki, Unveiling the Unseen
Antoni Abad^{ES}

Casa Jasmina
Team Casa Jasmina

Crowdcrafting
Scifabric,
<http://crowdcrafting.org>

D-CENT—Decentralised Citizens ENGagement Technologies
<http://dcentproject.eu>

Environment Dress
uh513 (María Castellanos^{ES} & Alberto Valverde^{ES})

Floating Points—Silhouettes
Hamill Industries, Junior Martínez^{UK/VE}



Nervous System—Jessica Rosenkrantz, Jesse Louis-Rosenberg

<http://exiii-hackberry.com>, exiii

William Victor Camillieri

Burton Nitta

Dave Lynch, Mike Nix

Daito Manabe, MIKIKO, TAKCOM, ELEVENPLAY, Rhizomatiks Research

processingfoundation.org

PBAI

Katja Petříšek

Floraform
Nervous System^{US} — Jessica Rosenkrantz, Jesse Louis-Rosenberg

HACKberry
<http://exiii-hackberry.com>, exiii^{JP}

Hortum machina, B
Interactive Architecture Lab^{UK}, William Victor Camillieri^{MT}, Danilo Sampaio^{BR}

Instruments of the Afterlife
Burton Nitta (Michael Burton^{UK} & Michiko Nitta^{JP})

Project Nimbus
Dave Lynch^{UK}, Mike Nix^{UK}

Nosaj Thing—Cold Stares ft. Chance The Rapper + The O'My's
Daito Manabe^{JP}, MIKIKO^{JP}, TAKCOM^{JP}, ELEVENPLAY^{JP}, Rhizomatiks Research^{JP}

Processing Foundation
processingfoundation.org

Sentient Chamber
Living Architecture Systems Group^{CA}

Time Displacement—Chemobronic Garden
Interactive generative (chemical) sound installation
Robertina Šebjanič^{SI}, Ida Hiršfelder^{SI}, Aleš Hieng – Zergon^{SI}

Earth to Space: Blue Future

Joint statement of the STARTS Prize Nomination Committee (Bradly Dunn Klerks, Luis Miguel Girão, Chiaki Hayashi, Sophie Lamparter, Alexander Mankowsky) and the STARTS Prize Jury (Bradly Dunn Klerks, Chiaki Hayashi, Sophie Lamparter, Alexander Mankowsky, Rikke Frisk, Shuzo John Shiota, Victoria Vesna)

Science and technology are developing ever more quickly, expanding our world's possibilities, but also its complexity. As automation and Artificial Intelligence (AI) merge into our daily reality, opportunities and risks alike dominate stories in popular media, even among experts and specialized literature. New studies pin ever-increasing job losses to self-driving cars, the spectral algorithm threatening to replace accountants, lawyers, doctors, and artists. We feed these learning machines with information, images, and patterns, while at the same time we wonder and worry about how many decisions we want to hand over to the machines. Smart objects, virtual assistants, and chatbots are increasingly present in our homes, bedrooms, and pockets. As digital interfaces and processes become invisible, the borders between us and the machines blur. We welcome our digital helpers and collaborators even as we are anxious about the data they record—an anxiety fueled by the small number of those who comprehend how the machines make decisions and suggestions.

We read about synthetic biology and how cures for diseases could be just five minutes away. Technologies like CRISPR hand us the power to change our genetic code, completely changing the way we think about life, our bodies, and our health. Humans might become more resilient, but will our natural environment transform even faster? We are witnessing the first undeniable effects of climate change: global warming, melting ice, dying forests, polluted oceans and cities, mountains of indissoluble plastic. Many of us around the world fear that it might be already too late to change the entire global energy production that sustains our consumption and our behaviors.

This rapidly emerging complexity and rapid change brings uncertainty for societies at large and fuels the populist political climate while leaving us with the question: are we prepared for the future we anticipate? How can we shape the future, make it ours? How can we contribute? For all these reasons and more, we are tasked to seek visionary ideas and solutions we can trust. A total of 2,977 entries from 97 countries were submitted and 474 projects were shortlisted. For four days, we, the STARTS Prize Nomination Committee and the STARTS Prize Jury, reviewed and discussed these collaborative projects, dealing with urgent and relevant questions from creative thinkers all over the world. We reviewed proposals for experiments on human and machine collaboration and interfaces, studies of humanized automation, new ways of translating and living with nature—moving from the individual to synchronizing with each other. Many of them used new technologies to share experiences and knowledge, to empower people through their communities, and to access information and tools.

To many, it is obvious that we can no longer work in isolation—we need active and focused collaboration. Complex questions require the know-how from different fields, cultures, and perspectives. We need to collaborate and experiment inbetween and beyond disciplines until new ideas emerge. Designers, artists, engineers, scientists, and industries have to work together and co-create the future we want to live in. Nobody can afford to miss the next trend or approaching change.

Forward-thinking institutions have realized this need for wide-reaching collaboration. Universities are building interdisciplinary programs. Technology companies are reaching out to students, artists, designers, and startups for inspiration and feedback. Research institutions and industries are hosting “artists-in-residence,” organizing interdisciplinary workshops, and taking classes in human-centered design thinking. Grassroots organizations and online communities are creating diverse platforms, from hacker spaces to DIY community bio-labs, to share access to know-how and technologies that help us understand the world and play an active role in it.

These are good and valuable initiatives. But the stakes are high, and the right decisions are crucial. We are designing our future, and inspiration is not enough. We must collaborate and co-create from the ground up. Nobody wants to live in a future programmed only by software engineers, nor in a world imagined only by artists, or by researchers in a laboratory, or by an inscrutable algorithm.

That's why the STARTS Prize means so much. Through the two main prizes and all the Honorary Mentions, we have a tool to highlight artistic contributions and outstanding examples of mutually beneficial collaborations between artists, researchers, and technologists; projects that allow technology and research to cross over the divisive borders of their disciplines. We awarded and recognized projects that prove the importance of interdisciplinary and diverse collaboration, and offer not just inspiration but adoptable models for institutions, organizations, and individuals to follow.

We are grateful to the EU commission for following this approach, for initiating and for pledging resources and support to STARTS, and we hope that this year's, and last year's, project examples show the necessity and the potential to strengthen even more interdisciplinary initiatives. We also want to thank Ars Electronica and its partners BOZAR and Waag Society for inviting us, and for their ongoing commitment to support, communicate, and showcase the selected STARTS Prize projects in the best possible way to policy makers, industry leaders, and the general public. Ars Electronica started 38 years ago, as a pioneering institution in Europe dedicated to art, technology, and its impact on society. They have created an important interdisciplinary hub for dialogue, discourse, and collaboration; giving millions of people access to these ideas. If there were a STARTS Prize lifetime achievement award, it would definitely go to Ars Electronica.

In an elaborate process that includes an open call and recommendations by advisory experts, a total of 2,977 entries from 97 countries were submitted during the application period that ran from January 11th to March 13th, 2017. Out of the total number of 2,977 entries, four groups of experts nominated 30 projects for the STARTS Prize, which were presented to the STARTS Prize jurors for final consideration. Following extensive deliberations, they decided to award *I'm Humanity* by Etsuko Yakushimaru for Artistic Exploration, and *Rock Print* by Gramazio Kohler Research, ETH Zurich, and Self-Assembly Lab, MIT, for Innovative Collaboration.



Etsuko Yakushimaru with *I'm Humanity* in culture



Etsuko Yakushimaru drew pictures on petri dishes using genetically modified microorganisms and cultured them

I'm Humanity

Etsuko Yakushimaru ^{JP}

Etsuko Yakushimaru is an example of a new generation of young artists who seamlessly traverse the worlds of fine art, pop culture, performance, science, and technology. Her creative expression includes drawing, installation art, media art, poetry and recitation, including doing vocals and illustrations for a rock band formed in 2006—Soutaiseirion (Theory of Relativity). She is also a primary member of electronic pop unit Tutu Helvetica, and collaborates with a number of highly regarded musicians.

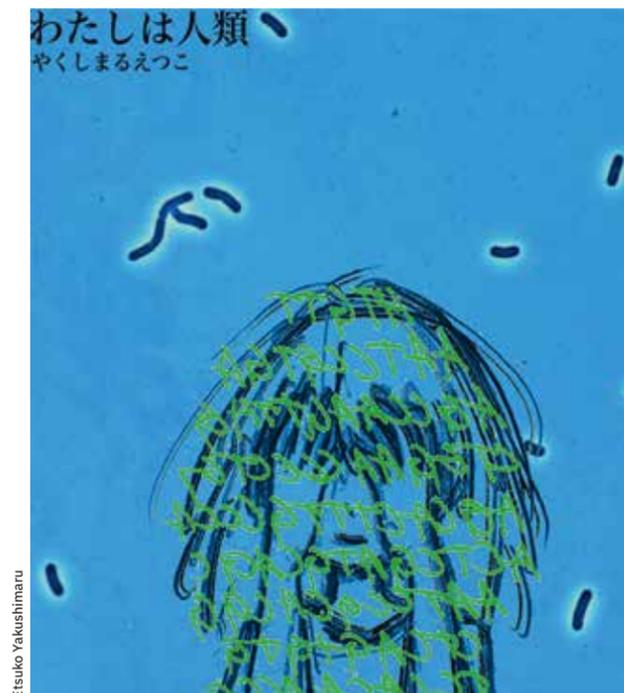
I'm Humanity is a song by Yakushimaru with which she imagines new ways that music could be transmitted, recorded, mutated, and diffused. Here we have pop music composed with the use of the nucleic acid sequence of *Synechococcus*, a type of cyanobacteria that has long existed in Ibaraki Prefecture. The artist envisions that even if humanity goes extinct in the future, the species that replace humanity will eventually decode the music in the microorganism through translation methods that go far beyond what we can even imagine.

Professor Satoshi Hanada at the Tokyo Metropolitan University opened his lab to enable the process by cultivating genetically modified microorganisms. The genetic codes (276 nucleotides) were artificially synthesized by a DNA synthesizer and inserted in a vector, designated pSyn_1. The inserted DNA fragment encoded music chords were then introduced to a genome of a host cell (cyanobacterium, *Synechococcus elongatus* PCC 7942) by homologous recombination. Thus the music chords in the *Synechococcus* genome can be infinitely reproduced along with

cell division and are continually passed on from us to the post-human with occasional mutation. Since recent developments in biotechnology, artists have been fascinated with genetic modification and we have seen multiple examples of work that utilize algae in Petri dishes or work with genetic modification in some form. Indeed, an entire field of BioArt has emerged and the jury understands that even if encoding music with a DNA sequence has been experimented with by artists such as the band OK Go working with biochemist Dr. Sri Kosuri or Charlotte Jarvis working with scientist Dr. Nick Goldman, Yakushimaru makes an important breakthrough by introducing this technique to a large pop audience. Further, she made a concerted effort to work with scientists in major institutions such as the National Institute of Technology and Evaluation (NITE) and Tokyo Metropolitan University. Thus, the idea of working with genes as a medium is taken beyond the DIY labs and the fringes of experimental audiences into established institutions of pop culture and scientific institutions. This is a testament to the ability of a singular artist to create bridges, to cross disciplinary boundaries, and to enable new ways of perceiving the influence of scientific research on daily life. It is the hope of the jury that by bringing this idea to large audiences, the emerging field of bioart will gain more acceptance and more artists and scientists will collaborate on visionary projects that may take unusual paths and thus potentially bring groundbreaking innovations in both arts and the sciences.



I'm Humanity genetically-modified microorganism



I'm Humanity digital music artwork



I'm Humanity CD artwork (CD in the UV-printed petri dish)



I'm Humanity Live performance at Yamaguchi Center for Arts and Media



Etsuko Yakushimaru (JP) is an artist, musician, producer, lyricist, composer, arranger, and vocalist. Broadly active, from pop music to experimental music and art. Consistently independent in her wide-ranging activities, which also include drawing, installation art, media art, poetry and other literature, and recitation. Producing numerous projects and artists, including her band, Soutaiseirion. While appearing in the music charts with many hit songs, she has also created a project that involved the use of satellite, biological data and biotechnology, a song-generating robot powered by artificial intelligence, and her own voice, an independently-developed VR system, and original electronic musical instruments. Major recent activities include exhibitions at Mari Art Museum, Toyota Municipal Museum of Art, KENPOKU ART 2016, and Yamaguchi Center for Arts and Media [YCAM]. Her Tensei Jingle and Flying Tentacles albums, both released in 2016, received praise from figures including Ryuichi Sakamoto, Jeff Mills, Fennesz, Penguin Cafe, Kiyoshi Kurosawa, and Toh EnJoe.

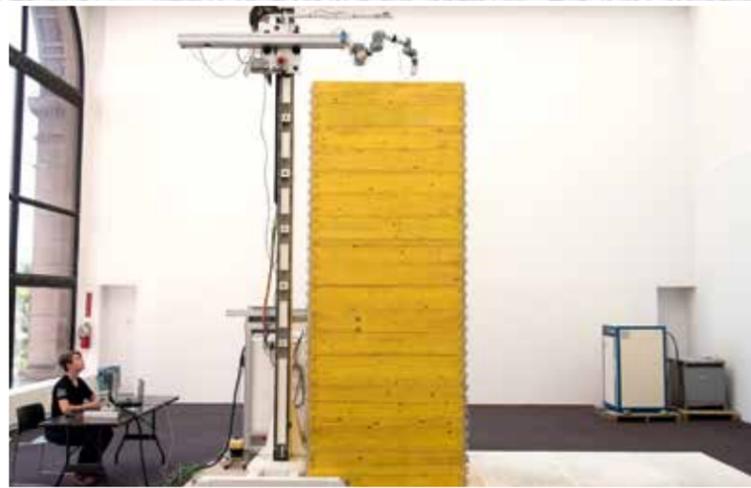


Rock Print

Gramazio Kohler Research, ETH Zurich ^{CH}
and Self-Assembly Lab, MIT ^{US}

Rock Print performs a full-scale 3D “rock printing process” using self-aggregating capacities of the material itself. This visionary research project is a collaboration of Gramazio Kohler Research, ETH Zurich and the Self-Assembly Lab, MIT.

The jury was impressed with the way the collaborators utilized innovative combinations of robotics, 3D printing, and self-assembly to experiment and develop new ways of approaching architectural construction. Their technique is extremely elegant and minimal in form and concept, and it is demonstrated in situ to audiences in public spaces and in their lab. By using granular materials and string, they utilize the physical phenomenon of jamming and demonstrate on a large scale the concept of self-organization that is found in natural systems. They focus on additive digital fabrication techniques used for building non-standardized architectural components, with the aim to develop criteria for a new system of structural logic that can be applied to architecture. Rock Print is built from low-grade granular material and constructed by robotic machines, bringing forward a new category of random packed, potentially fully reusable, poly-dispersed jammed structures that can be automatically fabricated into non-standard shapes. We witness in action full material reversibility and reusability of the aggregated materials; structurally active interlocking, differentiated structural performance that have geometric flexibility and articulation. The piece that was presented could easily be seen as a sculpture, but when we look more deeply into the process, it becomes clear that the elegant shape offers much more to the field of architecture.



The collaborative group developed this project to investigate methods and techniques for design and robotic aggregation of low-grade building material into load-bearing architectural structures that are fully recyclable and re-configurable with high geometrical flexibility and minimal material waste. One could imagine reconfigured architectural structures that are assembled when needed and taken down into the original raw state, moved around and reconfigured to whatever shape the next location would require.

Widespread adoption of robotics is promising to transform the construction industry and building techniques, and will become increasingly automated both on- and off-site. This means change and even dispensing with manual labor—which brings up many questions for the future of construction—both large-scale and small-scale. This project not only demonstrates the potential of future construction but also raises issues that are more easily addressed as we witness how functional and aesthetic qualities “inform” architecture through to the level of material.

Gramazio Kohler Research, ETH Zurich, and Self-Assembly Lab, MIT



Gramazio Kohler Research, ETH Zurich (CH), Since its inception in 2005 the research group at ETH Zurich led by Matthias Kohler and Fabio Gramazio has been at the forefront of robotics and digital fabrication in architecture. With their robotic laboratories and work that ranges from prototypes to building elements, they have inspired architects and researchers alike to explore the capacities of the industrial robot as a universal tool of the digital age. Self-Assembly Lab, MIT (US), Skylar Tibbits is the founder and co-directs the Self-Assembly Lab with Jared Laucks, housed at MIT’s International Design Center. The Self-Assembly Lab focuses on self-assembly and programmable material technologies for novel manufacturing, products and construction processes.



3arabizi Keyboard
Hadeer Omar^{EG}

Although this work is still at the conceptual phase, the jury was impressed by its unique message that technology could empower diversity and ethnicity. Instead of pushing the global standard, it reminds us of the importance to observe how local people interact and design services that will allow for differences in each region, country, and culture. It would benefit many to further develop these kinds of ideas that promote respect and the recognition of diversity while opening up venues for new hybrid communication systems (to emerge).

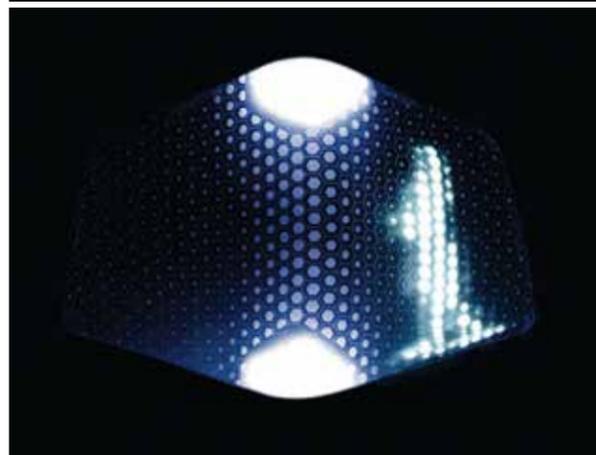


Hadeer Omar

Blink: Humanising Autonomy

Adam Bernstein^{US}, Raunaq Bose^{UK},
Leslie Nootboom^{NL}, Maya Pindeus^{AT}

Autonomous cars, drones, and other moving things will enter the public spaces in the next decade. While the public is informed mostly about the engineering progress, the task of integrating these things into our (human) way of cooperating with each other is rarely addressed. With *BLINK*, four students are suggesting a communication device that encourages the development of a “Language for Autonomous Vehicles.” The proposed system would communicate the intent of the vehicle while allowing pedestrians to influence its decisions. The jury wanted to further encourage this fresh approach towards intuitive interaction with autonomous, mobile machinery.



Adam Bernstein, Raunaq Bose, Leslie Nootboom, Maya Pindeus



[IGNIS AER AQUA TERRA]
Yuima Nakazato^{JP}

The title of this long project by fashion designer Yuima Nakazato is from the names of the elements in Latin—Fire, Air, Water, and Earth. Here we see the vision of each individual wearing their clothes as an extension of their personality and physical attributes. The jury recognized the importance of the idea of having clothing created without being sewn but instead being formed from thousands of components or units. We see this trend in many areas of society and technological development, and to have it also reflected in individual expression is an important contribution to new ways of envisioning the fashion design industry.

Yuima Nakazato

Library of Ourselves
BeAnotherLab

The jury felt that BeAnotherLab team is successfully utilizing virtual reality technology as a true empathy machine—by placing you in another person’s body and making you see the world through their eyes. While changing gender, age, race, or origin we potentially change somebody’s perspective and view on the “others” and on themselves. These experiments, artistically driven, and in close collaboration with several universities, investigate the feeling of embodiment and empathy and are impacting research areas in perception, psychology, neuroscience, and social relations.



BeAnotherLab



Mimus: Coming face-to-face with our companion species
Madeline Gannon ^{US}

Autodesk has taken the lead in how industries could collaborate with artists and designers. While the latest technologies like AI and robots tend to be managed highly confidentially, the jury agrees that it is very important for tech companies to design open collaboration by hosting residential programs and learning from anti-disciplinary groups for innovation.



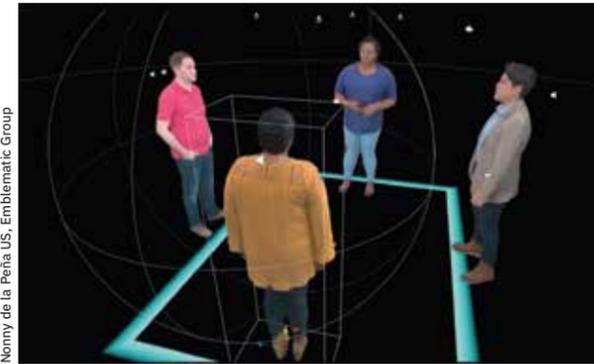
Madeline Gannon

nonvisual-art
Lisa Buttinger ^{AT}

One can never know from where the next groundbreaking idea comes. What will start the next wave of artistic expression? And what else might this lead to? *nonvisual-art* was passed over to the STARTS Prize jury from the u19 category and it was immediately agreed that this project deserves an Honorary Mention. It is strong in its curious investigation while at the same time it is controlled and very open to its "handmade" expression. Not only did Lisa create enchanted images, she also invented her own new media with everyday materials. She used her knowledge of natural science and turned it into an artistic tool where new, beautiful, almost magic images appear. This project is a really good example of how artistic exploration can lead to new expressions, new innovative tools brought to us by a very young artist who has received the right support to enable her to follow and develop her artistic skills and curiosity.



Lisa Buttinger



Nomny de la Peña US, Emblematic Group

Out of Exile
Nonny de la Peña ^{US}, Emblematic Group ^{US}

Nonny de la Peña is known by many as the 'Godmother of VR'. Committed to new ways of storytelling and immersive journalism, she experimented with virtual reality at the UCLA Creative Technology Lab long before the current hype. Her approach has inspired the first Oculus prototype, as well as many other technology companies, media outlets, and journalists. The jury agreed that she has the ability to use the power of virtual reality in a unique way to transport people inside stories and situations to create empathy and raise awareness for real world problems.

Research Institute for Arts and Technology
Research Institute for Arts and Technology ^{AT}

The RIAT – *Research Institute for Arts and Technology* based in Vienna acts as a platform for counter movement by creating space outside of academia and the established gallery system. The RIAT activists do not hesitate to tackle the most difficult and disturbing problems of our contemporary society such as creating crypto-currencies to change the course of our world. Moreover, they have initiated the Journal for Research Cultures to communicate their thoughts and experiences to the global community of academics and beyond. Artistic Bokeh at the Museumsquartier in Vienna and the Coded Cultures festival for fringe research and experimental arts are further activities. RIAT shows successfully how the reference to "Art" can provide an umbrella for unconventional and even revolutionary thinking.



Apertus AXIOM Beta open hardware cinema camera



Research Institute for Arts and Technology

Open Publishing Lab



Arnaud Rivière performing at Coded Cultures



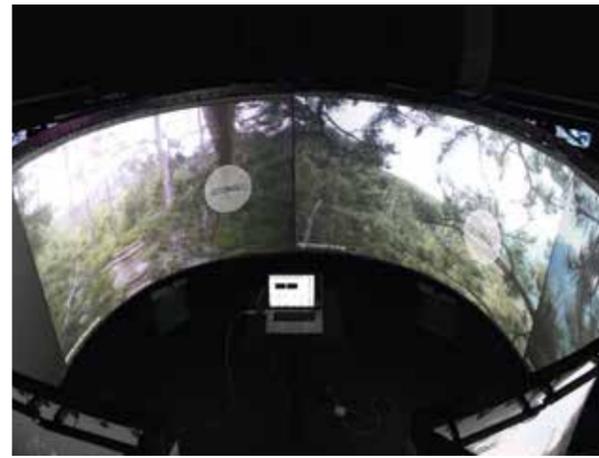
Sentient Veil
Philip Beesley^{CA}

Philip Beesley has succeeded in composing layers of cellular textiles, a multitude of LED lights, and glass vessels containing chemical photocells glimmering in color, into generic beauty. Looking at this work, one imagines the experience as being akin to walking into an ancient dreamy forest, and like such forest, it recognizes you, hissing, breathing, and groaning. The jury appreciated this work for its combination of intricate technology and strong yet elegant aesthetics; a thought-provoking installation that invites us to ponder about our most elemental state of being.

PBAI

Treelab
Marcus Maeder^{CH}, Roman Zweifel^{CH}

The jury was impressed with the unusual pairing of a forest expert and a researcher in computer music and sound technology that is bringing the so far unheard 'sounds of trees' to the surface. By needling tiny microphones beneath the bark of trees, much is revealed about their physiological processes, and about the forest ecosystem in general. Their collaboration resulted in a joint research project on complex environmental data collection and sonification. The sound models serve as a tool to analyze patterns, understand links, and unlock new research areas for both artists and scientists alike. But through a beautiful installation it also helps the general public to experience and gain deeper insight.



Marcus Maeder, Roman Zweifel



Aerocene Foundation
Tomás Saraceno^{AR}



Algaerium Bioprinter and Algae Printing
Marin Sawa^{JP/UK}



aura calculata
Tim Otto Roth^{DE}



**Brian Eno's The Ship
A Generative Film**
Dentsu Lab Tokyo^{JP}



BLOOMS 2: Strobe Animated Sculptures
John Edmark^{US}



Corpus Nil
Marco Donnarumma^{IT/DE}



Bug's Beat
Yumi Sasaki^{JP}, Dorita Takido^{JP}



DuoSkin
MIT Media Lab—Living Mobile Group, Microsoft Research—Natural Interaction Group



G3DP V2: High Fidelity Additive Manufacturing of Transparent Glass Structures across Scales
The Mediated Matter Group^{US}, MIT Media Lab

Marco Donnarumma performing Corpus Nil in a performance. Courtesy of Onix and ZKM Center for Art and Media, Karlsruhe, 2016.

John Edmark

Yumi Sasaki, Dorita Takido

MIT Media Lab—Living Mobile Group, Microsoft Research—Natural Interaction Group

Structures across Scales The Mediated Matter Group, MIT Media Lab

Studio Tomás Saraceno

Jet&James

Tim Otto Roth

Dentsu Lab Tokyo

John Edmark

Yumi Sasaki, Dorita Takido

MIT Media Lab—Living Mobile Group, Microsoft Research—Natural Interaction Group

Structures across Scales The Mediated Matter Group, MIT Media Lab



Light Barrier 3rd Edition
Kimchi and Chips / Mimi Son^{KR}, Elliot Woods^{UK}



Make Do and Mend
Anna Dumitriu^{UK}



Microbial Design Studio: 30-day Simit Diet
Orkan Telhan^{US/TR}, Karen Hogan^{US}, Mike Hogan^{US}



Project KOVR
Leon Baauw^{NL}, Marcha Schagen^{NL}



Silk
::vtol::, Dmitriy Morozov^{RU}



Smog Free Project
Daan Roosegaarde^{NL} and his team of experts



sonicPlanet GeoComposer/GeoPlayer
Sinan Bökesoy^{TR}



Speculative, Fashionable, Wearable
Daijiro Mizuno^{JP}, Kazuya Kawasaki^{JP}



Ugly
Nikita Diakur^{RU/DE}

Kimchi and Chips / Mimi Son, Elliot Woods

Anna Dumitriu

Orkan Telhan, Karen Hogan, Mike Hogan

Suzanne Waijers

::vtol::, Dmitriy Morozov

DerrickWang

Sinan Bökesoy

Daijiro Mizuno, Kazuya Kawasaki

Nikita Diakur

Anticipatory Art Sci Futurists

Joint statement of the STARTS Prize'18 Nomination Committee (Francesca Bria, Andrej Heinke, Sophie Lamparter, Daehyung Lee, Alexander Mankowsky, Seiichi Saito) and the STARTS Prize Jury (Francesca Bria, Andrej Heinke, Sophie Lamparter, Daehyung Lee, Alexander Mankowsky, Seiichi Saito, Kazuko Tanaka, Victoria Vesna, Alex Verhaest)

From the total of 2,344 entries, 811 projects were directly submitted to STARTS Prize'18. These 811 entries were reviewed by an international expert group, the STARTS Prize Nomination Committee, consisting of Francesca Bria, Andrej Heinke, Sophie Lamparter, Daehyung Lee, Alexander Mankowsky, and Seiichi Saito. The group spent three days reviewing the many excellent applications during one of the first sunny weekends in Europe, and singled out 15 projects to be nominated for the STARTS Prize.

In parallel, the Prix Ars Electronica juries were reviewing those projects that were submitted to STARTS Prize as well as to Prix Ars Electronica in the categories Computer Animation, Interactive Art+, and Digital Communities. Each jury was asked to select and to nominate five additional projects from their specific category for the STARTS Prize. For the final decisions, one representative of each of the Prix Ars Electronica Expert Juries joined the STARTS Prize Nomination Committee to form the STARTS Prize Jury, namely Alex Verhaest from the Computer Animation category, Victoria Vesna from Interactive Art+, and Kazuko Tanaka from Digital Communities. We made the decisions together as the STARTS Prize Jury.

STARTS Prize and the overall STARTS program of the Euro-

pean Commission send an important signal to the world supporting art, science, technology and industry collaborations. Everyone in the room understood the privilege of being able to review carefully what creative people worldwide are working on, what they care about, what they feel, and what they feel passionate about. 2,344 projects were submitted by artists, designers, entrepreneurs, companies and universities, individuals, collectives, communities, and institutions. All agreed that successful companies of tomorrow will actively include artists and designers. Targeted thinkers should combine forces with divergent thinkers—those who experiment in the wide-open space, who professionally wander, who are comfortable being uncomfortable. Only by looking at a problem from different perspectives will we find the best solutions. Europe with its strong and diverse cultural heritage, its artistic avant-garde, forward-thinking academia and long-standing industry is an excellent place to demonstrate the power of collaboration and become a global example on how we can co-create the future.

The jury analyzed the global tendencies that emerged throughout the review process and many controversies and questions were discussed at length. Topics that kept

surfacing were related to concerns about the critical environmental issues of our planet—from pollution to wars and human suffering. Many projects submitted were concerned with water—from water quality to sea level rise and plastic in the water. The Great Pacific Garbage Patch, the billions of kilos of plastic covering the water surfaces can no longer be ignored. Artists, designers, entrepreneurs are not waiting anymore for corporations and politics to finally steer this sinking ship but propose their own solutions. The jury also noted that the complicated and evolving relationship between humans and machines is still very much present as a topic of interest for artists and designers. Will these machines help us? Will they replace us? And who is making these decisions? A clear signal was registered—we should consider these complex interactions now and ask important questions such as: Is it ok to design virtual assistance who sound exactly like humans? How do we consider data and privacy when we speak about brain-computer interfaces? How can we understand and communicate with autonomous systems, like cars on the streets?

Finally, the jury also got a glimpse into what's going on in the global mind and what the future might bring.

Artists, scientists, designers, engineers working together are futuristas, or as Buckminster Fuller would say—Anticipatory Design Scientists who are preparing us for what is coming. Considering the main trends that emerged, the jury was interested in picking visionary ideas for the future that look to practical applications which could have an impact on existing models of production and by extension society in general. The ultimate questions were whether the project pushes at the known boundaries and exhibits high technological and aesthetic sophistication as well as excellence in research.

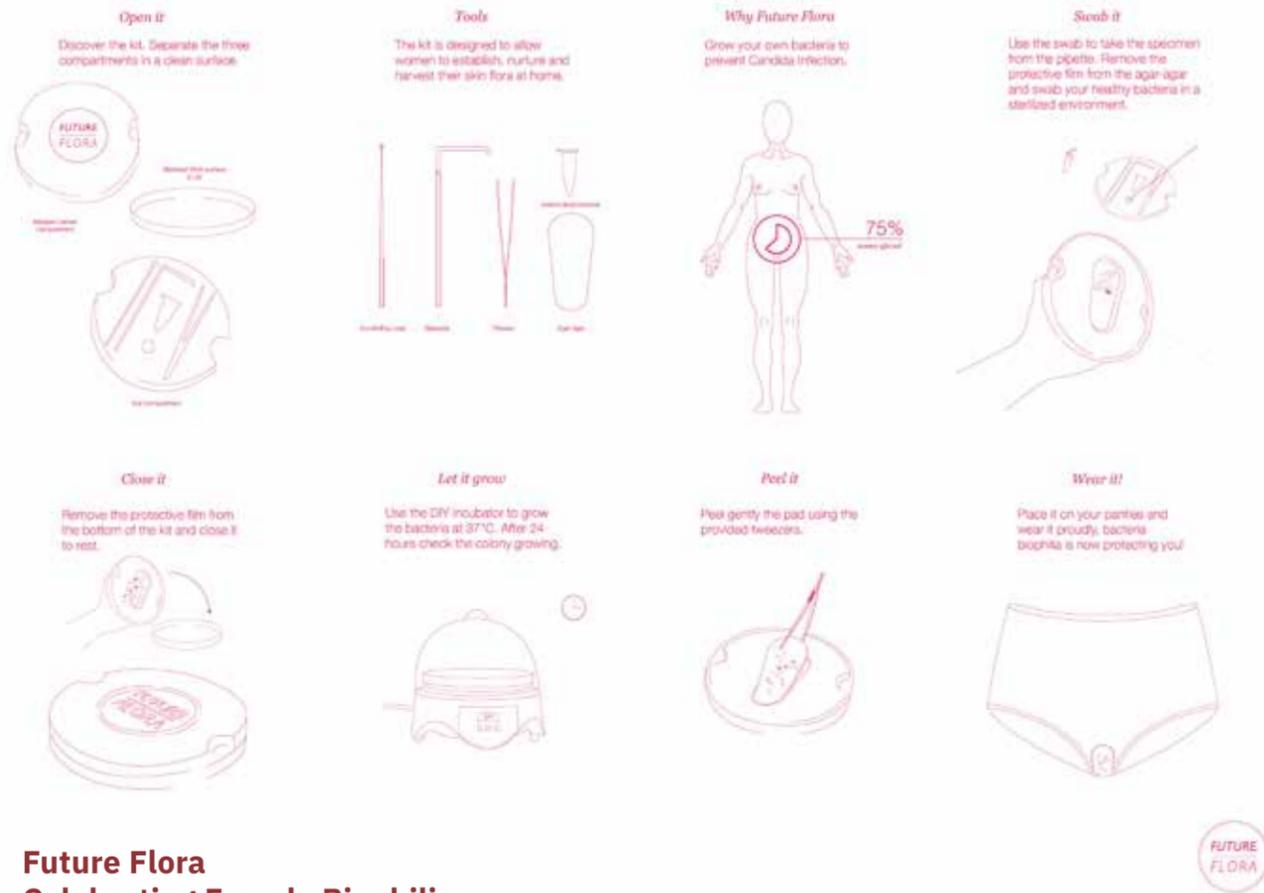
In an elaborate process that includes an open call and recommendations by advisory experts, a total of 2,344 entries from 88 countries were submitted during the application period that ran from January 10th to March 12th, 2018. Out of the total number of 2,344 entries, four groups of experts nominated 30 projects for the STARTS Prize, which were presented to the STARTS Prize jurors for final consideration. Following extensive deliberations, the STARTS Prize'18 Jury decided to award *Future Flora—Celebrating Female Biophilia* by Giulia Tomasello for Artistic Exploration, and *Amsterdam's 3D Printed Steel Bridge* by MX3D & Joris Laarman Lab for Innovative Collaboration.

S+T+ARTS Prize'18
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.

Jury Statement

Jury Statement



Future Flora
Celebrating Female Biophilia
Giulia Tomasello ^{IT}

Through the thick digital forest, there was a distinctive and loud call for returning to nature, attention to life, biology, the self, the body—especially empowering the female body and its sexuality which came as no surprise after a year of #MeToo. Responding to this collective consciousness wave, the jury agreed that *Future Flora* embraced the issues of reclaiming female power—with DIY and no shame—in a way that could prove empowering to others seeking to find a voice. Interaction designer Giulia Tomasello brings to the forefront issues that the medical community should consider in their production of pharmaceuticals for women. This project also engages the public to consider feminine hygiene and the surrounding taboos. It makes us think differently about bacteria in general—important in times of overuse of antibiotics and antiseptics that are destroying the ecological balance. With the advent of scientific research into the microbiome, the designer asks how we feel about the idea that we consist almost entirely of bacteria. Many existing thrush treatments include a whole host of chemicals that cure yeast infections but also destroy

good bacteria, making things worse for women. In her own words, Giulia explains that “the kit has been designed to allow women to establish, nurture and harvest their very own personal skin flora at home, becoming not only consumers but also active participants in their own health and wellbeing.” Digital technologies are tricking us into an immaterial world made out of shining data. As Digital Ghosts, we are hallucinating about being almighty, even immortal under the sun of a God-like AI. Giulia Tomasello forces us to lower our gaze from the digital heaven to the most vulnerable female body part—the vagina. With *Future Flora* she demonstrates this vulnerability as a strength, using the embodied openness as a medium between internal and external organisms, creating in this way what she calls “Future Flora”. *Future Flora* provides a clear and loud signal that “Future” is not only “Digital.” The STARTS Prize Jury got Giulia’s eye-opening message: there is a huge potential for innovation in the European spirit, but we must not forget that it is our bodily existence that fuels the imagination.



Giulia Tomasello (IT), born in 1990, is an interaction designer and researcher specializing in wearables, biotechnology, and material finishes. She is currently Research Assistant in Interactive Wearables at Nottingham Trent University. In the past two years she has been investigating the potential of biotechnology and living materials, proposing a biological and sustainable alternative for electronic textiles. She considers herself a maker and explorer, using materiality to question and communicate the boundaries between technology and our bodies. By designing alternative scenarios and acting as a creative thinker, Giulia questions our notions of wellbeing to develop innovative tools in the intersection of medical and social sciences. These intersections are enabled by her multidisciplinary collaborations and the symbiosis between her creative and scientific work, generating knowledge exchange and social integration in healthcare.



Adriaan de Groot

Adriaan de Groot

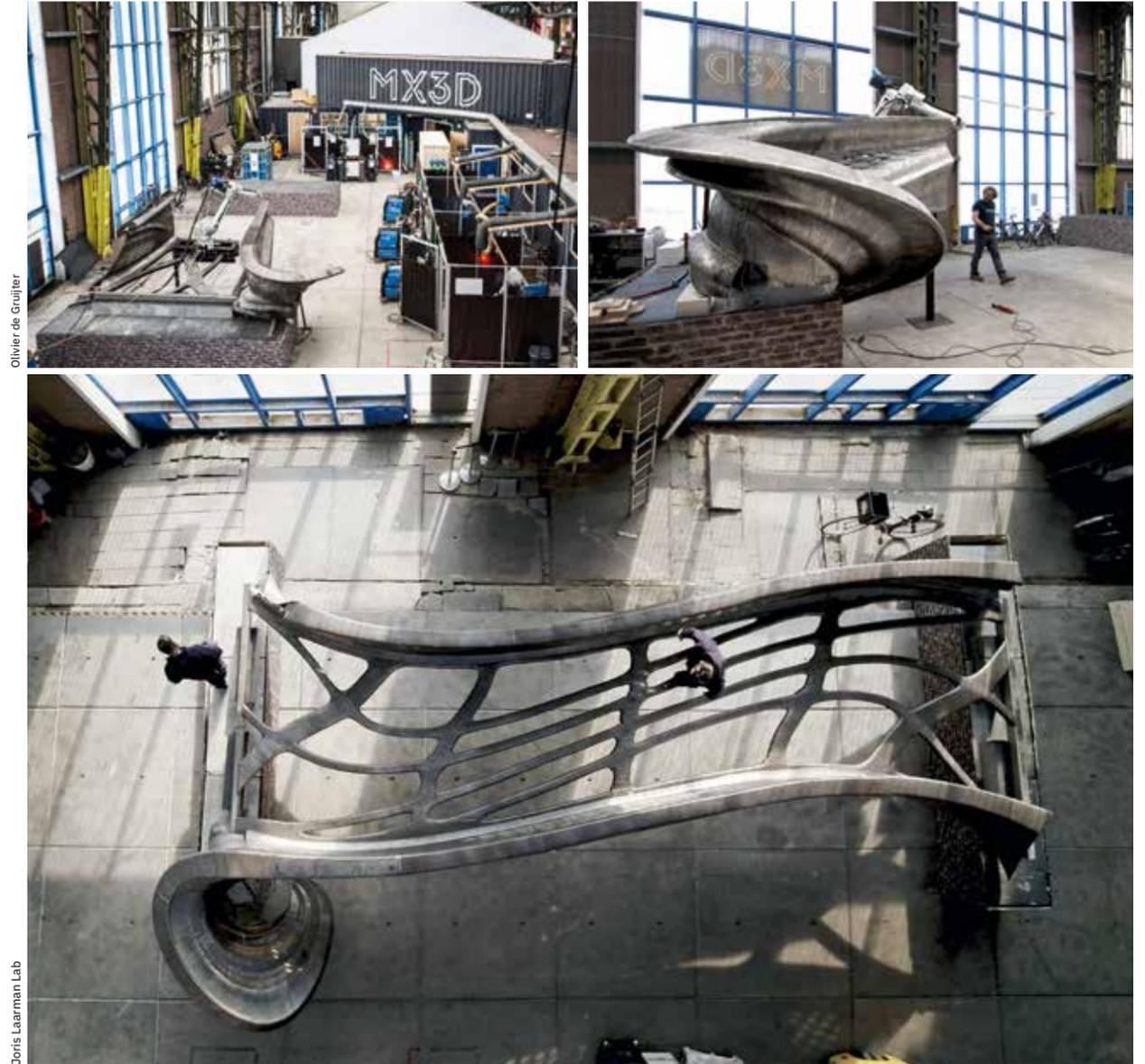
Amsterdam's 3D Printed Steel Bridge MX3D & Joris Laarman Lab^{NL}

Designing for 3D-printing opens up a whole new world of complex forms and shapes previously impossible with traditional techniques, says Tim Geurtjens, co-founder and CTO at Dutch design studio MX3D. The jury found their 3D-printed metal bridge a really important marker for the future of architecture and construction. The bridge was designed for one of the canals in Amsterdam's Red Light District, by Joris Laarman Lab.

Architects working in this area are convinced it won't be long before additive manufacturing transforms their discipline. This opens up all sorts of new aesthetic possibilities. Traditional steel or concrete structures have a high level of redundancy—material that doesn't need to be there, but which is too difficult or expensive to remove. But 3D-printing allows material to be placed only where it is required. This project is not only great in engineering and design but also generates discussion about the future of design and construction. Robotic arms are getting more sophisticated

by the day and can be used to print in traditional materials, such as plastic, concrete, or composites, or employed to weave or knit three-dimensional fiber structures.

The bridge is 12 meters long and 6 meters wide, and will be installed in the old city center of Amsterdam across a canal, early next year. The project innovates the type of materials and the techniques used and presents a new kind of open collaboration amongst MX3D engineers, Amsterdam city officials, scientists at Arup, and Imperial College London to define data-driven algorithmic methods for evaluating the safety of the bridge and enabling the bridge to interpret its environment. Sensor data will feed into a "digital twin" of the bridge, creating an algorithmic model that responds to the data in real time. This is the beginning of a great urban transformation. There are many large-scale 3D-printing projects happening all round the world but this project has built something that works for people living in a large European city and is leading the way.



Olivier de Gruijter

Joris Laarman Lab

MX3D (Amsterdam, 2015) is led by CEO Gijs van der Velden and CTO Tim Geurtjens. It is a spinout company originating from the renowned Joris Laarman Lab. The company develops (mobile) 3D large scale printing solutions. Its robotic metal printing technique allowed for the introduction of all the creative and practical advantages of 3D printing to entirely new industries like architecture and engineering. Initially the company inspired the tech community by sharing their early experiment on social media. The ecosystem created by this open attitude towards innovation formed the breeding ground for the innovative collaboration needed to construct the Bridge project. The company is collaborating with a bridge builder in the Netherlands and will supply its technology to several other industries within the next years. **Joris Laarman Lab** (Amsterdam, 2004) is an experimental playground set up to study and shape the future. It tinkers with craftsmen, scientists, and engineers with upcoming technology and its consequential esthetics. The lab was started in 2004 by Joris Laarman and filmmaker Anita Star. Joris attended the Design Academy Eindhoven in 1998 and graduated cum laude in 2003. Anita studied film at the UVA in Amsterdam. The lab first gained attention with the Reinventing Functionality project, which included functional rococo radiator Heatwave that was picked up by Droogdesign and is now produced by Jaga. Joris Laarman Lab has over 70 works in 37 museums like the MoMA, V&A, Centre Pompidou, and recently the Rijksmuseum Amsterdam where the Bone Chair is exhibited. In 2011 Joris Laarman received an "Innovator of the Year" award by The Wall Street Journal and in 2016 the Amsterdam Art Prize. In November 2015 an extensive solo exhibition of the experimental work initiated by the Groninger Museum was visited by more than 200,000 visitors and started travelling around the world.



489 Years
Hayoun Kwon^{KR}

489 Years is located in the demilitarized zone (DMZ) between North and South Korea—a dangerous place filled with unmapped landmines and hidden from media coverage. This highly relevant topic became even more so in the time between the jury deliberations and the present. In this interactive VR piece, the viewer approaches, enters, and experiences the DMZ through the eyes and memories of a South Korean soldier. First-person perspective is key to the engaging qualities of the piece and VR technology is used successfully by the artist to enhance immersion in the subject in deeply moving ways. Rather than approaching this space as a mere zone of war, the narrator speaks about the redemptive qualities of the beauty of its untouched natural state. By attracting attention to the silent force of nature in the landmine-filled DMZ, Kwon creates an atmosphere of discomfort for the viewer. Her poetic approach to this difficult problem reverberates a surreal atmosphere which is highly pertinent to the current state of affairs. The jury felt that this experience brings humanity and empathy to a very sensitive topic that is frequently misunderstood or lost in political discourse.

Hayoun Kwon

BLITAB – the innovative tablet for the blind

Kristina Tsvetanova^{BG}, Slavi Slavev^{BG} / BLITAB Technology GmbH

The temptation when talking about digital technology is often to focus on its visual aspects—not only the transfer of images, but also the aesthetics of digital tools. A world away from the dull, metallic minimalism that dominates tech design, the *BLITAB* offers an alternative view. Invisible to the uninitiated eye, the beauty of this niche product is the result of thoughtful, functional technology that can truly improve people’s lives. In our image-obsessed world, the needs and special abilities of visually impaired people are often neglected when it comes to digital experiences. Using unique technology to create a textured display, the *BLITAB* transforms text and graphics into legible bubbles. Thanks to this cutting-edge device, which translates text into “smart braille” in real-time, the pleasure and usefulness of reading online can be accessible even to those who cannot see clearly. When imagining an audience for technological creations, the jury agrees that the focus should be on humanity rather than on customers.



Kristina Tsvetanova, Slavi Slavev / BLITAB Technology GmbH



Mao Yamamoto



Florian Voiggeneder

ELECTRONICOS FANTASTICOS!
Ei Wada^{JP} + Nicos Orchest-Lab^{JP}

What is the role of media art? Wada has been using old consumer electronic devices like CRT televisions, radios, rotary dial phones, camcorders, and more for his pieces. He begins by collecting these items at workshops, in collaboration with local communities. The process seems to revive all of these forgotten devices, transforming old into new. The end result is really cool techno music, sounds one never could have imagined by simply looking at the old gathered items from his workshop. Even more beautiful is the community that he creates around this movement, here everyone of all ages and backgrounds comes together (dressed proudly in the same border shirts) to form his supportive tribe. As it builds, the media art piece gains momentum and opens doors of how tech can work for communities, and offer experiences of life-changing processes and outcomes. *ELECTRONICOS FANTASTICOS!* represents one of the most important roles of media art: opening doors for everyone, and introducing them to new worlds that they have never before experienced.

Fennec Turbine
Maxim Kuzin^{RU}, ATOM

Maxim Kuzin aimed to square the circle: Merging beauty, sustainable use, and longevity under harsh conditions. He succeeded by creating the *Fennec Turbine*. It carries on the best Russian traditions, because it works everywhere, under all conditions, without maintenance and it has a deeper purpose of making our world more sustainable. Inspired by a hyperboloid shell structure from the Russian past, Kuzin transferred it from a static plane to a full-fledged dynamic space using supercomputing powers and futuristic alloys from aviation. The resulting structure made of aluminum blades with an optimal airfoil profile looks more like an almost weightless sculpture or a precious vase. Yet it is inherently practical, would look beautiful on every urban roof, and produces power in conditions under which other products cannot work effectively. The STARTS jury gave Maxim Kuzin an Honorary Mention and sees his project as truly European.



Maxim Kuzin RU, ATOM



Luca Zanier

FluidSolids
FluidSolids® AG CH

If society wants to be serious about the environment, the production and use of synthetic plastic, especially single use plastics, has to stop. The designer Beat Karrer, with a small team in Zurich and through a research collaboration with the University of Applied Science in Rapperswil, invented a serious alternative. *FluidSolids* is a new bio-based material made from natural industrial waste like wood, foods, or paper. Compared to other bio-polymers currently on the market, this approach is convincing as it uses existing waste and turns it into value without any compromises in design or quality of the material. This bioplastic can be used for furniture, interior design, electronics, and packaging—the only difference is it's either reusable or 100% compostable. Companies and large industrial players will only make impactful ecological investments if they also offer clear economic benefits.



Making Sense—Citizen Sensing Toolkit
Making Sense Team

The CAPS EU funded project *Making Sense*, co-ordinated by the Stichting Waag Society, shows how citizens can use open source technology and open sensors to collectively act at the civic level. Making Sense developed an easy to install Toolkit—including a sensor kit and a data platform—which allows citizens to collect, share, and interpret open data about temperature, humidity, noise, and air quality. The project enables citizens, city halls, and communities to use data for the common good, since it can improve citizens' environmental awareness. The smart *Citizen Sensing Toolkit* fosters citizens' engagement in solving urban environmental issues they care about. It also facilitates their collaboration with experts and technologists to achieve positive change through real world pilots.



Nerea Coll @Sónar Festival @Advanced Music



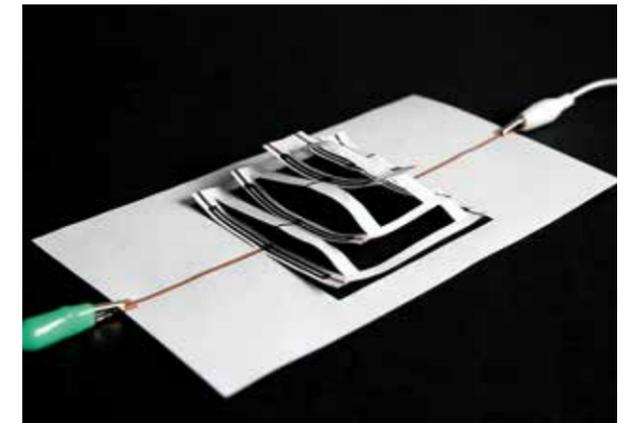
Albert Muñoz @Sónar Festival @Advanced Music

phosphere
Rhizomatiks Research JP, ELEVENPLAY JP,
Hironori Evala (evala) JP, Takayuki
Fujimoto JP (Kinsei R&D)

The jury found *phosphere* to be an excellent example of a complex immersive artwork / dance performance piece created by a large interdisciplinary collaborative group with visual and technical direction under media artist Daito Manabe and the Rhizomatiks Research studio. The unique performance experience brought together creatives from engineering, sound, stage design, featuring ELEVENPLAY choreography and dancers and signifies a new era of stage direction and design. *phosphere* (“sphere of light”) uses advanced digital technology to reproduce the processes of crystallization of certain minerals in a physical space and participants find themselves as part of an ever-changing, intangible architecture of light flickering about them, as if guided by intuition. The movements of light beams are reminiscent of natural forms waving beneath the surface of water or blowing in a breeze. At once a scene and an installation, *phosphere* entails both the physical space of the room and a space imagined within a computer.

Printed Paper Actuator
Morphing Matter Lab at
Carnegie Mellon University

We have been living with paper for more than two thousand years. It is a commodity that closely interfaces with human beings, even in this digital age. There have been several attempts at tech paper innovation over the past few years, for example, circuit ink printers and pens, but there has not yet been a huge innovation. However, the *Printed Paper Actuator* takes a new approach—not just printing circuit but actually kinetically working with paper. This innovation transforms the old media of paper and signals a new phase of media expression for industrial purposes (prototyping) and/or for pleasure (DIY for kids). These technological and material innovations take our idea of paper to the next level.

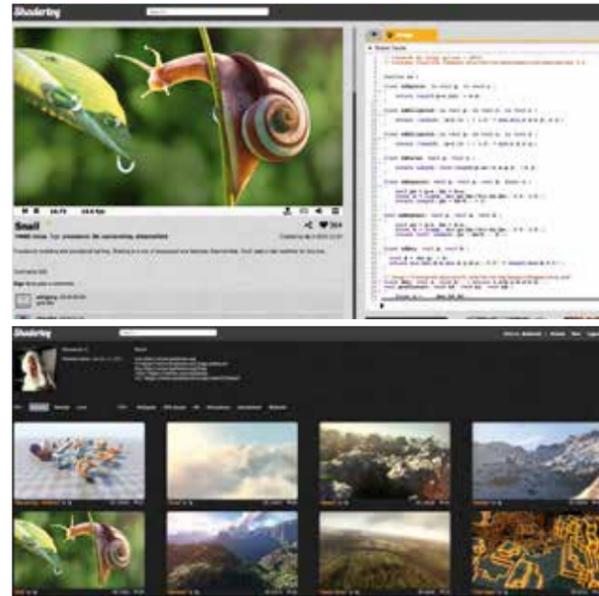


Morphing Matter Lab at Carnegie Mellon University

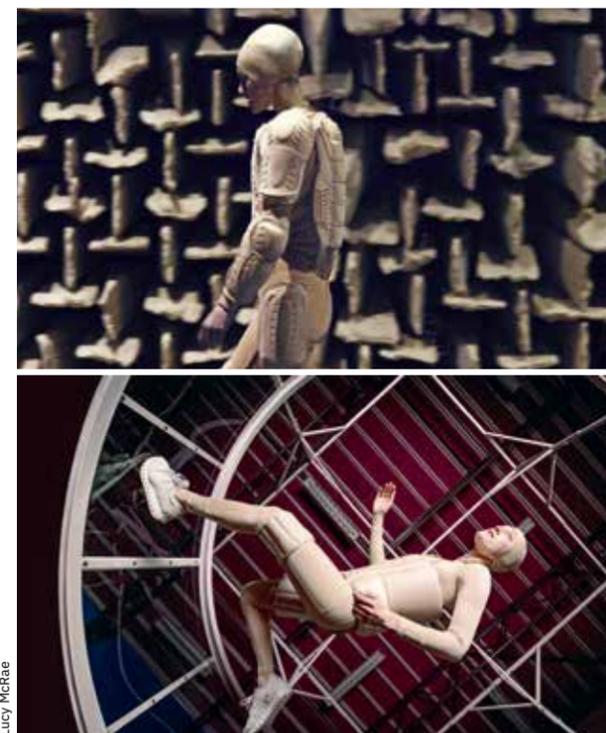
Shadertoy

Pol Jeremias Vila^{ES}, Iñigo Quilez^{ES} / Beautypi

Since the Open Graphics Library (OpenGL) was created in the 1990s, 2D and 3D graphic expressions have stepped into a new generation. The beauty of 3D graphic for games, films, and animation have been advancing based on this Open Library Platform for graphic hardware. The animation industry, however, has been struggling with shader, as it requires knowledge of programming, 3D creative platform rendering, and hardware. *Shadertoy* emerged in 2009, dedicated exclusively for WebGL, which has become the main browser based platform for 3D interactive and real-time animation. This open platform for creating and sharing shaders is by and large the next big leap for every creator, student, and educator in the field. The jury felt it was important to recognize the work that has served over 11,000 creators who have contributed their experiments, rendering techniques, and procedural art. *Shadertoy* is a good example of crowdsourcing and openly sharing creative knowledge that leads to better artworks as well as professional applications.



Pol Jeremias Vila, Iñigo Quilez / Beautypi



The Institute of Isolation
Lucy McRae^{UK/AU}

The jury recognized that the work of Lucy McRae has been successful in capturing the public's attention. Her movies reference genetic engineering, space travel, sensory deprivation, and the changing of the human body in relationship to these scientific advances. Although fictional and clearly an artist's vision, what is particularly striking about her films is the obviously deep and serious research that goes into the development and creation of the work. Here is an example of artwork that functions as many science fiction authors have—as visionaries that later inspire scientists to manifest the ideas into reality—making what seemed impossible at the time possible. In *the Institute of Isolation*, the artist addresses issues of our bodies and minds being slowly conditioned to a new set of possible existences—on other planets, with different sensory experiences. Inspired by the book, *Evolving Ourselves* in which the authors claim that we are not subject to Darwinian notions of evolution by nature but by our choice, she produced a film that is in-between science fiction and hard science—a quite possible future scenario. This vision may prove to be of interest to those who are envisioning travel and life on other planets or even how we may have to change to survive the environmental destruction of our own planet. This project was sponsored under the aegis of the EU-funded project SPARKS.

Lucy McRae



Justine Enard

Alter
Kohei Ogawa^{JP}, Itsuki Doi^{JP},
Takashi Ikegami^{JP}, and
Hiroshi Ishiguro^{JP}



Refik Anadol Studio

Archive Dreaming
Refik Anadol Studio^{TR}



Natsumi Kato, Hiroyuki Osone, Yoichi Ochiai

DeepWear
Natsumi Kato^{JP}, Hiroyuki Osone^{JP}, Yoichi Ochiai^{JP}



Etsuko Ichihara

Digital Shaman Project
Etsuko Ichihara^{JP}



Majid Almashtarawi

GreenCake Block
Majid Almashtarawi^{PS}



Hyphen-Labs / Carmen Aguilar y Wedge, Ashley Baccus-Clark, Ece Tankal, Nitzan Barto

NeuroSpeculative AfroFeminism
Hyphen-Labs / Carmen Aguilar y Wedge^{US/MX}, Ashley Baccus-Clark^{US}, Ece Tankal^{TR}, Nitzan Bartov^{IL}



James Paterson

Norman
James Paterson^{CA}



Andrew Styan

Off Grid
Andrew Styan^{AU}



Yasmin Litschauer, Chiara Mazanec, Aisling Pircher, Laura Scheidl, Johannes Zottele

Pounding Heart
Yasmin Litschauer^{AT}, Chiara Mazanec^{AT}, Aisling Pircher^{AT}, Laura Scheidl^{AT}, Johannes Zottele^{AT}



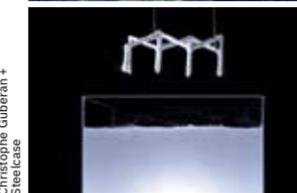
Markos Kay

Quantum Fluctuations
Markos Kay^{CY/UK}



http://radio.garden

Radio Garden
<http://radio.garden>



Self-Assembly Lab, MIT + Christophe Guberan + Steelcase

Rapid Liquid Printing
Self-Assembly Lab^{US}, MIT + Christophe Guberan^{CH/US} + Steelcase



Akinori Goto

Rediscovery of Anima
Akinori Goto^{JP}



Future Robotics Technology Center (fuRo), Shunji Yamanaka

RidRoid "CanguRo"
Future Robotics Technology Center (fuRo), Shunji Yamanaka^{JP}



Greg Dunn, Brian Edwards, Will Drinker

Self Reflected
Greg Dunn^{US}, Brian Edwards^{US}, Will Drinker^{US}



Freecoin "cornucopia", logo: Andrea Di Cesare

Social Wallet
Dyne.org



Xxx

VFRAME: Visual Forensics and Advanced Metadata Extraction
Adam Harvey^{US}



Xxx

Who Wants to Be a Self-Driving Car?
Joey Lee^{US}, Benedikt Groß^{DE}, Raphael Reimann^{DE}, MESO Digital Interiors, David Leonard^{US}

Poesis into Praxis: Hybrid Creative Activisms

Joint statement of the STARTS Prize'19 Nomination Committee (Francesca Bria, Nadav Hochman, Daehyung Lee, Alexander Mankowsky, Şerife (Sherry) Wong) and the STARTS Prize'19 Jury (Ferdī Alici, Francesca Bria, Rikke Frisk, Nadav Hochman, Daehyung Lee, Alexander Mankowsky, Moon Ribas, Şerife (Sherry) Wong)

From the total of 2,278 entries, 731 projects were directly submitted to STARTS Prize'19. These entries were reviewed by the STARTS Prize Nomination Committee, an international group of leaders from the arts, academia, and industry. This diverse group spent three days reviewing the applications and singled out 13 projects to be nominated as finalists for the STARTS Prize. In parallel, three additional Prix Ars Electronica juries—focusing on the categories of Computer Animation, Digital Musics & Sound Art, and Artificial Intelligence & Life Art—reviewed the projects that were submitted to the wider Prix Ars Electronica. Each of these three Prix Ars Electronica juries was then asked to nominate five additional projects from their specific award category for the STARTS Prize. Out of this group of 28 finalist projects for the STARTS Prize, the two Grand Prize winners and eight Honorary Mentions were determined by the STARTS Prize Jury, a group comprised of the STARTS Prize Nomination Committee and one representative from each of the three Prix Ars Electronica juries.

The European Commission's STARTS Program and Prize has become a dynamic global barometer through which new collaborative, cross-disciplinary, creative visions can be examined. With 2,278 project submissions to this

year's competition, representing work by artists, designers, technologists, and scientists, the program has grown to function as a critical instrument in showcasing alternative ways to see and question ourselves and others while maintaining an unbounded terrain that allows freedom in creative and technical experimentation. Throughout vibrant deliberations, the jury recognized and emphasized time and again the cruciality and significance of the STARTS program's distinctly European message, shining light on new pathways to innovative yet positive societal change driven by deep humanistic values and rooted in a long and extraordinary tradition of responsible cultural experimentation.

In the face of tectonic technological developments, environmental changes, and consequent volatile political climates, the majority of this year's projects go beyond the dialectic of legitimate and illegitimate ends and instead unfold the ways in which emerging technological developments affect not only what we can do but also what we can be. The jury noticed numerous projects' deep concern with emergent means of production that attempt to redefine our relations with and understandings of new forms of technology. Against technological totality that is becoming ever more efficient and translucent, many projects offer

instruments for individual and collaborative interventions that promote social and political awareness while facilitating an authentic sense of agency for positive change. This tendency was apparent throughout the review process. Many of the submitted projects deal with current and future environmental concerns, raising awareness but also providing concrete tactics and solutions. Other projects unveiled surveillance systems, delineating the mechanisms through which technological devices are constructed and helping us gain control (even if only partial) over our surroundings. The jury also noted the recurrent complicated relationship between the artificial and the biological, the subjectivity of science and the potential mutability of the body and identity. Finally, the jury appreciated the continued integration of more traditional artistic methodologies into unexpected environments and situations, offering alternative perspectives and insights within the field of medicine and medical training, in transportation of autonomous vehicles applications, and in strengthening dialogue and a sense of meaning among diverse communities—all emphasizing the centrality of humans and other living creatures in the development of technological ecosystems.

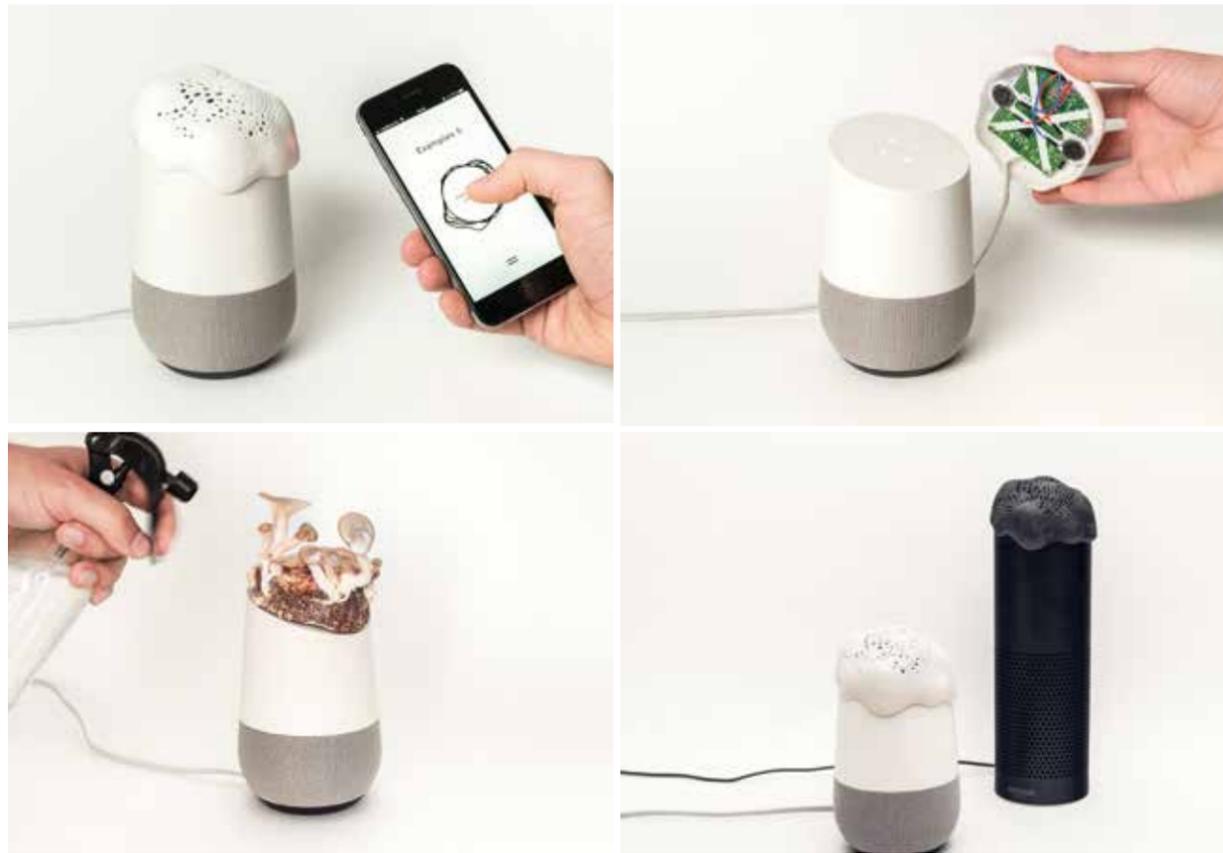
It seems to us that the message from these projects is

clear: the more evasive technology becomes, the more extrinsic agency becomes possible and necessary and, as a result, everything around us becomes a means in its service. The basic gesture here, so it seems, is to show how artistic thinking provides us with an empowered sense of hope for positive change—even in a state of totally administered, seemingly impenetrable, and universally invasive technological environments. And as the winners and nominees of this year STARTS Prize exemplify, this change is apparent and tangible on the individual, group, and societal levels.

The jury feels that this message of hope is symbolically appropriate on the occasion this year of Ars Electronica's 40th anniversary—an institution that has grown to become a responsible cultural leader, relentlessly advocating for the cruciality of the arts within technological and industrial setups; providing countless opportunities for conversing, collaborating, showcasing; and exposing the global community to the wonders that occur in the in-between spaces of art, technology, and society. We are grateful to Ars Electronica for giving the jury an opportunity to take part in their extraordinary mission and wish it continued boundary-pushing endeavors that cumulatively bring us all one step closer to a better tomorrow.

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.



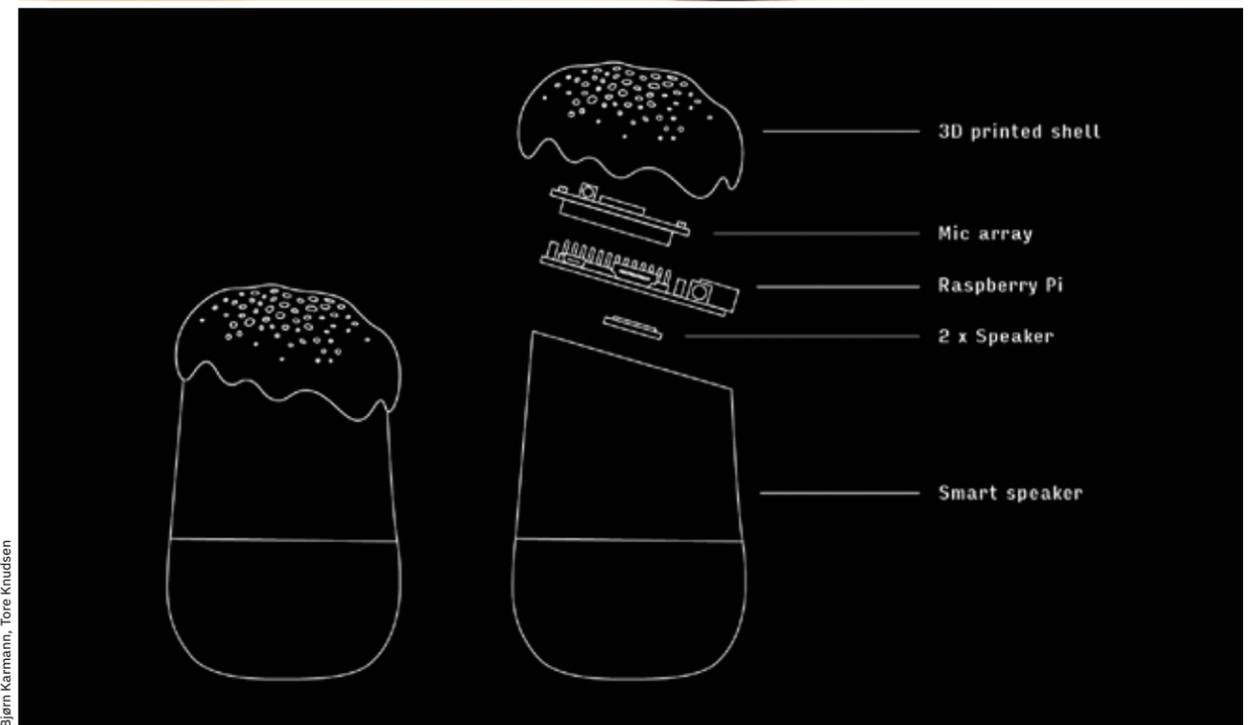
Björn Karmann, Tore Knudsen

Project Alias. Rename your home assistant and make sure it never listens.

Björn Karmann^{DK}, Tore Knudsen^{DK}

As many domains of our private and social lives are being transfigured by new technologies of identification, monitoring, analyzing, and controlling, Karmann’s fungus-looking “parasitic” device offers a poetic yet concrete DIY intervention that allows anyone to appropriate any voice-activated appliances, thus making smart assistants less invasive. As the project title suggests, Karmann effectively uses the artistic alienation effect (“making it strange,” or defamiliarization) to make the technology different and alien to us, as something to be carefully observed, learned, and potentially changed. It is a magnificent example of turning poesis into praxis, offering a balance in conveying technology’s means of communicability while effectively changing its mediality. *Project Alias* exemplifies how contemporary technologies—in this case, smart assistants—require that we open ourselves to the passive reception of the condition under which technology can be used: the user is used by the voice assistant in order to collect data about our private lives and environments. The medium is indeed the message, as

McLuhan used to say, and we the users and our private data increasingly, and in some cases unintentionally, become the content of that message. *Project Alias* offers to flip these power relations on their head, allowing us a more reciprocal exchange: producing white noise to prevent the speaker from constantly listening or teaching it to recognize our voice to help secure our privacy. *Project Alias* breathes new life into the metaphor of the parasite by turning it into an applicable political tool, hijacking a technological “host” in order to change their operations and in turn affect their relations to their surroundings. The parasitic intervention can take one of two forms: the host might do all it can to eradicate the parasite, or it might rearrange things to accommodate the needs of the parasite. In either case, the presence of the parasite means that things cannot, and will not, remain the same. *Project Alias*, the jury hopes, will prompt the industry to incorporate and adjust to this parasitic disturbance and provide us with transparency and control over our own technological environments.



Björn Karmann, Tore Knudsen

Björn Karmann (DK) is a Danish designer working at Tellart, Amsterdam. He holds a Master’s Degree in Interaction Design from the Copenhagen Institute of Interaction Design and a Bachelor’s degree in Communication Design from Kolding Design School. Graduating from CIID with highest honor, his graduation project (The Objectifier) has won multiple awards and pushed the thinking of machine learning as a means of prototyping and enriching spatial interaction. Björn combines his curiosity for new and emerging technologies with his passion for physical and human interactions, while finding a balance between nature and technology. With experience in design, installation art, robotics, and physical computing, he works across multiple disciplines and manifests between physical and virtual space. **Tore Knudsen (DK)** born in 1992, is an Interaction designer based in Copenhagen, Denmark. He holds a Master degree in Interaction design from K3, Malmö University, and has previously worked as a digital designer. Currently, he is working as a User Experience designer at Topp Innovation & Design in Malmö, Sweden. Tore’s interest in design and technology started with photography and has expanded into many different mediums, ranging from web to physical installations. His work is often driven by an interest to explore and challenge our relationship with modern technology and he mainly does so through design and prototyping.



Jorge Franganillo

Ciutat Vella's Land-use Plan
Big data, KDD, and Citizen Participation to Ensure Coexistence
between Economic Activity and Citizens' Quality of Life.
300.000 Km/s^{ES}

In Jean-Luc Godard's seminal 1965 film by the same name, "Alphaville" was a dystopian smart city that was optimized and consequently ruled by a central computer processor labelled "IBM." And come the early days of the implementation (and eventual failure) of early versions of these technologies around the year 2000, smart cities were in fact presented as glitzier versions of Alphaville. In today's updated version of Alphaville, we see Big Tech succeeding both technically and politically in applying technologies more familiar to us on our smartphones to entire city neighborhoods, namely the Toronto waterfront. Yet again as in Alphaville, a data-driven ecosystem is being erected in which the extent of citizens' participation is restricted to the mere configuration of tools that were designed and developed by overlord-like companies. And given Godard's grim vision of the data-driven city, it is no wonder that citizens across the globe today are worried by what this increasing integration of sensors and data-collection into our cities augurs for our collective futures. 300.000 Km/s represents a refreshing alternative path for smart city technologies. The Barcelona initiative wants to

reverse the top down, Big Tech-led smart city approach by putting citizens first, and using arts, technology, and data science to unleash the potential of human-centered urban planning and innovation. It proposes an urban plan designed through a large-scale participatory democratic process that engages thousands of citizens via the online platform decidim.barcelona. The objective is to then apply the learnings and insights gathered through this platform to tackle gentrification and find a balance between urban design interventions that serve tourists and the city's other commercial and economic engines, and interventions that serve the day-to-day needs of local residents. Can the digital layer influence how urban planners grapple with questions of social justice and health such that our cities champion the common good over capitalist gains for the few? Can the arts, data science, and democratic participation revive social, ecological, and economic equities in our urban spaces? In grappling with these questions, this work shows us compelling news way to meld crowdsourcing and data analysis to erect a new collective infrastructure for a shared, prosperous, urban future.

Housing density



69,6% premises are housing
 7,6% premises are business
 3,6% premises are offices

Population density



774 inhab/Ha CVella (avg)
 951 inhab/Ha Raval (máx)
 622 inhab/Ha Bcn (avg)

2nd district with more unemployment rate
 24% demand for social services

13.000 loss of population last 10 years
 9,2% raise of rental prices (2013-15)

Quality of construction



4 m2/m2 of land (avg)
 4 floors (avg in residential buildings)
 31% streets < 10 m wide
 63% plots < 200 m2
 150 m2 avg of business premises

Buildings before 1940
 Buildings in poor conditions
 Extreme residential vulnerability

Saturation of diurnal activities



5 public establishment/Ha
 20,98 public establishment/1.000 inhab.
 28 public est. 50 m radius (max)

2.831 public establishment + hotel 2010
 1.980 public establishment 2010

3.040 public establishment + hotel 2017
 2.191 public establishment 2017

41,15% bars and restaurants 2017

Saturation of nocturnal activities



Demonstrated health impact due to noise of nocturnal activities.

Noise complaints related to **street cleaning and waste collection.**

Impact in the public space due to **overcrowding.**

Impact of logistics related to premises.



300,000 Km/s

300.000 Km/s (ES) is an urban innovation office based in Barcelona that explores the potentials of data and new computation paradigms to extract relevant information with the aim to improve urban planning and decision-making. Directed by Mar Santamaria Varas and Pablo Martinez Diez, our interdisciplinary team works in the fields of urban analysis, cartography, strategic planning, development of digital tools, and digital humanities. In the last five years, we have collaborated with public entities, international firms, cultural and scientific institutions, and non-profit organizations. Our projects have been recognized with various awards and mentions—among others BBVA-Cívico Data Visualisation Award (2014), Open Data Institute Awards (2016), CityVis Prize (2017), Biennial Española de Urbanismo y Arquitectura (2018), and Lluís Carulla Award (2018)—and have been exhibited at the Biennale of Venice, the Chicago Arts Institute, the Center of Contemporary Culture of Barcelona, and Madrid CentroCentro, among others.



The Voice of the Sea, Óscar Octavio “Ukumari” and the Pataxó de Barra Velha community.



The Voice of the Pankararu Earth, Alberto Harres, André Anastacio and the Pankararu Community.

Arte Eletrônica Indígena Thydêwá

The jury found this initiative to be a strong example of partnerships that center the voices of indigenous communities and amplify their perspectives as part of contemporary identity and collective heritage. Indigenous people are among the front-line stewards of the environment and their continual contributions to modern cultural and ecological systems are critical inputs for innovation. In hopes of further supporting these peoples’ roles in the innovation ecosystem, *Arte Eletrônica Indígena* demonstrates best practices for creative capacity building in rural indigenous communities.

This project brings to attention the cultural symbols and creative output of eight indigenous villages in the Brazilian state of Bahia through supporting their close collaborations with artists from Brazil, Bolivia, and the UK. The jury recognized the importance of the impetus for this intercultural partnership coming from the non-governmental organi-

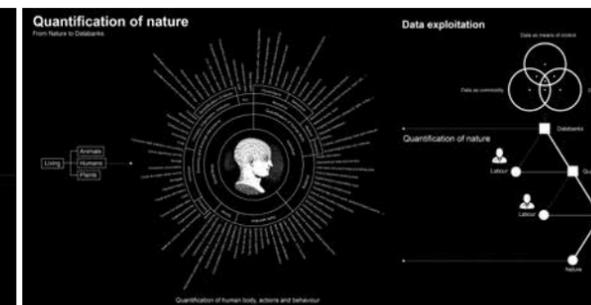
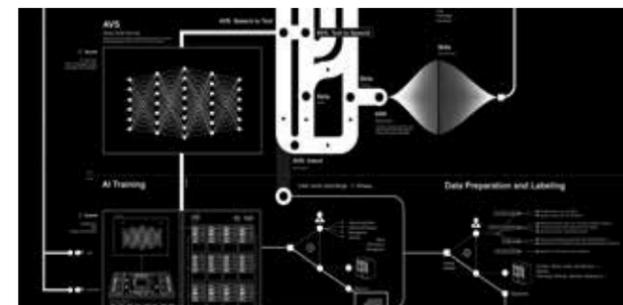
zation Thydêwá, a group of intercultural individuals that has been working closely with these communities for 17 years to promote positive social transformation. The dialogue created by these art residencies presents a powerful counter-narrative around and a show of meaningful resistance to the traditional integration-focused programs that all too often attempt to homogenize the artistic traditions and productions of historically-marginalized peoples. By incorporating digital tools into new creative formats, the residencies situate electronic art as a compelling medium for collaborative creative processes and proposes the crucial role indigenous people can and should play in the continued development of the global technological ecosystem. This multi-layered artistic engagement urges meaningful dialogues around the practical uses of technology to activate collaborative creative processes—and this can enrich digital practices for all.

Anatomy of an AI System

Kate Crawford^{AU} / AI Now Institute and Vladan Joler^{RS} / SHARE Lab

A leading political axiom of our time is that the future will belong to those that best harness the technologies of Artificial Intelligence. *The Anatomy of an AI System* hopes to construct a different path. In this collaboration between Kate Crawford, a world-leading AI researcher from New York University’s AI Now Institute, and Vladan Joler, an artist from the SHARE foundation, digital AI assistant technologies such as the Amazon Echo are exposed as new forms of extractivism, whose immediate reliance on human cognitive and affective labor extend into questions around capital, physical labor, and even the natural world. And

how, despite their growing ubiquity, the ultimate social, environmental, economic, and political costs of these technologies still remain unknown. AI is already employed in ways that exacerbate inequality and increasingly threaten global democracies. Yet it also represents one of humanity’s greatest opportunities to solve acute epochal challenges such as climate change and equitable access to healthcare. Despite the palpable fact that Artificial Intelligence is already deeply shaping our societies and fundamentally changing the human experience, it has been until now largely developed and deployed by private companies

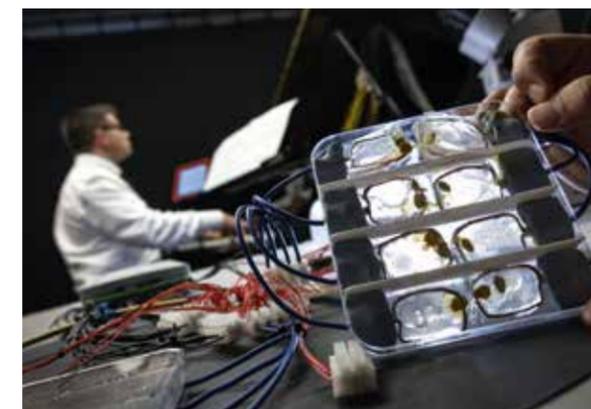


without public awareness or consent, and shielded from collective view as a form of “intellectual property.” Through its minutely-detailed high-resolution map, the *Anatomy of an AI System* allows us a more panoramic view of the diverse range of system extractions intrinsic to the current applications of this technology. Through this, we are urged to grapple with the ethical, legal, social, and economic implications of the current uses of AI and how we might in turn develop and deploy new forms of artificial intelligence in which the sources and later applications of these powerful algorithms might remain open and just.



Biocomputer Rhythms Eduardo Reck Miranda^{BR/UK}

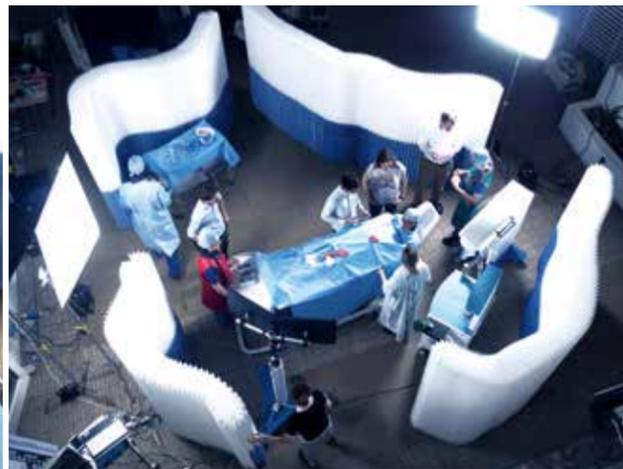
Can a genuine sense of creative partnership be established between a human and microorganism? Miranda’s *Biocomputer Rhythms* sets out to examine how a computer built out of living slime mold can play with and improvise on a musical instrument—in this case a piano—together with a professional musician. The resulting duet between the two living entities is unpredictable and suggests a new kind of “creation of a machine that is creative,” as Miranda describes it. The jury agreed that *Biocomputer Rhythms* is a significant exemplar of recent Bioart practices that continue to blur the lines between the programmable, the calculable, and the unpredictable. The work extends the range of existing interactions between humans and silicon-based computers, and offers a speculative creative application that is, perhaps, more aligned with the human tendencies to hesitate, improvise, and contrive.





SimCath
Fernando Bello—ICCESS^{MX} &
Salomé Bazin—Cellule studio^{FR}

SimCath is a simulation unit which is used for training medical professionals in cardiological surgical procedures. The jury commended Salomé Bazin for bringing her artistic practice as a multimedia artist with experience in theater design to the field of medicine. Her studio, Cellule, worked with the Imperial College Centre for Engagement and Simulation Science in London on the development of an immersive environment that resembled a theater stage that mimicked a real surgical environment. This scenographic environment was then used for simulation training for surgeons, creating a learning environment that more accurately mimics the real high-stakes situations of invasive procedures than the traditional staid classroom. The jury was fascinated and compelled by Salomé's creative application of her experience in stage scenography to the societally-critical context of medical training.



Fernando Bello—ICCESS & Salomé Bazin—Cellule studio

SLAP—See Like A Pony
Sabine Engelhardt^{DE}

Imagine you are driving a car. How do you perceive and preempt what another car on the road is going to do? Now what if that other car is an autonomous vehicle (AV)? Would and should your reactions be different? Driving is a collective intuitive process that relies on acquired heuristics, imparted knowledge, and a shared empathy with the other drivers on the road. Average human drivers and bystanders at present have neither the heuristics and the knowledge, nor the empathy to safely and effectively interact with autonomous vehicles. This presents a significant public safety concern, but also opens up a greater conversation on what effect autonomous driving, and autonomous systems

in general, will have on humans. How will we adapt, and in turn how will we be changed? The jury felt that Sabine Engelhardt's ponies were an engaging way to understand how autonomous vehicles could be designed to signal in a way that can be intuitively understood by humans. Part of Daimler's series of projects exploring empathy in self-driving cars, *SLAP* explores the application of biomimetic design principles to this emerging technology. By mounting cameras on herself and her horses, Sabine Engelhardt is able to trace the reactions of her horses as they wander through meadows and forests and encounter obstacles. In observing the positioning of



Video Stills, Video: Markus Werner

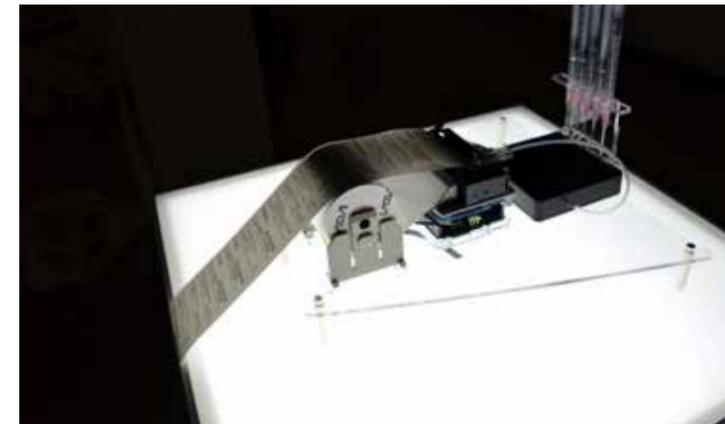


the horses' ears and nuances in their physical nudges, clear modalities of communication are revealed that help shape our understandings of the role of empathy between horse and rider when navigating through space and how this might be applied to emergent AV technologies. As autonomous transportation is increasingly deployed, new forms of human-centered signals that are anchored in an awareness of their psycho-social impacts on our perception and decision-making abilities must be developed. The complexity in resolving this element of human-computer interaction in autonomous vehicles is daunting, but the answers might already be hiding in the stable.



BLP-2000 / Black List Printer
BCL—Georg Tremmel^{AT} and Shiho Fukuhara^{JP}

Foucault's concept of Biopolitics—how regimes of authority manage our bodies to achieve control—is disturbingly reimaged in *BLP-2000 / Black List Printer*. BCL's project asks us to consider a plausible biotechnological future in which an unofficial "Black List" of potentially harmful and forbidden DNA sequences has been created and shared among companies for bio-security reasons. The output of this project is a never-ending printing machine that stores and chronicles DNA sequences that companies might label as harmful and forbidden. The jury noted that while the project is a powerful and poetic reminder of the ethical dangers that are inherent to the development of new biotechnological tools, its means of production—a DIY DNA Synthesiser and hackable processes—reveal a great sense of potential socio-political strength.



BCL – Georg Tremmel and Shiho Fukuhara



**The Murder of Pavlos Fyssas
Forensic Architecture**

Among the submissions received for this year's STARTS Prize that tended to call upon collaborative action to fight global challenges such as climate change or technological impact, this project was a stark reminder of how far ultra-nationalists will go in pursuit of their own agenda. Forensic Architecture used an interdisciplinary artistic approach and a vast partnership between researchers, scientists, video artists, and institutional partners to create video-based evidence of the role of the Greek political party Golden Dawn in the 2013 murder of Greek anti-fascist rapper Pavlos Fyssas. By revealing Golden Dawn's abuse of human rights by means of creating counter narratives to prevailing authoritative understandings of investigated events, the project continuously and meaningfully encourages an increase in public dialogue on nationalism, immigration, and politics. The jury found that though the questions raised by this project yet remain unresolved, they may be more relevant than ever in the current global political moment.

**This is grown.
Jen Keane US**

This is grown. is a project by Jen Keane that proposes a groundbreaking solution to our troubled relationship with nature. Working at the intersection of design and research, Keane has transformed her frustration with plastic pollution into an actionable idea for reducing the amount of plastic waste. *This is grown.* takes an organism-driven approach to material design. Thanks to her learning about bacterial cellulose from scientists at Imperial College London, Keane has been able to culture the bacteria herself. Using new tools to manipulate the natural growth process, she has succeeded in employing it to furnish an unprecedented form of textile creation that she calls "microbial weaving." Keane's multi-disciplinary collaboration with biology, bio-material science, and mechanical engineering strongly suggests that bio-fabrication technology could become a leading paradigm in 21st century fabrication. Combining technological ability with environmental responsibility in a unique way, *This is grown.* allows us not only to imagine, but also to shape the future of production. Far more than aesthetic design, the project proposes an end to the damaging cycle of petrochemical-based production and waste. "After all," Keane states, "nature has had 3.8 billion years to perfect the ultimate circular economy: Life. Maybe we can still learn something."



Jen Keane



Mathias Foot, Janna Nikoleit, Franziska Rast, Stephan Schakulat

30°
Mathias Foot^{DE}, Janna Nikoleit^{DE}, Franziska Rast^{DE}, Stephan Schakulat^{DE}



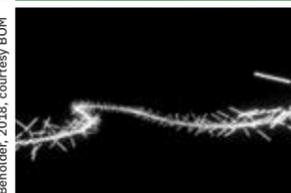
Alex Braga

A-MINT
Alex Braga^{IT}



Hakan Lidb

Alterplex
Hakan Lidbo^{SE}



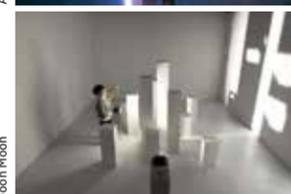
© United Visual Artists, Beholder, 2018, courtesy BOM

Beholder
United Visual Artists



Anastasia Alekseeva

Cave of Sounds
Tim Murray-Browne^{UK} in collaboration with Dom Aversano, Susanna Garcia, Wallace Hobbes, Daniel Lopez, Tadeo Sendon, Panagiotis Tigas, Kacper Ziemianin



Joon Moon

Hello, Shadow!
Joon Moon^{KR}



Giovanni Dominici

ISM Hexadome
Institute for Sound & Music (ISM)



Ayako Suwa, Evala, Yasuaki Kakehi

Journey on the Tongue
Ayako Suwa^{JP}, Evala^{JP}, Yasuaki Kakehi^{JP}



onformative, kling klang klong

Meandering River
onformative^{DE}, kling klang klong^{DE}



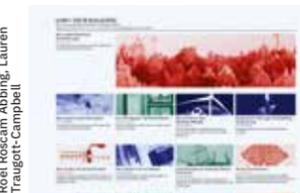
Superflux

Mitigation of Shock
Superflux^{UK}



Jie Qi, Carol Lin, May Qi, Ira Winder

PatentPandas.org
Jie Qi, Carol Lin^{US}, May Qi^{US}, Ira Winder^{US}



Kris De Decker, Marie Otsuka, Roel Roscam Abbing, Lauren Traugott-Campbell

Solar Powered Website
Kris De Decker^{BE}, Marie Otsuka^{JP}, Roel Roscam Abbing^{NL}, Lauren Traugott-Campbell^{US}



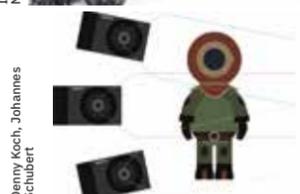
Studio Roosegaarde

SPACE WASTE LAB
Studio Roosegaarde^{NL}



Idalene Rapp, Natascha Unger

Stone Web—Expanding Space
Idalene Rapp^{DE}, Natascha Unger^{DE}



Denny Koch, Johannes Schubert

Stop-Motion VR
Denny Koch^{DE}, Johannes Schubert^{AT}



CuteCircuit

SoundShirt 2.0
CuteCircuit^{UK}



Thijs Biersteker

Voice of Nature
Thijs Biersteker^{NL}



Taggy Duff

Wastelands
Taggy Duff^{CA}

Reimagining Growth and Decay: Artistic Research in Service of the Circular Economy

Statement of the STARTS Prize'20 Jury (Mara Balestrini, Clara Blume, Francesca Bria, Domhnaill Hernon, Nobu Ide, Alexander Mankowsky, Kei Shimada)

From the total of 1,775 entries, 858 projects were directly submitted to STARTS Prize'20. For the first time in the history of the STARTS Prize, the jury wasn't able to physically gather in Linz for its official jury meeting. In the context of the global COVID-19 health crisis, all travel was suspended, necessitating the first ever virtual jury meeting on May 1-3, 2020. Over the course of three days, the group of 7 members from three continents joined an online discussion; some started the session bright and early with the Californian sunrise while jury members in Tokyo wrapped up the meeting after midnight. A virtual jury process has the distinct advantage of helping to save the environment, time, and travel costs. However, the lack of physical proximity, missed opportunities for casual conversations among peers, and reduced downtime for reflection stripped our verbal exchanges down to their essential bits and pieces. The jury thus emphasized the necessity of physical interaction for in-depth discussions that allow for a thorough evaluation process by addressing a variety of questions that arose during the sessions.

The diversity among this year's jury members highlighted how cultural prerogatives construct different relations with and perceptions of art and technology. This realization led to a series of spirited debates around the value of art in today's societies, the nuanced distinction between art and design, and the broad range of contrasting evaluation criteria that on occasion complicated finding a consensus. Another critical point of discussion formed around the inherent difficulty to compare submissions by multi-institutional collaborative projects with DIY homemade installations by individual artists. The former have access

to vast financial, material, and logistical means, which may warp the jury's expectations when contrasted with the latter's struggle with limited resources; perhaps the future implementation of certain "weight classes" during the submission process could help solve this dilemma.

Lastly, this year's submissions were overshadowed by the gravitas of the global pandemic and its devastating long-term economic and societal repercussions. Due to the untimely call for this year's applications, none of the submitted projects was in a position to address the current crisis. After much deliberation and many stimulating discussions allowing for a constant reevaluation of the strongest projects, this jury proceeded to nominate two Grand Prize winners and 10 Honorary Mentions for the STARTS Prize'20.

The vast number of submissions by artists, technologists, designers, and scientists from around the world illustrates how the European Commission's STARTS Program and Prize has merited its international renown: As standard setter among collaborative projects at the intersection of Science, Technology and the Arts, it pushes the envelope of artistic exploration. Projects that embody the STARTS criteria tend to pursue a holistic approach for positive societal change by broadening their scope of influence and action to include our civil society, minorities, and marginalized groups. Many of this year's submitted projects advocated for shared responsibility in pressing global challenges, while simultaneously giving agency to people by encouraging a participatory and empowering self-starter attitude.

The profound distress over human-machine interaction

and the emphasis on human-centered design prevalent in last year's submissions gave way to a more optimistic outlook on technology. Many submissions used VR to help us empathize with people suffering a variety of distressing circumstances. Others painted a distinctly European trajectory for tech regulation, embracing a third way between big tech surveillance capitalism and big state centralized control. Notably, this year's entries included very few artworks based on machine learning and/or dealing with society's troubled relation with this technology. This tendency further illustrates that AI is a moving target, more entangled in our lives than ever but no longer necessarily perceived as an omnipresent threat. On the contrary, the jury observed an optimistic shift towards incorporating AI into DIY artistic practices as yet another tool in an artist's toolbox, allowing it to enhance human capabilities while also raising awareness for its potential risks and biases. The jury saw a rising trend in the artistic experimentation with wearable technology and smart textiles. This playful take on new fabrics anticipates a dynamic customization of apparel as well as the sensorial amplification of the wearer. Another notable tendency was apparent in the large number of submissions centered around 3D-printed objects. The increasing availability of 3D-printers in private homes, design studios, and academic institutions has triggered a wave of new design approaches that pave the way for a revolutionary rethinking of consumerism and circularity in tomorrow's economy.

Perhaps the most dominant theme in this year's submissions is the circular economy, intending to use collective resources in a sustainable manner. Many of the submit-

ted projects, including the Grand Prize winners, deal with climate change and environmental sustainability as the most pressing issues of our time and aim at providing tangible solutions. They respond to an increasingly global movement of citizens demanding concrete action from governments, industry, and society as a whole to deliver on the United Nations' sustainable development goals and significantly reduce global warming before it is too late. They also respond to some of the main goals articulated in the European Green Deal, such as resource efficiency, the restoration of ecosystems, and the preservation of biodiversity. It further illustrates that the ambitious plan of achieving climate neutrality by the mid-century will require the full mobilization of our ambition, passion, and ingenuity. Additionally, the winner in the category of artistic exploration inspires an urgent political and ethical debate around the necessity for a European approach outlining the risks and benefits of biotech. Born out of a genuine artistic inquiry, the winning projects led to a phase of open experimentation and artistic research, concluding in an artwork that helps us reflect our own relationship with nature and inspire the necessary change in our behavior.

Given the avalanche of chasmic events and unprecedented predicaments steamrolling our world today, this jury wants to encourage mutual learning between scientists, technologists, and artists. By joining forces in a bold out-of-the-box creative practice, they can spark pioneering collaborative ways to address this new set of challenges. Now more than ever, we rely on artists to help us make sense of the world we live in and envision a better path into the future.

S+T+ARTS Prize'20
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.

Jury Statement

Jury Statement



Andrea Ling

Design by Decay, Decay by Design
 Andrea Ling^{CA}

Andrea Ling describes herself as an architect and installation artist. In architecture, most of the parts of a building will end as landfill. Natural ecosystems in contrast do not know about waste. Ling states that in biology, one system's entropy can be another system's organization. This insight has motivated her to enter a creative residency at Ginkgo Bioworks—a leader in synthesized biology. Artistic director Christina Agapakis emphasizes that the company's goal is "(...) to show, through art, the immense potential of synthetic biology and genome engineering." This is widely seen as a path into a sustainable future, replacing petroleum-based products through grown ingredients for a fuel free future.

Ling created biological artifacts to illustrate and prove the possibility of a paradigm shift in the production of goods: First, through a shared sense of agency between engineer and living material. Second, since biological ecosystems are finite, they aren't scalable. Overgrowth will always be

punished. Biological systems can provide a far more robust system of growth and decay than extractive systems. And third, biology is a value creator using decay to fuel new life. Only by integrating biological systems into design processes can we truly meet our ambitious goals for a sustained renewal.

Finally, *Design by Decay, Decay by Design* illustrates the potential of combining two key-enabling technologies: ICT and biotechnology. This provides an opportunity to create new products that are sustainable by design. The artwork also exemplifies the importance for a political debate around a European approach to biotech by establishing ethical safeguards for gene editing and balancing both benefits and risks for a broader application of this technology. Andrea Ling's bold and visionary reimagining of growth and decay in service of the circular economy merits the Grand Prize in the category of Artistic Exploration of the STARTS Prize'20.

Andrea Ling (CA) is an architect and installation artist who works at the intersection of art, fabrication technologies, and biological sciences. Her most recent work focuses on how the critical application of biologically and computationally mediated design processes can move society away from exploitative systems of production to regenerative ones. She was the 2019 Ginkgo Bioworks creative resident exploring how to design the decay of artifacts in order to access material circularity. Andrea is a founding partner of designGUILD, a Toronto-based art collective and a former project lead for Philip Beesley Architect where she worked on a series of international immersive kinetic installations and textiles for Iris van Herpen. She is also a former research assistant and designer for the Mediated Matter Group, at the MIT Media Lab, where she and her teammates won Dezeen's 2019 project of the year with their research project, *Aguahoja I*, which will be shown in 2020 at the MoMA and 2021 at SFMOMA. Andrea has an MS from the MIT Media Lab and an M.Arch. from the University of Waterloo with a background in human physiology from the University of Alberta.



Ally Schmalig, Andrea Ling

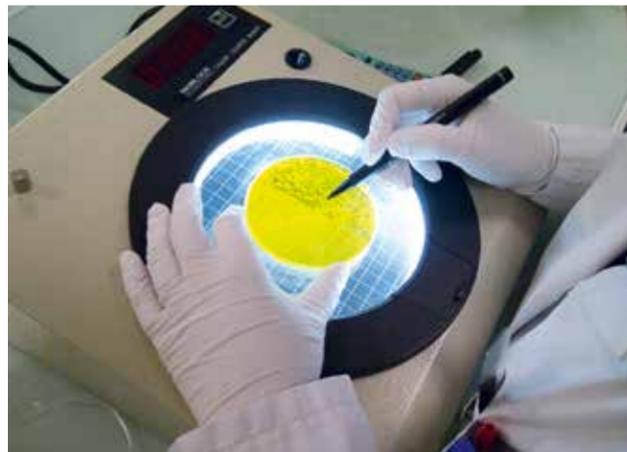
EDEN—Ethique-Durable-Ecologie-Nature

Olga Kisseleva^{RU}

EDEN won the STARTS Prize category of Innovative Collaboration because the project exemplified the role that art can play in driving large-scale societal change through interdisciplinary collaboration.

EDEN examines the difference between physical and genetic extinction. This project started as an artistic commission and evolved into a large-scale international collaboration from which the learnings and outcomes are transferable to other global-scale societal challenges facing humanity. EDEN commenced with, and succeeded in, bringing a species of elm tree back into existence in Europe and the project team extended their impact to several species of tree across the globe. The diverse project team was vast—far too many collaborators to reference here—further illustrating the benefits of cross-disciplinary collaboration. EDEN leverages scientific thinking (genetics) and emerging sensor technology to gain a new understanding of nature. The project leveraged sensor and telecommunication network technology to investigate how trees interact with each other and their environment. They developed a technique to connect trees across the globe in the hope that different species across different locations could communicate and learn from each other. The vast and complex data captured from the tree networks was made audible and visible via a range of exhibits and performances across the world.

In summary, EDEN represents a world-leading example on how art can inform science and how science can inform art—where the combination of both is far greater than the sum, unlocking new knowledge to better humanity. The process and outcomes in EDEN are an exemplar that could, and should, be replicated elsewhere.



Olga Kisseleva



Yaolan Luo



Olga Kisseleva

One of the key figures in the international art&science field **Olga Kisseleva** (RU) approaches her work as a scientist. She calls upon collaborations with exact sciences, biology and geophysics, and she proceeds with experiments, calculations, and analyses, while strictly respecting the methods of the scientific domain. Olga Kisseleva has had major exhibitions in Modern Art Museum (Paris), KIASMA (Helsinki), Museo Nacional Centro de Arte Reina Sofia (Madrid), Fondation Cartier for contemporary art (Paris), Centre Georges Pompidou (Paris), Guggenheim Museum (Bilbao), NCCA (Moscow), as well as Biennales of Dakar (2002), Tirana (2003), Moscow (2011), Istanbul (2013), and Venice (2019). Her works are present in many of the world's most important museum collections, including the Centre Pompidou, Louis Vuitton Foundation, ZKM, Moscow Museum of Modern Art, and the NY MoMA. Olga Kisseleva teaches contemporary art at the Sorbonne University of Paris, she is head of the Art & New Media program and Founding director of Art&Science International Institute.



computer 1.0

Victoria Manganiello^{US}, Julian Goldman^{US}

computer 1.0 is a fascinating installation that is not only a beautiful art piece replicating an imaginary information processing device from the past but also a visually poetic testimony of the stressful dystopian future of the information age.

Victoria Manganiello and Julian Goldman create a canvas using polymer, natural threads, and flowing fluids to represent an analog display that portrays the flow of information but leaves room for comprehension by the observer to what the analog representation, which can also be interpreted either as being the process or the output, means. It is both an intellectual stimulus from a communication design angle and an antithesis to the rigid society that we live in; one that is controlled by zeros and ones and often brings limits to the imagination by the observer. The artwork is an intimate crossover of tech and textile, and a reminder of how intellectual people of the past have ignited the evolution of communication, starting from a primitive form of design.

Victoria Manganiello, Julian Goldman

Perception iO
Karen Palmer^{GB}

Perception iO is an interactive installation that provides an intuitive understanding of the importance of transparency and regulation of AI, especially for citizens unfamiliar with the technology. Karen Palmer (aka Storyteller from the Future) creates an immersive experience utilizing film, biometrics, and other technologies to capture and assess the emotional response of participants in the judgment enforcement process, providing a valuable insight into the unarguable dark reality of inequality.

By uncovering unconscious bias in both ourselves and the authorities, it addresses the need for a control mechanism during the conceptualization, development as well as implementation of AI. While AI is oftentimes seen as something that will replace humankind, it is also largely misunderstood. The *Perception iO* installation in contrast provides an insight into the implications of a flawed process, without necessitating a deep understanding of the complex technology behind it. It thereby motivates the observer to reflect on their own ethical values while also recognizing the positives and negatives of AI.



Karen Palmer



Dave Hakkens

Precious Plastic Universe
The alternative plastic recycling system
Dave Hakkens^{NL}

Precious Plastic opens a new perspective on waste and sustainability, while empowering local communities and creatives. The project is open source with over 400 projects globally using the *Precious Plastic* recycling system where local recycling workspaces process plastic waste into new products. It works because it's easy, shareable, and open to everybody, prompting local collective environmental action.

Precious Plastic offers a compelling vision for the future of a Green Europe, following the trajectory of maker spaces, fab-cities, and civic technology hubs. It shows how a global community led by creators, designers, and engineers can be harnessed to tackle one of the world's most pressing environmental problems. It's a fresh approach fit for the environmentally conscious youth: It's our future—we need to have a say, and we have the tools to create change! In times of crisis, we are urged to change our behavior and adapt to the new circumstances for the greater good of society. The *Precious Plastic Universe* pushes us to embrace a new mindset while opening production pathways into a new sustainable future and putting communities first.

Proposals of Collaboration with the Viral Entities
Tame is to Tame, Virophilia
Pei-Ying Lin^{TW}

Proposals of Collaboration with the Viral Entities is an artistic reflection on our relationship with viruses. Especially in the context of the Corona pandemic, it provides a deeper understanding of our role as human species in the ecosystem we inhabit.

Viruses are a source of evolutionary variation. They cannot self-reproduce and are inert without inserting themselves into a living cell. The core idea in Lynn Margulis' *The Symbiotic Planet* is that the engine of evolution can be explained by symbiosis rather than the Darwinian survival of the fittest. Today's proof lies in the acceptance of the microbiome hosted in our bodies as an acquired organ, essentially turning us into supraorganisms. Viruses are thus no more our enemies than bacteria or human cells.

With *Virophilia*, Pei-Ying Lin has translated non-mainstream scientific knowledge into a thought-provoking artwork. Her cookbook, set up for the year 2068, where food is prepared with viruses integrated as functional ingredients, hints at productive change in the perception of ourselves in the biosphere: The symbioses between us and the Other opens room for innovation.



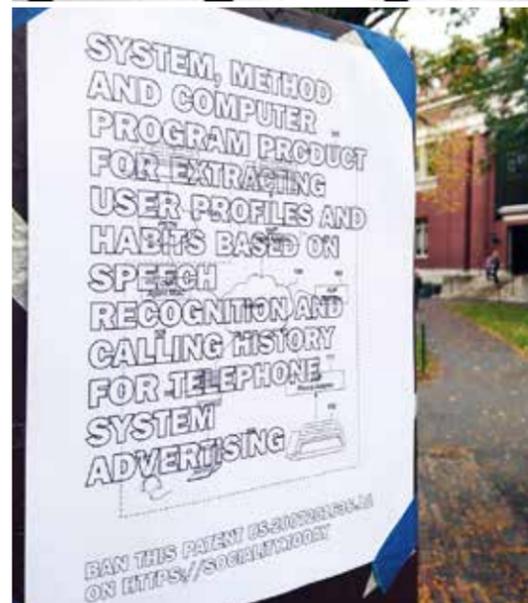
Pei-Ying Lin



Prosthetic Memory
M Eifler^{US}

Prosthetic Memory is an experiment composed of journals, video recordings of daily events and thoughts and processed by a personalized AI algorithm that triggers video projections filtered by the relevancy of analogue handwriting in journals. It is an ongoing experiment that might show some different adaptations in the future. With this project, M. Eifler tries to solve the limitation of her permanent loss of long-term memory capabilities, while also asking a series of interesting questions: How can AI capture and confirm human identity? Can an AI algorithm reproduce my own feelings or only generate feelings that I am supposed to be feeling?

The artist illustrates how a DIY homemade AI, solely designed for personal use and generated without any cloud data, can open up an empowering approach to this technology while also enhancing human capabilities. It lives up to the challenge of humanizing a technology that is so often negatively perceived. *Prosthetic Memory* is thus a highly relevant artistic inquiry into the relationship between humans and artificial intelligence.



Sociality
Paolo Cirio^{IT}

Paolo Cirio offers a strong artistic provocation that serves as an urgent call for action to challenge tech monopolies and regain democratic accountability over algorithms. With *Sociality*, he inquires how new internet technologies impact our human psyche and behavior. By coding a scraper to download large volumes of patent data from Google, he depicts the new reality of surveillance capitalism. The 20,000 social media and Big Tech patents featured in *Sociality* deal with technologies firmly entrenched in the cultural zeitgeist.

This is a powerful artistic manifesto for a more ethical use of technology that subverts intellectual property laws in the interest of the collective intelligence of people that in the first place created the knowledge and data continuously harnessed and extracted in social media platforms. It provides a trajectory for a digital future where it is possible to regulate technology and put it at the service of society. It suggests that we embrace a third way between Big Tech surveillance capitalism and Big State centralized control: a people-first digital future based on democratic control and collective accountability that can be championed by Europe.



SOMEONE
Lauren Lee McCarthy^{US}

SOMEONE is a distributed installation and exhibition where visitors are invited to act as a human version of the Amazon smart speaker Alexa. The homes of four people have been augmented with bespoke smart devices. Through a command center with four computers, visitors can hear the occupants of the “smart homes” call out for “Someone,” prompting them to step in as their home automation assistant and respond to their needs.

The exhibition addresses timely topics that have emerged in the intersection of smart technologies and everyday life, in particular surveillance and control. The piece questions whether these technologies give us convenience and improved quality of life or actually threaten our autonomy, agency, and privacy. Furthermore, by having the visitor act as a smart device themselves, the exhibition questions labor relations that exist behind the scenes of our apparently seamless connected world. These are pressing questions in a time when our most intimate spaces and routines are becoming increasingly embedded with “smart” devices that collect and share sensitive data about ourselves and our individual and social behaviors.

Lauren Lee McCarthy

Spoiled Spores
Avril Corroon^{IE}

Spoiled Spores is an artistic provocation on the topic of the housing crisis in Ireland and the UK. In the latest estimate, the UK requires 1 million homes to provide everyone with worthy living conditions. Within the rental community the standard of home is often so poor that toxic mold is commonplace.

Corroon harvests mold from properties in the UK and Ireland from which she crafts a range of artisanal cheeses. The various cheeses are exhibited within industrial fridges that resemble the buildings from which the mold was harvested. The critical aspect to the work is that the cheeses are toxic—they are poisonous to consume and present a real health hazard, as does the mold from which they are harvested. The housing crisis has placed even more stress on rental communities during the COVID-19 pandemic and this issue will grow as more people move to urban areas and “mega cities” of the future. *Spoiled Spores* is an excellent example of the role art can play in provoking thought and action. It looks at a social issue from a new perspective. Not only does it look at a problem of today, it also addresses an issue of growing concern for the future.



Avril Corroon



The Wrong Biennale, 4th edition, from November 1st, 2019 to March 1st, 2020. Europe map of embassies, pavilions and routers.



The Wrong Biennale, 4th edition, from November 1st, 2019 to March 1st, 2020. World map of embassies, pavilions and routers.

TransVision
Jiabao Li^{CN}

TransVision is an artistic provocation on the role that technology plays in mediating and controlling our perception of the world. Presented as a set of wearable devices in three scenarios, it shows how technology mediates our sense of vision and controls our perception.

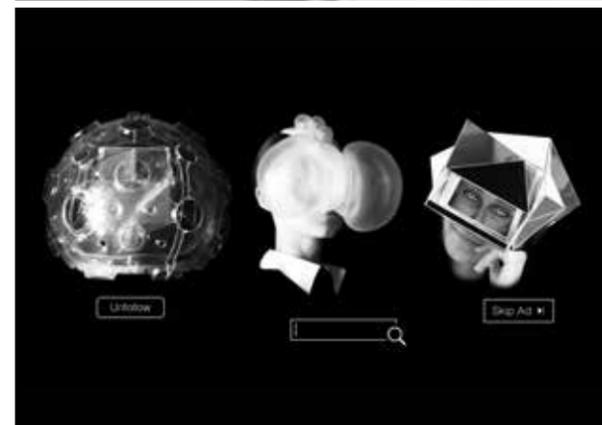
The work is prescient given the proliferation of mobile screen-based technologies in the last decade and the emerging understanding of the role that digital technology plays across society. We have quickly entered a world where digital loneliness is a pandemic—one that has crept up on us without much warning yet penetrates all aspects of modern society.

In hyperallergenic vision, the user develops a hypersensitivity to the color red as a reflection on the ways that we have become hypersensitive to certain information presented online. In tactile vision, the user is alerted to the fact that we easily become immersed in echo chambers owing to the bias of our online networks and our methods of receiving information. In commoditized vision, the user is alerted to the fact that our existence has been commoditized through the monetization of our time, attention, and ultimately our existence itself.

The Wrong
David Quiles Guilló^{ES}

As the COVID-19 pandemic and social distancing shuts down vast swathes of local and global activity, this piece shows an alternative yet ambitious new path for the arts and culture. The *Wrong Biennale* is a collaborative effort to create and promote digital art and culture across the world, launching a global art biennale open to participation, happening both online and offline, and harnessing the potential of collaboration and the internet.

Furthermore, the concept aims to connect the world through online pavilions that are virtually curated spaces and offline exhibitions at embassies, institutions, art spaces, galleries, and artist-run spaces in cities. The event is organized following a bottom-up approach through which an extended team of curators appoint themselves to feature what they like best of the new digital art scene today and artists also appoint themselves via open calls. Since 2013, more than 5,500 artists and curators have officially participated in *The Wrong Biennale*—a concept that could prove key to the flourishing of the arts and culture in post pandemic times.



Jiabao Li



Takashiterada

aqua_forensic
Underwater Interception of Biotweaking in Aquatocene
Robertina Šebjanič^{SI}, Gjino Šutić^{HR}



lok1126, Designed by Eric Siu

Be Water by Hong Kongers
Dedicated to the Hong Kong protesters by Eric Siu & Joel Kwong



Barbro Scholz, Esther Stühmer, Axel Sylvester, Tanja Döring

BETAlight
Barbro Scholz^{DE} with Esther Stühmer^{DE}, Axel Sylvester^{DE} and Tanja Döring^{DE}



Michael Sedbon

CMD: Experiment in Bio Algorithmic Politics
Michael Sedbon^{FR}



Code of Conscience

Code of Conscience
Code of Conscience



Lucy McRae

Compression Cradle
Lucy McRae^{GB}



Open Cell + worldwide contributors

CONTAIN / Open Cell—Mobile COVID19 Emergency Testing Facilities
Open Cell^{UK} + worldwide contributors



Mariam Ibrahim

Hale: An Upgrade on Patient Attire
Mariam Ibrahim^{EG}



The Mediated Matter Group

Hybrid Living Materials
The Mediated Matter Group



Tobias Trübenbacher

INNER VALUES
Tobias Trübenbacher^{DE}



Pierre Azalbert, Benton Ching, Karlijn Sibbel

Re:flex
Pierre Azalbert, Benton Ching, Karlijn Sibbel



Faidra Oikonomopoulou, Telesilla Bristogianni

Re3 Glass
Faidra Oikonomopoulou^{GR}, Telesilla Bristogianni^{GR}



Marcus Maeder

Sounding Soil
Marcus Maeder^{CH}



Audrey Briot

Stymphalian Birds
Audrey Briot^{FR}



Alexandra Daisy Ginsberg

The Substitute
Alexandra Daisy Ginsberg^{GB}



Cheng Guo

The Net Wanderer—A tour of suspended handshakes
Cheng Guo^{CN}



DataPaulette

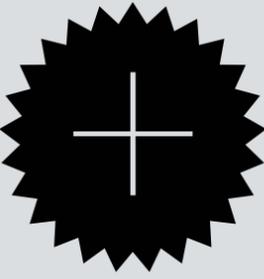
Topographie Digitale
DataPaulette



Irakli Sabekia

Voicing Borders
Irakli Sabekia^{GE}

S+T+ARTS

Prize 

at a Glance

**S+T+ARTS Prize'16–20
Jury Meetings**



Ars Electronica, vog.photo

Jury meeting 2016: Yamina Aouina, Filip Visnjic, Alexander Mankowsky, Luis Miguel Girão



Ars Electronica, vog.photo

Jury meeting 2016: Alexander Mankowsky, Gerfried Stocker, Yamina Aouina, Horst Hörtnert, Katharina Bienert, Filip Visnjic



Ars Electronica, vog.photo

Jury meeting 2019: Martin Honzik, Daehyung Lee



Ars Electronica, vog.photo

Jury meeting 2019: Moon Ribas, Veronika Liebl, Francesca Bria, Florina Costamoling



Ars Electronica, Martin Hieslmair

Jury meeting 2017: Chiaki Hayashi, Sophie Lamparter, Shuzo John Shiota, Alexander Mankowsky



Ars Electronica, Martin Hieslmair

Jury meeting 2017: Shuzo John Shiota, Bradly Dunn Klerks, Chiaki Hayashi, Victoria Vesna, Sophie Lamparter, Rikke Frisk, Alexander Mankowsky



Ars Electronica, vog.photo

Jury meeting 2019: Florina Costamoling, Veronika Liebl, Francesca Bria, Daehyung Lee, Moon Ribas



Ars Electronica, vog.photo

Jury meeting 2019: Daehyung Lee, Şerife (Sherry) Wong, Francesca Bria



Ars Electronica, vog.photo

Jury meeting 2018: Victoria Vesna, Alexander Mankowsky, Daehyung Lee



Ars Electronica, vog.photo

Jury meeting 2018: Seiichi Saito, Victoria Vesna, Kazuko Tanaka, Alexander Mankowsky, Francesca Bria, Sophie Lamparter, Daehyung Lee, Andrej Heinke, Alex Verhaest



Jury meeting 2020: Alexander Mankowsky, Veronika Liebl, Domhnaill Hernon, Kei Shimada, Nobu Ide, Clara Blume, Karla Spiluttini, Kristina Maurer

**S+T+ARTS Prize'16–20
Award Ceremony**



Ars Electronica, tom mesic

STARTS Prize'17, Grand Prize—Innovative Collaboration, *Rock Print*, Gramazio Kohler Research, ETH Zurich and Self-Assembly Lab, MIT



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STARTS Prize'16, Grand Prize—Artistic Exploration, *Magnetic Motion*, Iris van Herpen



Ars Electronica, vog.photo

STARTS Prize'16, Grand Prize—Innovative Collaboration: *Artificial Skins and Bones*, Artificial Skins and Bones Group



Ars Electronica, Jürgen Grünwald

STARTS Prize'19, Grand Prize—Artistic Exploration, *Project Alias*, Tore Knudsen and Bjørn Karmann



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STARTS Prize'19, Grand Prize - Innovative Collaboration *Ciutat Vella's Land-use Plan*, Pablo Martínez Diez and Mar Santamaria Varas



Ars Electronica, tom mesic

STARTS Prize'18, Grand Prize—Artistic Exploration, *Future Flora*, Giulia Tomasello



Ars Electronica, vog.photo

STARTS Prize Trophy



Ars Electronica, tom mesic

STARTS Prize'17, Grand Prize—Artistic Exploration, *I'm Humanity* performance, Etsuko Yakushimaru



Ars Electronica, vog.photo

STARTS Prize'18, *Who Wants to Be a Self-Driving Car?*, Joey Lee, Benedikt Groß, Raphael Reimann, MESO Digital Interiors, David Leonard

**S+T+ARTS Prize'16-20
Exhibitions & Talks**



Chiaki Hayashi, STARTS Prize Forum 2017



Journey on the Tongue, Ayako Suwa, Evala, Yasuaki Kakehi



Florina Costamoling at Practices & Impacts of STARTS Collaborations, AIxMusic Stage, POSTCITY



Impressions STARTS Exhibition 2019



Impression from STARTS Roundtable and Get-together at POSTCITY.



Atlas, Yann Deval, Marie G. Losseau



Facebook Algorithmic Factory, Vladan Joler



Speculative, Fashionable, Wearable, Daijiro Mizuno, Kazuya Kawasaki



STARTS Talks 2019



Algae Bioprinter and Algae Printing, Marin Sawa



Rock Print: a Manistone, Gramazio Kohler Research, ETH Zurich



30°, Stephan Schakulat, Mathias Foot, Janna Nikoleit, Franziska Rast



Project Alias, Bjørn Karmann, Tore Knudsen

Ars Electronica, Jürgen Grünwald



Ars Electronica, tom mesic

Making Sense – Citizen Sensing Toolkit, Making Sense Team



ICCMR, University of Plymouth

Biocomputer Rhythms, Eduardo Reck Miranda



Ars Electronica, vog.photo

[IGNIS AER AQUA TERRA], Yuima Nakazato



Ars Electronica, Jürgen Grünwald

Meandering River, onformative DE, kling klang klong



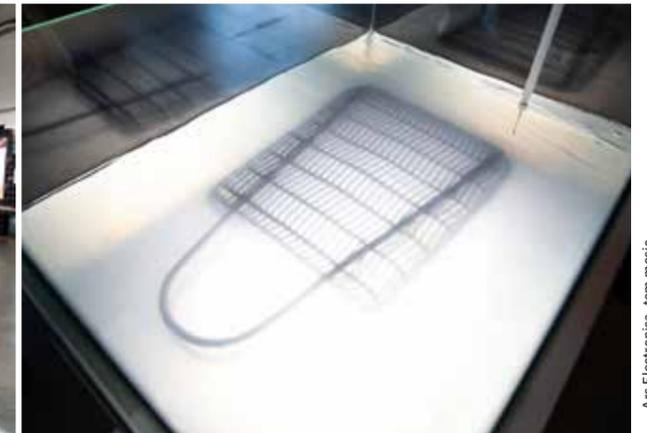
treelab, Marcus Maeder, Roman Zweifel

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Ars Electronica, Jürgen Grünwald

Impression of the STARTS exhibition, POSTCITY



Ars Electronica, tom mesic

Rapid Liquid Printing, Self-Assembly Lab US, MIT + Christophe Guberan



Ars Electronica, tom mesic

S+T+ARTS

PRIZE

On behalf of the European Commission and in collaboration with BOZAR and Waag, Ars Electronica issued five open calls for entries (2016–2020) to the prestigious S+T+ARTS competition.

In this brochure you will find an evaluation of the European Commission's S+T+ARTS Prize, which honors Innovation in Technology, Industry and Society stimulated by the Arts, as well as the projects that won a Grand Prize and the statements by the S+T+ARTS Prize juries that singled them out for recognition.



Horizon 2020
European Union funding
for Research & Innovation



S+T+ARTS

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