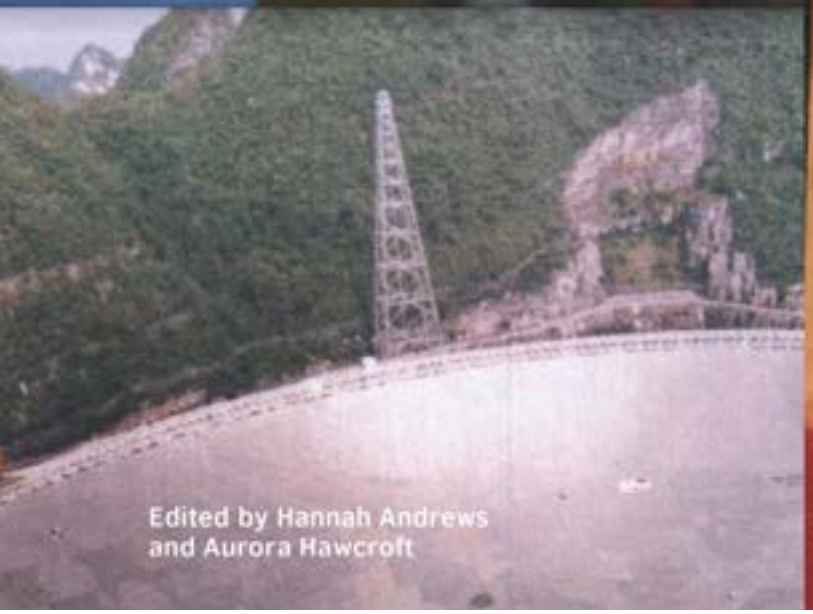
Why technology needs artists:

40 international perspectives



Edited by Hannah Andrews
and Aurora Hawcroft

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Foreword

Ruth Mackenzie
Director of Arts, British Council

In 1968, the Institute for Contemporary Arts opened Cybernetic Serendipity. Bringing together composers, artists, film makers, engineers, scientists, and academics, the exhibition sparked a dialogue, spanning multiple continents, about the relationship between technology & the arts. It pushed at what is possible when computation and creativity are combined and marked an important moment in a long history of the UK engaging in international experimentation and creation with advanced technologies.

It's curator, Jasia Reichardt, has offered the opening to this collection; an archival description of lectures from 1976, discussing the close relationship between scientific and technological advancement and artistic expression. Reichardt's words, originally written on an Adler typewriter, still ring true today.

They resonate through the 40 essays in this collection. In Berlin, Holly Herndon and Mat Dryhurst are piloting new ways to protect artists' intellectual property; in Senegal, Linda Dounia Rebeiz is highlighting underrepresentation of West African biodiversity in AI datasets; in the UK, Libby Heaney creating with quantum computers; in India, Harshit Agrawal is retraining generative AI on Kathakali and Theyyam dance rituals; and in China, Xu Bing is hosting international artist residencies in space.

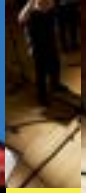
These imaginative leaps taken by artists are of immense value as technology rapidly and radically transforms our world. They show, alongside the many other examples in this collection, that innovation led by artists, cultural organisations, and creative industries pushes technologies forward. Artist-led innovation also reorients technologies towards people, resists bias, prioritises sustainability, creates public engagement, and decentralises the tools that are transforming our world.

As the UK places increasing emphasis on technological advancement, ensuring this rich, culturally diverse source of innovation is invested in and internationally connected has never been more vital.

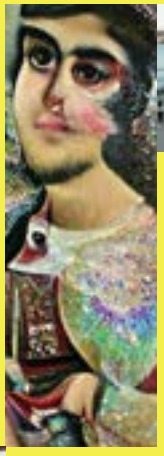
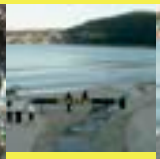
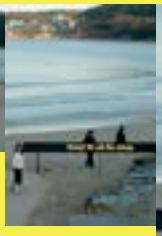
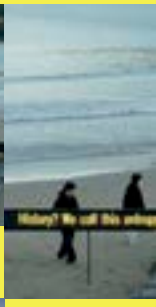
This paper marks a critical step in achieving this goal. It brings together global leaders from tech companies to artist-activists, to map the diversity of ways art invites innovation, international collaboration, and the development of more diverse and inclusive technologies. It builds on British Council work connecting international arts and technologies ecosystems, integrating technology in heritage preservation, and platforming UK creative innovation.

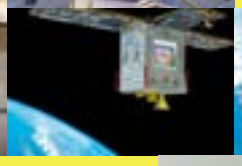
For the British Council, an organisation that builds peace and prosperity through international collaboration, nurturing human-centric and hopeful futures is of the utmost importance. We are therefore committed to supporting innovation led by artists who dare to reimagine technologies, and the ecosystem of cultural organisations and creative industries that supports them.

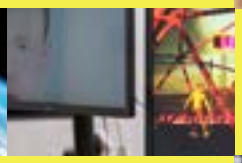


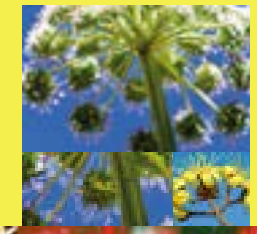


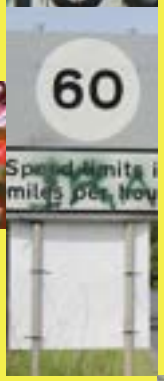





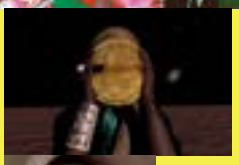
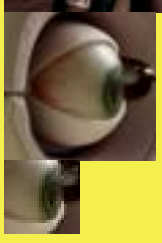


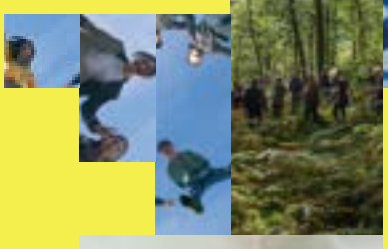


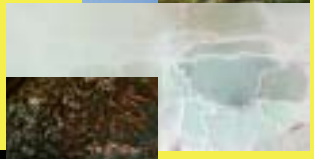



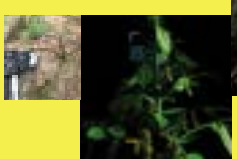











Contents

Defining ‘artist-led innovation’

Articulating the form of innovation that takes place in the arts, and its wider technical and social impact is challenging. Perhaps this is because of its inter-disciplinarity, cutting across the arts, cultural sector, and creative industries, and spilling over into sectors such as commercial technology and academia, among others.

The term ‘artist-led innovation’ is intended to represent this wide ecosystem. ‘Artist’ should be understood in broad terms, as referring to musicians, filmmakers, designers, writers, craftspeople, or theatre-makers alongside creative ttechnologists. Furthermore, it should be well understood that artist-led innovation requires essential infrastructure spanning the cultural sector and creative industries, alongside preservation of cultural histories and heritage

At the core of ‘artist-led innovation’ however, is the understanding that, within this broad and essential ecosystem artists are central to the reimagining and reengineering of technologies. It is through the long-term investment in artistic practice, and the people and organisations that sustain it, that true imaginative leaps with technologies take place.

Introduction

Artists have always taken imaginative leaps with technologies.

From telling stories that seed future breakthroughs to diversifying AI datasets, artists reimagine what technologies can be, and who they can be for. This practice of artist-led innovation encompasses an ecosystem of independent practitioners, studios, cultural institutions, creative industries, technology companies, activists, festivals, heritage organisations, and academic research labs. It can look like an orchestra trialling an AI model (see Laidlow, p. 30), an algorithmically generated garden for pollinator insects (see Ginsberg, p. 98), or artist-activism advocating for digital commons (see Aguilar Gil, p. 114). It is deeply collaborative, cross-art form, and international.

Despite – or perhaps because of – this interdisciplinarity it often happens on the margins. However, in a rapidly transforming world in need of new mechanisms for connection, collaboration, and trust, artist-led innovation is a vital resource.

This publication creates an international evidence base for this argument. 56 leaders in art and technology have offered 40 statements, spanning 24 countries and 5 continents. Together, they build on rich histories of artist-technologist collaboration, map the present moment, and offer hopeful pathways forward. As a collection, they articulate artists, the cultural sector and creative industries as catalysing progressive innovation with cultural diversity, human values, and community at its core.

Responses include research leads from Adobe, Lelapa AI and Google, who detail the contribution artists make to the human-centric development of high-growth technologies. UK institutions like Serpentine and FACT, and LAS Art Foundation in Germany show cultural organisations are essential spaces for progressive artist-led R&D. Directors of TUMO Centre for Creative Technologies in Armenia, and Diriyah Art Futures in Saudi Arabia highlight education across art and technology as a source of skills for the future. Leaders of African Digital Heritage in Kenya and the Centre for Historical Memory in Colombia demonstrate how community ownership of technologies for heritage preservation increases network resilience. Artists such as Xu Bing in China and Libby Heaney in the UK present art as a site for public demystification of complex technologies, from space satellites to quantum computing.

The perspectives presented in this publication serve as a resource for policy making and programme development spanning art and technology. Global in scope, they offer case studies that highlight why innovation needs artists, on both a national and international scale.

In the UK, understanding the full potential of the artist-led innovation is particularly timely against the backdrop of a *Modern Industrial Strategy*[1] that prioritising both 'Digital & Technology' and 'Creative Industries' as key areas of growth. Alongside this, the *Creative Industries Sector Plan*[2] acknowledges 'creative innovation' as a national asset, while the AI Opportunities Action Plan states the need for the UK to 'shape the AI revolution rather than wait to see how it shapes us'.[3] In the context of dual foregrounding of innovation and creativity, and the recognised need for the UK to stay ahead in the AI revolution, investing in innovation led by artists, cultural organisations and the creative industries, delivers across these agendas. 20 contributions from the UK, spanning the four nations, underscore this, articulating artist-led innovation as not only creating with technologies but transforming technologies in the process.

Internationally, artist-led innovation is an equally valuable resource, opening space for the collaborative development of culturally-diverse technologies. In an era of rapid technological advancement, global partnership is essential. The United Nations, for example, emphasises multi-lateral cooperation as key to a robust and 'inclusive digital economy', an 'open, safe, and secure digital space', and the 'governance [of] AI for humanity'.[4]

Beyond economic, security, and regulatory objectives, there is a profoundly human reason for why new ways of collaborative innovation are needed. As technologies reach deep into our public and private lives, it is essential they are engineered to respect the full diversity of lived experience (the UN Pact for the Future).[5] Many of the statements in this collection highlight ways in which this currently isn't the case. They discuss technology replicating current and historic power imbalances, undermining democratic infrastructure, and causing uneven environmental impact.

Reorientation towards hopeful, inclusive futures, will require international effort grounded in new models for innovation that radically diversify technological advancement.[6,7]

Artist-led innovation offers such a model. The case studies in this collection demonstrate this from a diversity of perspectives, from quantum researchers to indigenous activists. Across these perspectives, there is a clear message: artist-led innovation catalyses technological advancement while remaining culturally diverse, internationally connected, and deeply human.

Four key insights articulate this message:

1. Artist-led innovation catalyses technological advancement across sectors

Innovation thrives on creativity – the ability to generate new ideas and methods. Within the arts, culture, and creative industries, innovation often manifests as new aesthetics and creative applications of technologies.

However, the impact of artist-led innovation extends far beyond this, by contributing to a cross-disciplinary ecosystem that incorporates industry and academic settings. This results in the development of new knowledge and capabilities, testing of technical limitations, creation of new legal and economic infrastructure, or redeveloping technologies to reflect key social needs.

2. Artist-led innovation delivers both social and economic value

Through the development of new tools and techniques, collaboration with product developers, or contribution to interdisciplinary cultures of innovation, artists, cultural organisations, and creative industries directly contribute to high-growth technologies.

For example, industry researchers are engaging with artists to increase cultural specificity in AI. Game developers, through working with cultural organisations, have developed more inclusive games. New insights into emergent quantum technologies have been surfaced through artist-led experimentation. This generates both economic and social value by increasing technological efficiencies whilst prioritising social and cultural representation.

3. Artist-led innovation integrates cultural diversity in technologies, leading to more resilient networks

Resilient technologies are adaptable to instability, inclusive of diverse contexts, and responsive to community needs. This is vital for long-term innovation. Emerging technologies must function in low-resource settings, be secure against threats, and support local decision-making. Teams with diverse perspectives are better equipped to design such systems, while communities with critical understanding of technologies are better equipped to maintain them.

Artist-led innovation fosters such resilient ecosystems. Art and technology education programmes, residencies, and festivals engage communities in both technical and ethical considerations. Through breaking down opaque concepts and cultivating interdisciplinary skillsets they build the public agility required to adapt to and remain critical in changing digital landscape.

4. Artist-led innovation proposes hopeful social and technological futures

By taking imaginative leaps, artists, cultural organisations, and creative professionals propose alternative approaches to technologies, grounded in sustainability, community, and human values. This influences shared ideas of what good and attainable futures might look like, while proposing creative solutions to planetary challenges. Such pathways are essential to realigning technologies with ecological and social wellbeing.

These insights position artist-led innovation as both a vital asset nationally, and an untapped resource internationally. As the UK looks to promote growth, modernise international development[8], and 'shape the AI revolution'[9], artist-led innovation cuts across all these areas. Internationally, as new approaches are being sought to establish trust and collaboration amidst rapid technological advancement, artist-led innovation connects diverse contexts, develops culturally nuanced technologies, and creates representative, resilient networks.

With 90 years of experience supporting cultural networks that build peace and prosperity, the British Council is uniquely placed to play a key role in ensuring the potential of artist-led innovation in international collaboration is realised.

Our position is that artists are essential to technological advancement. What makes artist-led innovation particularly powerful is that artists aren't afraid to challenge, break and redevelop technologies to better represent people. Piloting these new approaches to technology in the arts relies on a strong international and cross-sector ecosystem of cultural institutions, venues, festivals, heritage organisations, and creative industries.

As such, international collaboration between artists and organisations innovating with technologies becomes an invaluable resource; to connect cultures, transform technologies and point together to hopeful futures.

1.

Artist-led innovation catalyses technological advancement

Artists, cultural organisations and the creative industries catalyse innovation by co-producing new knowledge and capabilities, testing technical limitations, and redeveloping technologies to reflect social and cultural needs

The relationship between artists and scientists is not new. **Jasia Reichardt**'s archival description of lectures from 1976 open this section, detailing the proximity of artists to scientific and technological advancement. The text emphasises artists' critical engagement with scientific thought, blending visionary and logical processes, and representing complex phenomena from anatomical drawings to disease depiction. Today, cutting-edge laboratories continue to bridge these fields. **Erik Lucero**, lead research scientist at Google AI Quantum, explains how collaboration between artists and scientists has helped his team 'push the boundaries of human knowledge'. Theoretical physicist **Luis Álvarez-Gaumé** echoes this, emphasising the new insights that emerge from artist-scientist dialogue.

Beyond the lab, cultural institutions serve as testbeds for progressive technological R&D in collaboration with artists. **Eva Jäger and Mercedes Bunz** describe the unique characteristics of cultural organisations that make them effective sites for public interest AI development. Artists **Mat Dryhurst and Holly Herndon** illustrate this through their Data Trust Experiment with Serpentine Arts Technologies, which pioneered a novel data governance model for AI training. Similarly, **Robert Laidlow** describes the orchestra as a 'dress rehearsal' for integrating AI into society, while **LAS Art Foundation**'s exhibition of Laure Provost's *WE FELT A STAR DYING* (2025) prototyped applications of early quantum AI, surfacing new technical insights and engaging broad audiences.

These collaborations extend across diverse cultural contexts. **Iris Long and Gary Zhexi Zhang** highlight cultural exchange in art and technology as fostering global collaboration over competition. **Xu Bing**, for example, partnered with Chinese aerospace companies to launch the world's first shared art satellite, pushing for space technology beyond military and business purposes. **Morehshin Allahyari** reinforces the arts' capacity to expand technological understanding beyond the Global North, embracing decentralised innovation.

Together, these perspectives illustrate the arts as a vital driver of technological innovation – collaborative, international and deeply rooted in experimental practice.

(UK)

Writer on art and exhibition organiser

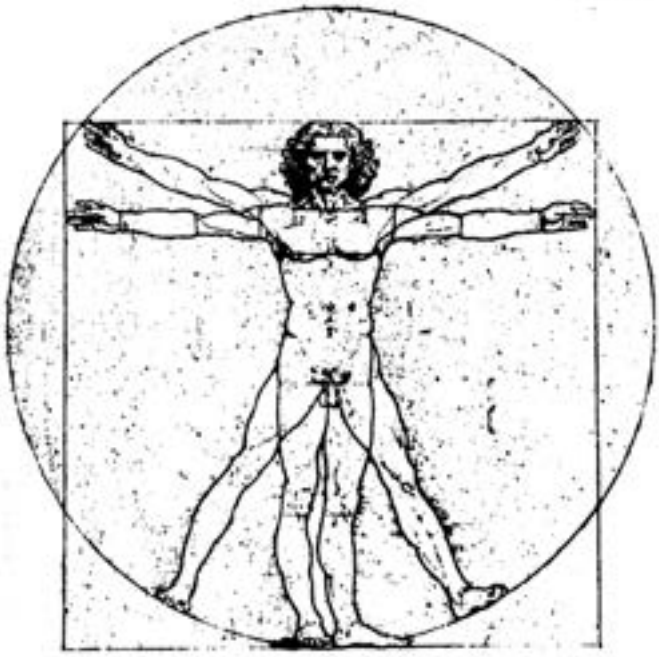
Jasia Reichardt

On art and science

Written in 1976, this is an archival description of 12 lectures introducing the different aspects of the relationship between art and science. The 6-page leaflet, of which we see 3 pages here, was originally typed on an Adler manual typewriter with a carbon ribbon and designed by Françoise Berserik.

1. Who said what?

There are two kinds of thinking involved in both art and science. The first sort could be described as visionary, hallucinatory and imaginary, and the second as logical, critical and empirical. Comments on this topic by Poincaré, Einstein, Kekulé, Constable, and others.



Leonardo da Vinci's interpretation of Vitruvius' theory of proportions. The drawing represents the orientation of man in the universe with the figure touching both the circumference of the circle and the outline of the square.

Charles Csuri's Leonardo - circle to square transformation. A computer graphic with images treated as if a circular rubber sheet was stretched into a square.

2. Sometimes art is useful in science

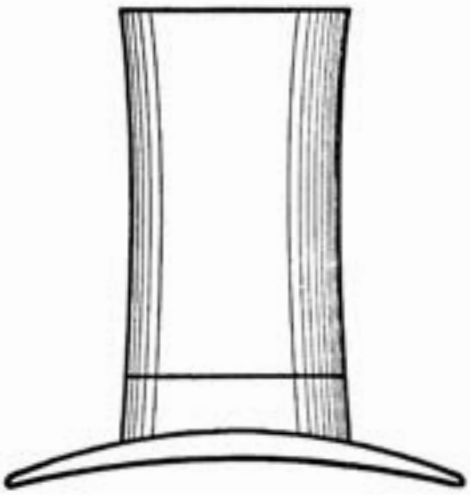
Before the invention of photography phenomena depicted by artists provide the only visual record we have of how anatomy was taught, what sick people suffering from various diseases looked like, how nature was studied and even what the weather was like. Detailed and objective illustrations were no simple matter.

3. Art as a record of subjects of scientific interest

In a more lighthearted way artists have also commented on science with wit and irony. They have made fun of scientific and medical practices but they have also produced many powerful paintings of dissections and experiments.

4. The aesthetic in science

Anyone familiar with art of the past 50 years is thereby familiar with the images in science and technology. The idioms used in 20th century art are to be found in thermograms, schlieren pictures, scanning electron micrographs, pictures of ultrastructure and even the equipment of the most sophisticated laboratories. Oscar Wilde always claimed that effects in nature did not exist until art invented them.



The Luckiesh Hat - the vertical dimension is equal to the horizontal one, but the former appears greater.

◀Ernst Haeckel's illustrations of Dinoflagellata from his Kunstformen der Natur. These minute planktonic organisms were observed by him through a microscope and drawn during the latter part of the 19th century. Contemporary micrographs confirm their extraordinary accuracy.

5. When we talk about art what do we mean?

Not all images which we recognise as art today were made with that intention. This is true of traditional robes, architecture, ruins, utensils and found objects. Also, art as an aesthetic and thereby a social phenomenon, is linked to an integrated personality. How then are we to look at the art of the insane?

6. Symmetry, pseudo-symmetry, asymmetry

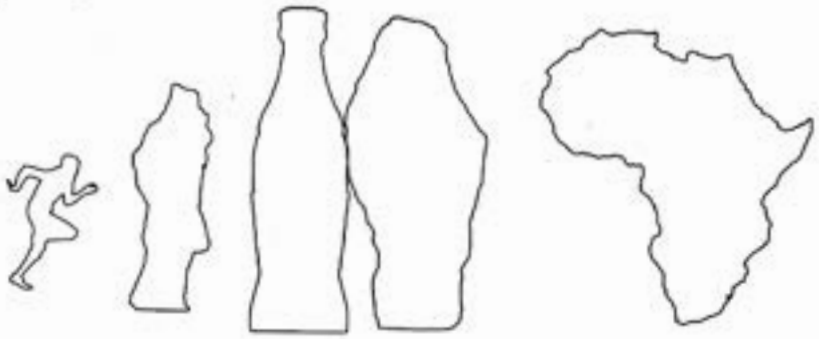
True symmetry is to be found in crystallography, ornamental design and ritual. Pseudo-symmetry exists in a greater range of natural things including man himself. But, while both these types of symmetry express the idea of stasis and rest, asymmetry is related to dynamism.

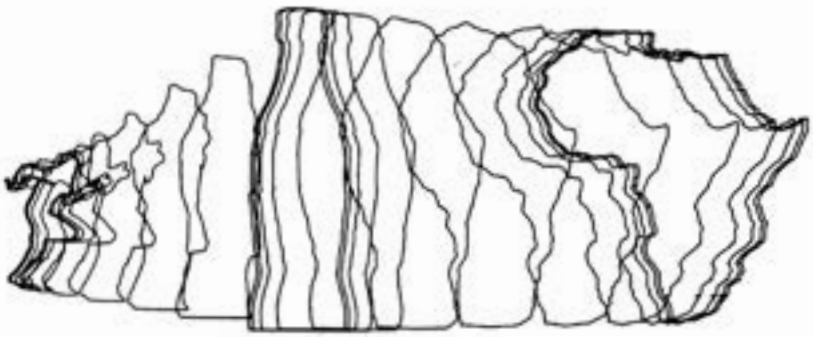
7. Fibonacci series and the golden mean

The Fibonacci series describes some of the most pleasing shapes in nature. In its relationship to the golden section and the logarythmic spiral it is to be found in many ancient temples including the Parthenon, in the buildings of Le Corbusier, and in nature in the most beautiful shell of all - that of the Nautilus.

8. Optical illusions

There is an entire repertory of visual diagrams and tableaux which demonstrate the fallibility of the eye. Many artists, including Hogarth, Albers and Riley have explored ways of engendering impossible and disturbing images causing many a gallery visitor to leave feeling giddy, believing concave surfaces to be convex and seeing one colour as two.

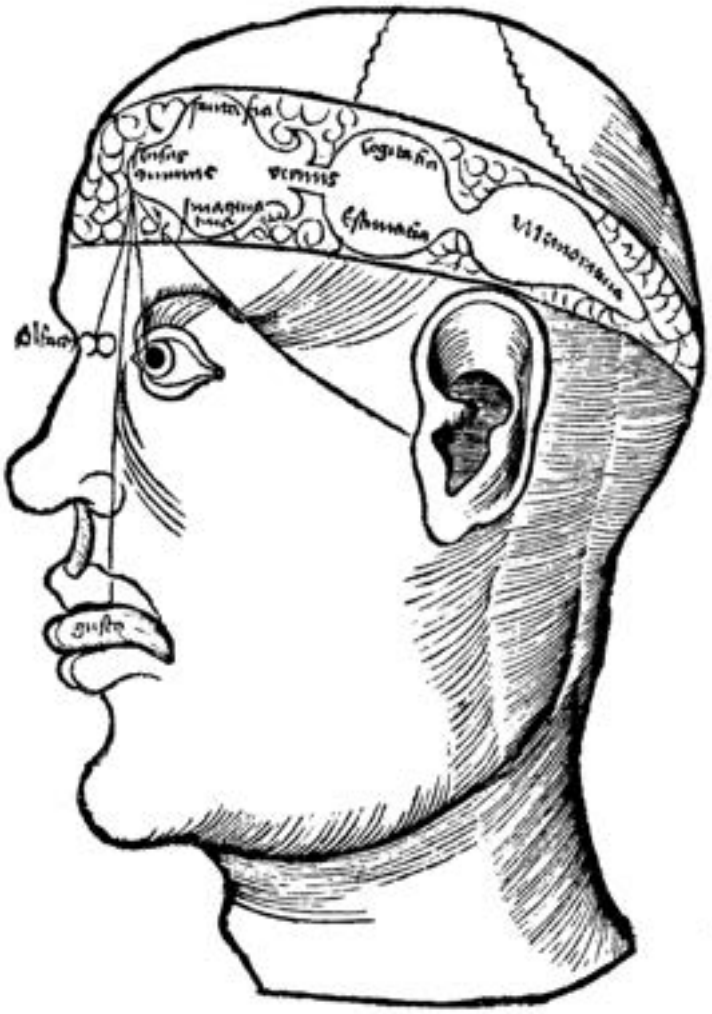




'Running Cola is Africa' by Komura, Ohtake and Fujino. A computer algorithm converts a running man into a bottle of cola, which in turn is converted into a map of Africa.▶

9. Ways in which artists use science and technology

Artists' media and techniques today encompass a great variety of methods and materials. Many work with chemistry, biology and physics and there are numerous creations which could not have been done without the collaboration of engineers and other specialists.



One of the many representations of the medieval localisation of mental functions.

10. Electronics and cybernetics

The two major developments in art which incorporate sophisticated technology are Video and Computer Art. Video has become the new drawing pad for artists to make quick notes and record the development of their work. Computer art has enabled people who can't draw at all to make images and to correct the image as it is being drawn. The computer driven graphic plotter pen, the teletypewriter and the cathode ray tube display and light pen have become accessible to artists in the past ten years.

11. The artist's concern with science

Artists have commented on two aspects of science. First of all they have described and commented on what science does, and secondly they have made use of some of its ideas and language for their own purposes. In the first case they have treated it in context and in the second out of it.

12. Suspend your creativity

Neither art, nor science have solved the social problems which beset us. Some artists are turning away from all that has been recognised as art so far, in order to try something new and which they feel may be more relevant for the time being.

Bio

Jasia Reichardt is a writer on art and an exhibition organiser. She is interested in art that encroaches on other fields, be it science or literature and has spent many years following up the connections between art and technology.

(US)

Erik Lucero

**Lead Engineer,
Google Quantum AI Lab**

The Quantum AI Artists in Residence Program

I implore all of us to invite creativity in and foster a science+art practice with your people.

I see the scientist's and the artist's perspectives as one, the human perspective.

As Lead Engineer at Google Quantum AI, Site Lead for the Quantum AI Campus in Santa Barbara, and co-founder of the Quantum AI Artists in Residence program (AiR), I am reminded daily how important it is to invest early and often in the human perspective; to weave art and science into the fabric of the culture.

'The association of art and science is inspiring for the scientists in that it provides a point of view not attainable by rational thought only.'
-Michel Devoret, Physicist and Chief Scientist

The Quantum AI Artists in Residence program (AiR), established in 2018, has invited over 25 artists to spend time in residence and participate in creative exchanges with the team. For Google Quantum AI, this program has helped us reenvision the scientific lab, from a precambrian hermetic and sterile space into a space whose energy evokes innovation, inspiration, and creativity. A place where scientists, engineers, technicians, and artists push the boundaries of human knowledge and experimentation, with the collective goal of delivering a fault tolerant error corrected quantum computer to the world.

Quantum computing exploits the principles of quantum mechanics, which in turn explain the behavior of nature at the smallest and fundamental levels. Our intent is to create a sanctuary to celebrate quantum computing and the human endeavor to deepen our understanding of and connection to nature. Quantum computers speak quantum mechanics and here we are learning to speak the language of nature.

The first artists in residence created artworks on circular canvases wrapped around some of the coldest places in our universe - Google's Sycamore quantum computers. The Quantum AI Lab's principal artist and AiR cofounder, Forest Stearns and I invited artists from all over the world to hug our quantum computers with original artworks celebrating natural wonders; a reminder of the existential promise quantum computers could deliver to help us protect and deepen our understanding of nature.

The response of our scientific and engineering teams to bringing art into the heart of the lab has been overwhelmingly positive.

'The art and science inspire me to improve myself as a human everyday for my colleagues and the betterment of society.'
-William Giang, Senior Verification Engineer

Since its inception, AiR has extended across the Quantum AI Campus, a constellation of laboratories and workspaces filled with artifacts from the future of computing: from big wall murals, art on quantum computers, regular exhibition of scientific photos and imagery, to

(1) *"Dawn of the NISQ era"*, by Forest Stearns, Courtesy of Google Quantum AI
(2) Quantum AI Campus, South High Bay Laboratory, Big wall mural and stained glass by Forest Stearns, Courtesy of Google Quantum AI
(3) Quantum AI Campus, South High Bay Laboratory, Artwork by Forest Stearns, Courtesy of Google Quantum AI

(1)

engineered objects memorialized as museum pieces tracing our team's technological history. The impact on our team has been a collapse of the boundary between art and science to reveal a common language that welcomes curiosity and appreciation of each other's work.

> *'Although I'm a theorist, I like to work as close to the lab as possible. A big reason is the inspiration from the experiment, the space and the art.' - Yuri Lensky, Physicist*

Although primarily an internally facing endeavor for our team, AiR has been instrumental in bridging the gap between quantum science and the broader public to help create a shared language between humans from heterogeneous backgrounds, training, and expertise. By embedding and evolving art-science collaborations within our team we have:

- **Developed a shared language:** Through close interaction, artists and scientists have developed a common language for describing the technology stack we are inventing, which directly enhances communication and fosters more efficient collaboration within the team.
- **Invited curiosity and communicated complex scientific concepts:** Artists have translated intricate quantum phenomena into accessible and engaging visual representations, aiding public understanding and providing representational imagery to contextualize breakthroughs. (See: PBS News Hour piece[10], scientific journal covers, and blog posts[11])
- **Marked significant quantum computing milestones for the community at large:** AiR celebrates critical scientific achievements like the transition from classical computing to the noisy intermediate scale quantum (NISQ) era of computing and advancements in quantum error correction through artistic expression, making these breakthroughs more tangible. (See: Hall of Fame in the Deutsches Museum[12])

(2)

Welcoming art and artists into the Quantum AI Lab has played a crucial role in attracting and retaining talent. This practice has helped to renew an affinity for hands-on and in person collaboration.

'I get to work in a museum of art and science' - Wayne Liu, Materials Scientist.

At Quantum AI, AiR continues the work to demystify quantum science through a shared language, by inviting curiosity to help humanity develop intuitions of quantum mechanical phenomena, and fostering a profound appreciation for the transformative potential of quantum technology to broader audiences.

Strengthening our relationships to each other and nature are critically important. Therefore, I implore all of us to invite creativity in and foster an artist in residence and a science+art practice with your people. Whether you are presented with the opportunity to invent the future, looking to create community, or inspire your team, a sound investment is to invest in the human perspective.

(3)

The Quantum AI Artists in Residence

Adam McCauley
Alme Allen
Ando Pndlian
Andre Klots
Andres Amador
Anne Bown-Crawford
Arian Stevens
Dr. Sian Proctor
Eriko Yamada
Eugenia Mitsanas
Forest Stearns
Franck Marchis
Fraser King,
Genevieve St. Charles Monet
Holly Wach
Jeremy Hara
Kate Rado
Lux Meteora
Matt Beard, Eureka
Mike Dewey
Mike Dutton
Naomi Kampher
Nick Schwaller
Nir Hindie
Ranger Ravis McQuade Henry
Raymond Bonilla
Richelle Ellis
Toons - Anthony Martin
Vicky Vanthof
Willoughby Arevalo

Bio

Dr Erik Lucero designed, built and operates Google's Quantum AI campus in Santa Barbara, with the mission to build quantum computing for otherwise unsolvable problems. He is one of the scientists on the Google Quantum AI team, which demonstrated humanity's first beyond-classical computation,[13] recognised as one of the Breakthroughs of the year, and subsequent quantum computing milestones.[14] He has over two decades of experience in quantum computing architectures, engineering quantum systems from the qubit level to the campus level. Recognising how an artist's perspective invites curiosity, Erik photographed the evolution of quantum processors from single qubit devices to Google's Willow quantum processor. In 2018 Dr Lucero and Forest Stearns founded the Quantum AI Artist in Residence programme, to build community for aspiring quantum mechanics in a culture of inspiration and creativity through a science and art practice. Dr Lucero joined Google in 2015.

(ES/US) Luis Álvarez-Gaumé

Director, Simons Center
of Geometry and Physics,
Stony Brook University

Interview

Interviewed by Hannah Andrews,
Director, Digital Innovation in Arts, British Council

The power of both science and art is in its ability to help us understand what's in front of us in terms that previously nobody could even think about. They show us how the human mind can transform our lives – transform the way we see and understand the world – in ways that are totally unpredictable.

HA: What is the value of initiatives that bring artists and scientists together, such as Arts at CERN, from your perspective as a theoretical physicist?

LAG: I think that the scientific and artistic communities have many common features – obsession, frustration, creativity.

In science, however, we have an oracle – nature. You can have as many crazy questions or as many crazy ideas as you like, but at the end of the day you must ask nature. In contrast, artists themselves are the oracle because they create their own reality.

What is inspiring in this context, is the dialogue between scientists and artists. This dialogue opens frontiers, opens visions and opens inspirations.

If an artist is engaging with quantum mechanics, for example, before they reconstruct reality or create a new reality, listening is important to understand what scientists do. It is also important the other way around; scientists also must try to understand what artists do when they look for representations of abstract ideas.

This way there is no hierarchy and no manipulation. We are not there to tell artists what they should do, and artists are not there to tell us what to do. We must have a dialogue, because in our search for knowledge or ideas and creation we share very similar patterns, and then we can really inspire and enhance each other.

HA: Have you had your perspective changed by any of the artists in residence?

LAG: Yes. Semiconductor (Artist collective by Ruth Jarman and Joe Gerhardt, Arts at CERN residents 2015, 2018), for example. They are very good at explaining magnetic fields and magnetism. Their visual images of magnetism are much better than anything I've seen in physics books. They really understand how it works by exploring different materials and different behaviours of magnetised matter.

Scientists in these residencies also change artists' perspectives. Another artist, for example, was making sculptures about dark matter made of dark materials, and I asked him 'How do you know it's dark?' There is dark matter from here to Andromeda to any other galaxy but it doesn't impede light to reach our eyes. So it is invisible. Through this dialogue he reworked his sculpture in a translucent colour.

HA: There's a long history of science diplomacy and CERN is a prime example, bringing together so many nations to collaborate on historic discoveries. Do you think we need to apply these principles that underpin science to the context of technology?

LAG: I think we could solve many problems in medicine and other things if we honestly shared our knowledge. But of course, if you want to honestly share your knowledge, there can be no patents.

The web, for example, was invented at CERN because people needed to communicate very complex material in a way that was independent of platforms and devices.

If CERN charged, say, one cent or even one hundredth of a cent, then it could make enough money to support research for the next 1,000 years. But that's not the point. The point is that this is public money that is used for public knowledge, so if we all earnestly and honestly shared knowledge, I think things would evolve much faster.

HA: In your talk at the *CERN Art and Science summit* (2025)[15] you discussed creativity in the context of 'being unreasonable we can achieve the possible'. Can you explain this idea?

LAG: The power of both science and art is in its ability to help us understand what's in front of us in terms that previously nobody could even think about. They show us how the human mind can transform our lives – transform the way we see and understand the world – in ways that are totally unpredictable.

In the same way, this is what the quantum world has done.

A good parallel to quantum is electromagnetism. Michael Faraday, one of the great scientists in history invented the electric motor in the UK in the 19th century. He found that turning a loop of wire coiled around a magnet creates an electric current. Every engine or turbine that makes electricity today is still based on that principle.

At the time of discovery it was unthinkable, because people have looked at magnets since antiquity and failed to see what was in front of them. The fact you could solve the energy problem by moving a wire around a magnet was a stroke of genius, but it was also a stroke of nature – it's nature that is unreasonable and possible at the same time.

Both scientific discovery and creativity are the extraordinary that help make the ordinary possible – they both explore the unreasonable to achieve the possible.

Bio

Luis Álvarez-Gaumé was born in Madrid, where he obtained his BA in physics at the Autonoma University. He moved to Stony Brook University soon after, where he obtained his PhD in 1981. He then joined the Harvard Society of Fellows, later joining the faculty as assistant and then associate professor. After a brief stay at Boston University he joined the Theory Division at CERN in 1988. He has been director of the Simons Center of Geometry and Physics at Stony Brook since 2016.

(UK)

Creative AI Lab, Serpentine Arts Technologies, Kings College London

Eva Jäger and Mercedes Bunz

Public [interest] AI: Cultural organisations shaping technology

Art x technology initiatives like the Serpentine Arts Technologies and the Creative AI Lab have demonstrated their ability to provide real-world solutions for public-interest tech development. With the right investment and interorganisational coordination, art x tech spaces can serve as valuable proving grounds for public-interest AI innovation.

Since its inception in 2019 the Creative AI Lab, a collaboration between the Serpentine Arts Technologies and King's College London, has identified and evidenced the diverse ways in which artists are working with AI to remake interfaces, build datasets and influence technical development across the AI ecosystem.

Between 2014 and 2025, Serpentine has produced four Digital Commissions[16], four exhibition projects[17], and one strategic briefing with a particular focus on AI[18]. The Creative AI Lab grew out of a need to explore and understand the research R&D phases of these complex projects as high-value intellectual, technical and creative outputs in their own right. It is one of several labs incubated in Serpentine's Arts Technologies programme under an initiative led by Dr. Victoria Ivanova which has since grown into the Future Art Ecosystems project. Focusing on the production or 'back-end' environments of art-making with AI, the Lab, including one PhD student, has held space for conversations, research and experimentation that addresses both the impact of AI on art-making and the impact of art-making on the R&D of AI.

This R&D, made possible through the Creative AI Lab and Serpentine's Arts Technologies programme, has been a key resource for Serpentine as it produced its fourth annual strategic briefing: *Future Art Ecosystems: Art x Public AI.*

The report, building on the Creative AI Lab's research, envisions how the UK's rich cultural ecosystem could advance AI innovation, not only seeing creative AI as a new category of tech products, but as a public resource and infrastructure that cultural institutions can help shape. It identifies the need for cultural organisations to consider themselves stewards of valuable data sets (collections, archives, etc.) capable of delivering valuable AI research and contributing to necessary AI infrastructure in a way that is efficient and useful to the public.

This proposition was tested at Serpentine through Holly Herndon and Mat Dryhurst's exhibition, *The Call:* an exhibition that involved the development of a bespoke generative AI dataset and model. In developing this bespoke AI, the arts technologies team, the artists and a team of legal and policy experts in intellectual property and general data protection regulation (GDPR) developed a pioneering framework for collective data governance.

Three key insights have emerged from the experiment. First, it demonstrated the need for data governance approaches that go beyond individual opt-in/opt-out, highlighting the impact of building capacity for meaningful participation through relationship-building and structured preference-gathering towards outcomes such as trust and transparency. Second, it established legal frameworks that enable creative communities to collectively exercise and negotiate their rights, while also revealing limitations in

(1, 2) *The Call*, 2024, Holly Herndon and Mat Dryhurst, Still, Courtesy of Foreign Body
(3) South Lakes Acapella (Windemere), 2024, *The Call*, ©Serpentine

current individual rights-based approaches. Third, it validated the potential for cultural institutions to serve as trusted intermediaries in AI development[19]. At a time when the implications of AI on intellectual property and data ownership are the subject of urgent and intense public debate, this experiment goes a long way to offering a solution that provides agency to creators who opt-in their content to AI training.

Though this proof of concept emerges from the creative industry and relates to art-making, the proposals for data intermediation by national institutions applies more broadly to nationally powered AI development across all sectors. Because of its unique approach to R&D, Serpentine was a fine testbed, providing the financing, framing and production for a highly complex real-world experiment. The project's findings (including a white paper, legal recommendations and contracts) have since provided useful in policymaking and technology companies. Sharings of the project's outcomes have been attended by tech organisations such as Google DeepMind, Signal, OpenMined and Spawning, and policymakers such as the Information Commissioner's Office, the Ada Lovelace Institute, the Department for Digital, Culture, Media and Sport, and the Department for Science, Innovation and Technology, who also invited Serpentine to give evidence in their forthcoming consultation on data trusts.

(1,2)

Art x technology initiatives like the Serpentine Arts Technologies and the Creative AI Lab have demonstrated their ability to provide real-world solutions for public interest tech development. With the right investment and inter-organisational coordination, art x tech spaces can serve as valuable proving grounds for public-interest AI innovation.

(3)

Bio

Eva Jäger is Curator of Arts Technologies at Serpentine Galleries in London. She commissions artists working with advanced technologies and is a collaborator in teams designing novel approaches, workflows and philosophies of emerging tech. Most recently she curated The Call, a project made in collaboration with the artists Holly Herndon and Mat Dryhurst. Eva is also part of the team working on Future Art Ecosystems as a researcher for the annual briefing (most recently Future Art Ecosystems Vol. 4: Art x Public AI). She is also a co-investigator of the Creative AI Lab (Serpentine x King's College London).

Mercedes Bunz is Professor in Digital Culture and Society at the Department of Digital Humanities, King's College London. She studied philosophy, art history and media studies at the FU Berlin and the Bauhaus University Weimar and wrote her thesis on the history of the internet, driven by a deep curiosity about digital technology. Until now she has not been disappointed by the transforming field that is digital technology, which reliably provides her with new aspects to think about. At the moment that is artificial intelligence and machine learning. Looking into these topics, is also a Co-Investigator of the Creative AI Lab (Serpentine x King's College London).

(UK/US)

Artists

Mat Dryhurst and Holly Herndon

Interview

Interviewed by Hannah Andrews,
Director, Digital Innovation in Arts, British Council

Working with a choir also offers a relatively safe space in which to experiment, before contemplating collective AI governance in higher-risk contexts such as health data.

The Call, by artists Holly Herndon and Mat Dryhurst (2024), is a Serpentine Arts Technologies commission that takes inspiration from choral tradition as an ancient communication technology to explore 'a beautiful way to make AI'. It is grounded in a collectively owned, first-of-its-kind choral AI model and dataset, accompanied by a governance framework ensuring choristers retain agency over their voices once incorporated in the AI workflow.

This governance framework is called the Data Trust Experiment, and offers a practical way to approach AI governance, allowing rights holders (in this case choristers) to collectively determine how the AI model trained on their voices will be used, mediated by an elected data trustee.

HA: What was the motivation for experimenting with collective AI governance through *The Call*?

HH + MD: We feel that you cannot substantively contemplate how IP will work in the era of AI models without considering the collective. Foundation models are a monumental collective accomplishment, us in aggregate, arguably owned by everyone and no-one in particular. As such we need mechanisms for collective data governance.

Contemplating collective rights is considering that, in the context of AI datasets, the relative value of an individual's data is tiny, however in aggregate the data produced by a community or population can be incredibly valuable. This gives the collective much more agency than the individual to negotiate the purposes and applications of AI trained on their data.

In the web 2 paradigm, major tech companies, from search engines to social media platforms made the convincing claim that the small value of an individual's data more than compensated for the ability to use their services for free. For better or for worse, these companies now have an overwhelming AI advantage, due to the substantial datasets they have amassed from decades of public use of their platforms.

This is a model that could be considered in public contexts. As collective AI data becomes more valuable, can transparent contracts be agreed between public entities and citizens, where data is offered in return for public access to digital services? In contrast to the early web2 paradigm, could we imagine these as contracts that afford citizens the ability to collectively determine the development, application, and use of the AI models trained on their data?

(1) *The Call*, 2024, Holly Herndon and Mathew Dryhurst, Serpentine, ©Leon Chew

HA: What was the motivation for experimenting with collective AI governance through *The Call*?

HH + MD: We get to ask questions outside of the pressures and politics of business and policy. It is our duty to make sure we know at least as much as people holding the levers of power, so that our questions and proposals are compelling. We try to make our perspective difficult to ignore with tools and art people can experience and see running in the world. We have a degree of freedom to speedrun possibilities, and as such often find ourselves a couple of years ahead of industry and policy in areas we find interesting.

Working with a choir also offers a relatively safe space in which to experiment in, before contemplating collective AI governance in higher-risk contexts such as health data.

The process is equally thrilling and alienating, as on top of the pressures of producing art for a living we are running the world's least funded AI thinktank from our kitchen.

HA: What is the value of international, intercultural collaboration when it comes to trialling new models for engaging with AI?

HH + MD: More people need to be involved in these discussions, as they have serious consequences. We think there are a lot of brilliant and thoughtful people working within the field of AI, however a handful of abundantly resourced actors are so far ahead of institutions and governments in terms of their comprehension and capacity, and this brings into question the safety of democracy itself. It is very difficult and often thankless to bring these complex matters to the public, but it is very important to do so. We would all benefit from greater participation and wider perspectives on where this leads.

The Data Trust Experiment was led by Victoria Ivanova, Jennifer Ding (Data Intermediary), and Eva Jäger with Ruth Waters and Mercedes Bunz. It was incubated by the Future Art Ecosystems project at Serpentine Arts Technologies. Further research support for data empowerment by the Centre for Data Futures at King's College London and RadicalxChange. Legal counsel for data empowerment of choir members by AWO and Keystone Law.

(1)

Bio

Holly Herndon and Mathew Dryhurst are artists known for their pioneering work in machine learning, voice and digital identity. They develop original technologies and systems for engaging with the tools of others, often proposing technical protocols as artworks in themselves. In 2024, they presented the solo exhibition The Call at Serpentine and participated in the Whitney Biennial. They co-founded Spawning, an organisation building public domain AI models and data infrastructure. Their acclaimed music is released via 4AD and RVNG Intl. Holly holds a PhD from Stanford; Mathew is self-taught. They received the STARTS Prize, Austria's Digital Human Rights Award, and the KAIROS Prize.

(UK)

Robert Laidlow

Composer
and Researcher

AI innovation and orchestras

When you join an orchestra with its audience, you get a micro-society. This micro-society has a long history as a site for innovation and experimentation … Continuing this tradition today, with AI, I see the orchestra as a valuable dress rehearsal for society at large.

An orchestra is a computer. Its constituent parts (musicians) follow lines of code (musical notation), communicated through a symbolic language that can take years to learn. The conductor, like the central processing unit, directs the flow of information (though isn't necessarily in charge). Watching a hundred people perform in absolute synchronisation with each other is about the closest you might get to seeing the precise and perfect streams of numbers that power your laptop. Both are inspiring human creations.

An orchestra is also a museum of technologies. Remember that once someone invented the modern piano, added valves to a horn and designed the violin you see on stage.

It seems a natural fit, to me, to introduce experimental new technology like AI instruments, improvising machines and listening algorithms to the orchestra. This is especially true for groups like radio orchestras – of which we have five phenomenally good ones in the UK – which were set up a hundred years ago to take advantage of new technology. There's also an element of hacking involved in my work – I like the idea of repurposing technology that may replace musicians, to instead add it to our toolboxes, making us more resilient.

Of course, an orchestra is only a machine in a metaphorical sense. This group is composed of actual people with diverse skills, outlooks, interests and ideas, united by their love of music. When you join an orchestra with its audience, you get a micro-society. This micro-society has a long history as a site for innovation and experimentation, beginning with integrating early tape parts, like those found in Varese's Déserts, and continuing through work done with composers at institutions such as the Westdeutscher Rundfunk and Milan Electronic Music Studio.

Continuing this tradition today, with AI I see the orchestra as a valuable dress rehearsal for society at large. How will people react to it? What will they find useful, creatively stimulating? What do they actually want out of new technology, and how can we design it in future to accommodate that?

(1) Stacco, Embedded AI instrument used in *TECHNO-UTOPIA*, ©Intelligent Instruments Lab
(2) Sound Vessels, 2025, Robert Laidlow, Vessels: Federico Visi, Cello: Cosima Gerhardt, Elec.: Alberto de Campo, Images from Performance using pouring liquid to control AI sound models, Universität der Künste Berlin, ©Nikolaus Brade
(3) Silicon, 2022, Robert Laidlow, Image of performance with BBC Philharmonic at the premiere, ©Megan Walker

(1)

(2)

These are the questions key to my upcoming project *TECHNO-UTOPIA,* commissioned by the BBC Philharmonic and the Berlin Radio Symphony Orchestra. It explores memory, magic, ruthless algorithms and what makes music more than just data. The piece's soloist performs on the piano, synthesisers and brand new embedded-AI instruments developed with my collaborators across Europe. AI here is not doing anything as tedious as generating end-to-end pieces of music, but rather acting as a tool for creative exploration and expression. It allows musicians to create sounds we've never heard before.

TECHNO-UTOPIA is also local. The AI instruments used in it are trained only on recordings that the orchestra owns and have shared with me for this project. It's an audible rejection of the corporate notion we often hear that AI simply can't function without scraping every piece of music online, whether the creator wants you to or not. Importantly, this AI locality helps lend the project a sense of place. The technology is responding to that specific orchestra, interacting with that society. I find that much more interesting than a sonic sum of averages from the internet. With projects like *TECHNO-UTOPIA*, I believe musicians can actively influence how technologies might be imagined, by showing what is possible. Rather than passively commenting from the sidelines, we can be loud about the future we want to see.

(3)

Bio

Robert Laidlow's 'gigantically imaginative' (BBC Radio 3) music discovers new forms of creative expression through colliding advanced technology, scientific collaboration and live performance. His genre-defying orchestral music includes Silicon for orchestra and artificial intelligence (BBC Philharmonic), Exoplanets, made in collaboration with James Webb Space Telescope astrophysicists (London Philharmonic and Basel Interfinity Festival) and *TECHNO-UTOPIA* (BBC Radio 3 and Berlin Radio Symphony Orchestra), which sees the orchestra embedded with newly developed expressive AI instruments. He is a Fellow in Composition at Jesus College, Oxford University, a governor of the Royal Conservatoire of Scotland and an Associate of the Royal Northern College of Music.

(DE)

LAS Art Foundation

Entangling Futures: Quantum Technologies and the Value of Artistic Experimentation

For many visitors [our exhibitions] offer a first meaningful encounter with quantum technologies – one grounded not in science fiction or geopolitical headlines, but in felt experience and critical inquiry.

Quantum technologies are predicted to enact a paradigm shift in our world, with the potential to reshape computation, communications, simulation and sensing at a fundamental level. Their complex mechanics and limited points of access mean their development is largely opaque to the public, giving the cultural sector an urgent and critical role to play. In this formative stage, artists are not only bringing quantum technologies into public discourse, they also have the agency to co-innovate, surface latent potentials, and open new ethical and imaginative dimensions.

Quantum computing, in particular, presents a wholly new medium for creative practice. Its logics – non-determinism, entanglement, superposition – challenge classical thinking and invite aesthetic exploration. LAS Art Foundation is deeply invested in artists' early engagement with these emerging media and has, since 2021, commissioned projects that open different aspects of the technology to audiences. Libby Heaney's installation Ent- (10 Feb – 1 May 2022, Schering Stiftung, Berlin) explored how quantum entanglement can be used as an aesthetic tool, while simultaneously interrogating the corporatisation of quantum research and the question of equitable access to technologies whose development is dominated by corporate and national interests. The commission attested to how artists are not only vital in pushing experimentation with applications of quantum technologies but also in surfacing the ethical dilemmas they raise.

Earlier this year, we opened Laure Prouvost's large-scale installation *WE FELT A STAR DYING* (21 February–4 May 2025, Kraftwerk Berlin) to over fifty thousand visitors. The work emerged from the artist's exchanges with physicist Hartmut Neven (Google Quantum AI Lab) and philosopher Tobias Rees over a period of two years. Together they developed a generative AI model based on quantum noise – data extracted directly from Google's quantum processor. Unlike classical noise typically used in AI, quantum noise is not merely a mathematical model but arises from the fundamental quantum fluctuations that occur in all matter. This data became a generative force, shaping audiovisual works that reflect the indeterminacy defining the quantum scale of reality.

The installation shaped a multisensory language for quantum with this profound experiment in AI-quantum hybridity at its heart. In a moment when quantum-generated data is beginning to introduce new forms of unpredictability and complexity into AI systems, Prouvost's prompts led the model's developers to consider conceptual and aesthetic challenges they hadn't previously encountered. This

(1, 2) *WE FELT A STAR DYING*, 2025, Laure Prouvost, Installation view at Kraftwerk Berlin, commissioned by LAS Art Foundation and co-commissioned by OGR Torino, © 2025 Laure Prouvost, Photo: Andrea Rossetti

(1)

underscores how artists can influence how technologies evolve, not by illustrating them, but by testing their premises, complicating their narratives and shaping their trajectories.

Together these commissions attest not only to the diversity of artistic strategies, but also to their capacity to mediate complex technologies for broader publics. For many visitors they offered a first meaningful encounter with quantum technologies – one grounded not in science fiction or geopolitical headlines, but in felt experience and critical inquiry. This matters because technological imaginaries – the stories we tell about how technologies work and what they mean – are shaped long before a tool reaches widespread use. The arts provide a space to prototype new relations with technology: not only to critique, but to speculate, to feel and to rethink.

Such work must proceed with a clear understanding of the conditions in which it unfolds. The development of quantum technologies is already being steered by powerful corporate and national actors, whose influence reaches beyond innovation into governance and regulation. While artists and publics may not hold equal power in this terrain, their work introduces possibilities, expands the language and imaginary, and makes visible the stakes before infrastructures harden. In a field that remains largely inaccessible and speculative for most, cultural engagement plays a vital role in holding space for public agency, critical reflection and the possibility of alternative futures. What is at stake is not only how quantum technologies will function, but how – and for whom – they will come to matter. This kind of probing, participatory and imaginative engagement is not ancillary to innovation: it is what innovation, at its most meaningful, should ultimately be.

(2)

Bio

LAS Art Foundation is a new type of arts organisation – one that looks deep into our present and gives form to future imaginaries. We explore topics ranging from artificial intelligence, quantum computing and gaming to ecology and biotechnology, illuminating the intersections between art, science and the latest technologies. Our programme comprises installations and performances, as well as educational programming, publications and research projects. Curiosity drives us to continually reimagine the role of an arts institution as one that shapes and evolves with our collective futures.

(CN/UK)

Independent Art and Science Curator, Visual Artist and Writer

Iris Long and Gary Zhexi Xhang

Free electrons in a planetary technoculture

Art and technology – as a sociotechnical mediator between new industrial modalities, scientific knowledge, technological exploration, cultural and cosmological expression, and society at large – can play the role of the free electron building new visions and connections in a world increasingly erecting borders.

What *is* art and technology? Today, both art and technology, East and West, are dynamic and unmoored entities revolving around how we ground our material conditions and conceptualise a common future.

In our roles as practitioners and researchers working internationally – principally between London, Beijing and Shanghai – and across sectors – interfacing with art, academia and the tech world – we see art and technology not as fundamentally different fields but as a shared set of sense-making and world-making practices.

China, for its part, will no doubt play a role in shaping the terms of art and technology, just as the West did over the last half-century. Today, young Chinese artists are not only adopting new technologies like AI as part of their creative toolkit. In this pivotal era of global transitions they are also rediscovering narratives of China's own techno-scientific history and cosmology, and exploring alternative societal trajectories – new technological imaginaries – to the one which led us here. With the increasing convergence of technological power and nationalism across the world, and a paradigmatic shift still taking form in the form of AI, the stakes have seldom been higher for carving out new paths for collaboration over competition.

International cultural exchange and innovation through art and technology allows us to build common visions of the future. The global scientific community, for instance, has long offered an inspiring model for the international exchange of ideas, without which science could not have flourished as it has. As global cultural and political fissures threaten to widen, it is important that innovation takes place in pursuit of a shared planet, one that is undergoing seismic transformations at almost every level. During our research in China, we encountered a growing enthusiasm for artistic dialogues, residencies and exhibitions at scientific research institutions, particularly in fields like quantum, astronomy, synthetic biology and AI, which compel us to ask fundamental philosophical and aesthetic questions beyond the laboratory. We do not know what 'quantum culture' will look like, but

(1) *Earth Heat Flow*, 2022, Curated by Iris Long, Installation View, Art & Tech section of the inaugural Beijing Biennial, Courtesy of Iris Long
(2) Curatorial/research trip for rocket debris and space economy, 2025, Courtesy of Iris Long.
(3) *METAMERS*, 2024, Gary Zhexi Zhang, Courtesy of the artist.
(4) Ocean briefings, 2023, Gary Zhexi Zhang, Courtesy of the artist
(5) *Postscript of Silence*, 2023/2024, Curated by Iris Long and Sam Shiyi Qian, Installation view, Shanghai Ming Contemporary Art Museum, Courtesy of Iris Long
(6, 7) *Under the Cloud*, 2023, A site visit for field research on digital infrastructure in China, Courtesy of Iris Long

we do know that there was a time before thermodynamics became the master metaphor, and nature resembled clockwork. Art and technology – as a sociotechnical mediator between new industrial modalities, scientific knowledge, technological exploration, cultural and cosmological expression, and society at large – can play the role of the free electron building new visions and connections in a world increasingly erecting borders.

More profoundly, arts and technologies are ways of seeing, knowing and making the world which is powerfully, at times devastatingly, shaped by human imagination and the systems it creates. Only by connecting across planetary frameworks, whether aesthetic, epistemological or technical, can we build ecosystems of innovation that are sustainable for all. Art, whether as methodology, creation or even institutional soft power, helps us understand what technology is.

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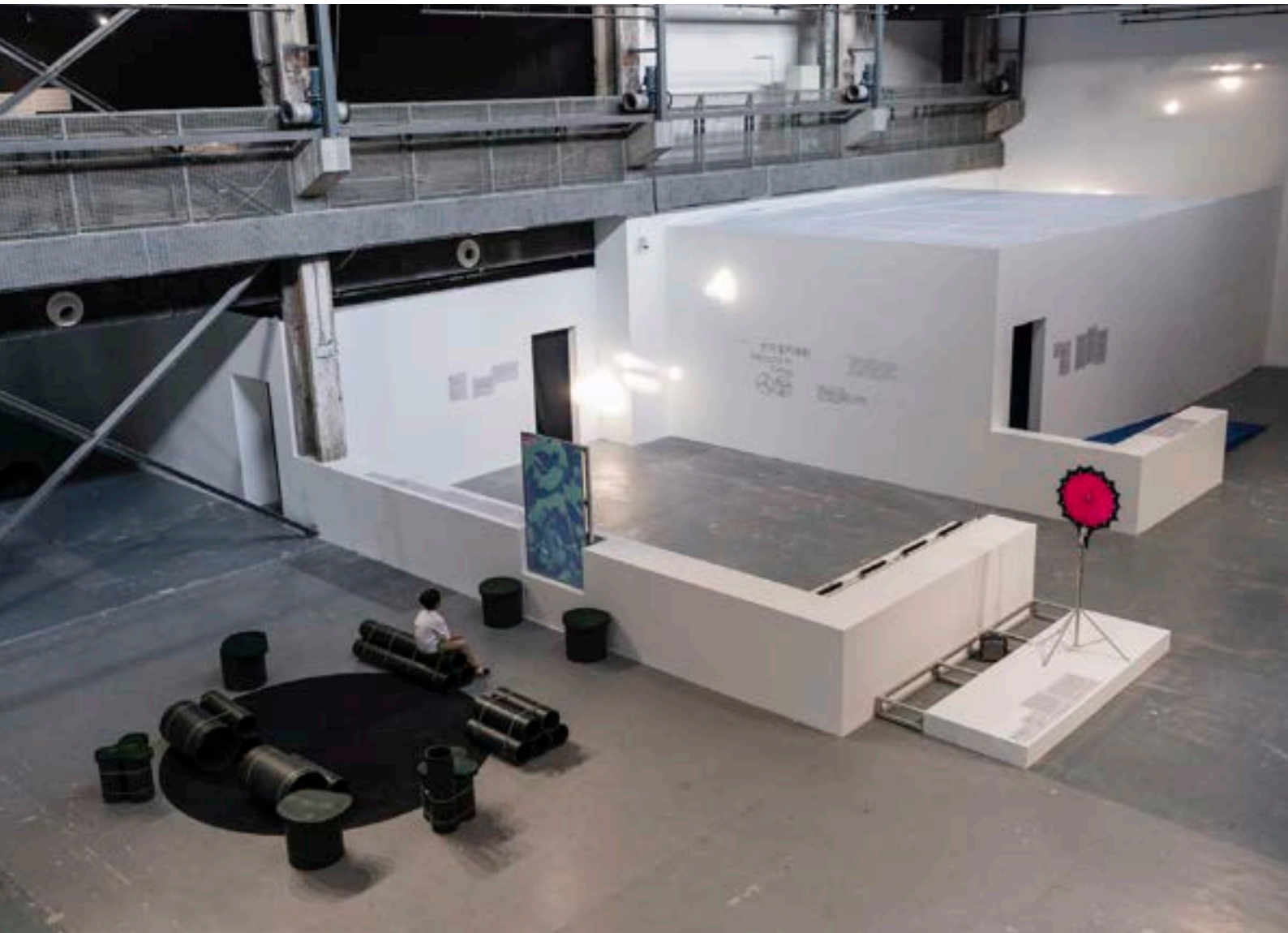

(6)

(7)

Bio

Iris Long is a writer and independent curator whose research focuses on the megastructures of science and technology in China and the psycho-geography of technoscience. She was a 2022–2023 Berggruen Fellow and a Swissnex Fellow. On the radio waves, she goes with 'BY1TYW'. She has curated and co-curated exhibitions exploring art, science and technology, and her international presentations include *The Magic Machine* (University of Cambridge), *Antikythera Salon, Space in Time* (Warburg Institute/UCL Institute of Advanced Studies) and *Art and Artificial Intelligence* (Open Conference, ZKM). In 2021 she co-initiated *Port: Under the Cloud*, a long-term research and curatorial project on the infrastructures of science and technology in China – her passion project.

Gary Zhexi Zhang is an artist and writer exploring connections between economy, technology and cosmology. His work often takes the form of sprawling investigations into systems that border on the irrational and the fictitious, without becoming any less real. He is the editor of *Catastrophe Time!*,[20] a collection of essays, fictions and interviews about finance and time. *Dead Cat Bounce*, the opera he created with Waste Paper Opera, premiered at Somerset House in 2022. His works have been exhibited at the 9th Asian Art Biennial, Taichung; Power Station of Art, Shanghai; and EPFL Pavilions, Lausanne.

[CN]

Xu Bing

Artist

Art satellites in space: Beyond business and military purposes

With space art evolving rapidly alongside technological advancements, artists can now access space resources, collaborate with private space companies and create art using space technology.

Entering the 21st century, governments worldwide recognised the potential of private space enterprises in advancing space exploration and actively supported their development. Space technology gradually transitioned from being solely government controlled to being more accessible to the public.

This transition has ushered in a new era for contemporary art, with space art evolving rapidly alongside technological advancements. Artists can now access space resources, collaborate with private space companies and create art using space technology.

Art also introduces new interdisciplinary perspectives to space exploration. With this vision in mind, Xu Bing launched his first space art project, *Satellite Lake: Cosmic Reflections* (2021–2024), which used the remaining orbiting energy of a decommissioned satellite, Ladybird-1, to create the first stop-motion film in space.

In 2024 Xu Bing established the Star Chain of Arts Project and the Xu Bing Space Art Residency Program to make space resources more available to artists and the general public. It is a collaboration between Xu Bing Studio and Beijing Wanhoo Cultural Media Co. Ltd., with technical support from Beijing Xingyi Lianxin Technology Co. Ltd. and Chengdu Guoxing Aerospace Technology Co. Ltd. This collaborative programme is conducted from two satellites. On 3 February 2024 at 11:06 am, the SCA-1 satellite was successfully launched aboard the Jielong-3 Y3 rocket from a sea launch site near Yangjiang, Guangdong. This is the world's first shared art satellite. Later, on 24 September 2024 at 10:31 am, the SCA-2 satellite was launched from a sea site near Haiyang, Shandong. Both satellites have a three-year lifespan.

The programme invites artists and professionals with an interest in space exploration to contribute their work on these satellites. Among the more than 40 participants there are established and emerging artists, such as Joseph Kosuth, Eduardo Kac, Zhang Wenchao, Hao Ruichang, Korean artist Miri Park, and a 14-year-old student, Cao Zheng. Eduardo Kac's *The Silent Circle* expresses the three fundamental phases of a person's life (youth, maturity, elderhood) via AI-generated GIFs, by matching them with the planned three-year life cycle of the SCA-1 satellite. Zhang Wenchao's *90 Minutes Cosmology* weaves together diverse cosmological views from different cultures and explores the interaction between a physical exhibition space and the satellite. In *Flower City in the Sky*, Hao Ruichang used the light from the projected satellite recording to grow plants on Earth.

Historically, space art projects were not only costly, but also had high barriers to entry, often making them one-time-only endeavours. However, for the first time two art satellites are operating in orbit simultaneously, bringing artists closer to space and enabling new interactions between Earth, satellites and space.

(1) *Flower City in the Sky*, 2024, Hao Ruichang, Xu Bing Space Art Residency Program. © Xu Bing Studio
(2) *Xu Bing Space Art Residency Program*, 2024, Visualisation by Kac Studio based on a photograph provided by Xu Bing Studio, © Xu Bing Studio
(3) Xu Bing working with technicians on the SCA satellite, © Xu Bing Studio

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These satellites also advance curatorial possibilities in space. As new artworks continue to be uploaded to the satellites they explore the ‘continuity of space narratives’, shaping an evolving artistic dialogue beyond Earth. The Xu Bing Space Art Residency Program aims to continue broadening the creative platform, offering a glimpse into the future of art and pioneering new cultural and societal perspectives on space exploration.

Translated by Maisie Luo

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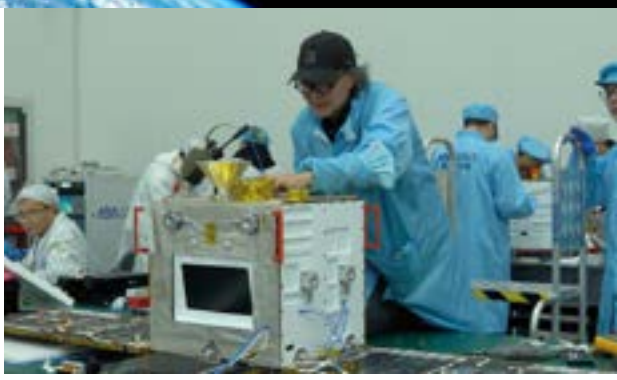

Bio

Xu Bing is a leading conceptual artist exploring language and semiotics. His works have been exhibited by renowned institutions, such as MoMA, the Metropolitan Museum of Art and the British Museum. He has received numerous accolades, including the MacArthur Fellowship, the Artes Mundi Prize and an honorary doctorate in humanities from Columbia University.

(IR/US) Morehshin Allahyari

Artist

Interview

Interviewed by Khaldoun Hijazin, Artist, Curator, and Lecturer

If we want inclusive and representative technologies then it's also important to extend our understanding of technology and technological culture outside of the Global North.

KH: As a Kurdish/Iranian artist, activist and educator based in the US, how do questions of your own identity and positionality shape your work?

MA: Growing up in Iran in a Kurdish family, I learnt the power of speaking up – raising questions when you see something that is not just. Also, as an undergraduate I studied social science and media theory at the University of Tehran. There, I also learnt the power of critical thinking – about the social norms, settings and power structures that influence the way that we are in the world, and how artists, organisers, and educators can influence the things we want to change.

Now as an artist interested in digital technologies and tools, I challenge things because I know that no technology is neutral. Every tool we touch is biassed because we live in a world that is biassed, and all the social and political issues that we're dealing with are reflected in the tools we make.

Being in the heart of Silicon Valley, and at Stanford University where I teach at the Department of Art & Art History, much of my work is about what it means to live somewhere like the US and come from the Global South. I feel my role is to bring more space for critical thinking around technology away from Western conversations.

KH: Beautifully said! In your work *Speculations on Capture* (2024) you speak of the colonial gaze and technology as an instrument of conquest, dating back to photography in the 19th century. Do you see the same patterns with emerging technologies today?

MA: To me, it's very important to think back to [older technologies], like photography in the 19th century, which I discuss in my film *Speculations on Capture* (2024).

[I explore photography] as a tool of colonial gaze and the exoticization of subjects, but also how, in Iran, and many other places at that time, photographers and artists fed into that colonial gaze – taking pictures in a way that they know European tourists or collectors would like.

Fast forward to today, the legacy of the colonial gaze is continuing and extending into new technologies. I coined and developed the term 'digital colonialism' in 2016, thinking about the ownership and copyright of data. My body of work, *Physical Tactics for Digital Colonialism* (2019), specifically engages with this concept in relation to 3D scanning technology. [I explore how] colonial legacies are continuing as tech companies go to different countries in regions like the Middle East to 3D scan historical sites or artefacts, extracting data, and taking ownership by saving it in their data centres overseas.

(1) *Moon-faced,* 2022, Morehshin Allahyari, Still image from video, Courtesy of the artist
(2) *She Who Sees The Unknown: Kabous, The Right Witness and The Left Witness,* 2024, Morehshin Allahyari, Installation with 3D printed resin sculptures and VR video, 32 Lisgar, Toronto Biennial of Art ©Toni Hafkenscheid, courtesy of the artist and Toronto Biennial of Art

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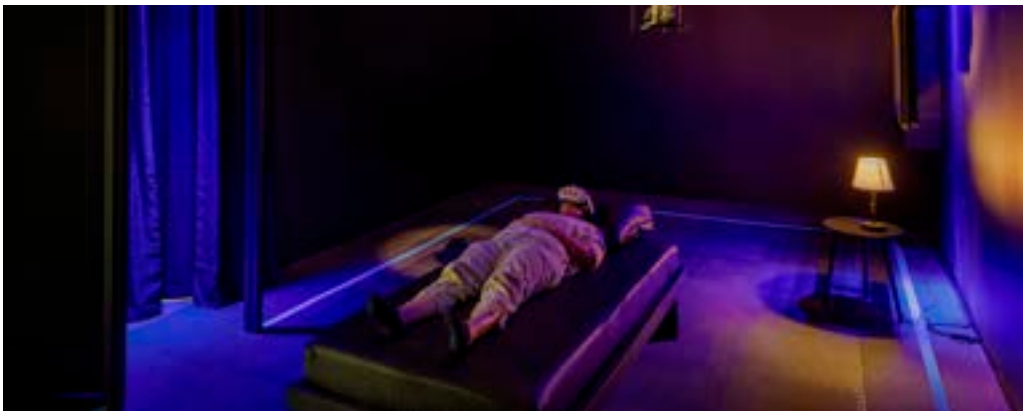

KH: How do the arts and cross-cultural collaboration provide a space for effective resistance to 'digital colonialism', in a context where other channels have failed?

I think critical thinking is a key practise. That itself is a first step of resistance. The second step is how we actually do the groundwork and move into an action-based practise.

This involves teaching ourselves to develop technologies like 3D scanning, or learning to
use these technologies, making sure we are in charge of our own conservation work, and saving our own data, instead of relying on western-imported expertise.

In many countries in the Middle East today, local archaeologist teams are in charge after decades where foreigners used to lead their cultural heritage and conservation work. We now understand what happened when the doors were open for colonial agendas, and what was lost as a result.

The same goes for AI. We can build our own spaces and data libraries to decentralise what is out there, and ultimately lead how things around us shall be shaped.

KH: Do you think where technology leads the art follows or vice versa?

MA: It works both ways. Culture affects technology, and technology affects culture. That said, I think it's important for technology companies to include digital artists and critical thinkers of technology to use these tools and tell them what's working and not. If we want inclusive and representative technologies then it's also important to extend our understanding of technology and technological culture outside of the Global North.

Bio

Morehshin Allahyari is a Bay Area-based Iranian–Kurdish artist using 3D-simulation, video, sculpture and digital fabrication as tools to refigure myth and history. Through archival practices and storytelling, her work weaves together complex counternarratives in opposition to the lasting influence of Western technological colonialism in the context of MENA (Middle East and North Africa). Morehshin has been part of numerous exhibitions, festivals and workshops around the world, including Venice Biennale di Architettura, New Museum, The Whitney Museum of American Art, Pompidou Center, MoMa, Victoria and Albert Museum, Queens Museum, and Museum of Modern Art, Taipei. Morehshin is an assistant professor of Digital Media Art at Stanford University.

2.

Artist-led innovation delivers social and economic value

Through the development of new tools and techniques, collaboration with product developers, or contribution to interdisciplinary cultures of innovation, artists, cultural organisations, and creative industries directly contribute to high-growth technologies.

Creative practice is driving new commercial models and technological capabilities with wide-reaching effects. **Laura Herman**, head of AI research at Adobe, explains how working with artists pushes her team to develop more technically nuanced and inclusive tools. Artist **Sougwen Chung**'s Scilicet Studio evidences this in practice, through pioneering robotics, computer vision and biosensors, grounded in her own gestures.

Dating back to the 1970s, artists have influenced the development of commercial technologies outside of the arts. **Rebecca Allen** recalls her work at the New York Institute of Technology Computer Graphics Laboratory, where she created the first 3D model of a woman swimming and walking, pioneering the motion-capture and 3D-modelling techniques now integral to gaming and animation. Allen's integration of the female body into 3D modeling evidences the ability of artistic engagements with technology to foster inclusive growth. Today, in Kenya's 'Silicon Savannah', **Brian Afande** is developing accessible augmented reality (AR) tools that enable creators and brands to better distribute revenues. Researcher, artist and disability activist **Anna Landre** exposes the lack of digital assets representing disabled people and their assistive devices in game engines, while **Greg Mothersdale** details 'fair' and 'green' objectives at the heart of Media Cymru's film making and media practice in Wales and **Nicola Triscott**, CEO of FACT Liverpool, highlights how such artist-led gaming initiatives promote representative world-building, arguing that 'homogeneity is economically unsustainable'.

Likewise, technologists are highlighting the arts as a crucial avenue for developing more culturally representative AI. Artist **Harshit Agrawal** points out that generative AI often fails to reflect the aesthetics and languages of the global majority, while computer science professor **Vukosi Marivate** argues that arts and humanities thinking – not just more data – is key to addressing this gap. Aligning with Marivate's position, researchers **Piotr Mirowski and Rida Qadri** emphasise cultural understanding as fundamental to inclusive AI development at Google DeepMind.

Together, they underscore that integrating the arts into AI research advances for the development, making artists a valuable resource in shaping a representative and equitable AI future.

(UK/US) Laura Herman

Head of AI Research, Adobe & Co-Director of the Inclusive AI Lab, Utrecht University

Artist-led approaches to equitable AI tools

We have an ethical responsibility to create tools that respect the plurality of global creative expression – and that means listening to the voices of creatives who embody cultural nuance.

Artists bring with them a long history of exploring, repurposing and questioning media tools. At Adobe we view their engagement as foundational to our innovation. Through my team's research, we've seen how creative practitioners push the boundaries of what our tools can do, challenge assumptions embedded within them and often repurpose them in ways we could not have anticipated. This is not only a source of inspiration, it is a necessary mode of critique and direction-setting for our development teams. In commercial environments, technological development can often be overly focused on scale, speed and automation. But when we intentionally embed artists into these processes – through co-design, participatory research or collaborative prototyping – we find ourselves shifting priorities. We begin to ask: *Who is this tool really for? Whose perspectives are encoded in its training data? What kinds of creativity does it enable and which does it risk marginalising?*

Adobe's role within a broader creative ecosystem is central to how and where we operate. We are acutely aware that the value of our technology is shaped in conversation with diverse communities of practice. This means that we cannot build in isolation, nor can we assume a single set of needs, values or aesthetics. We have an ethical responsibility to create tools that respect the plurality of global creative expression – and that means listening to the voices of creatives who embody cultural nuance. My team of researchers – with backgrounds spanning linguistics, anthropology, social psychology and more – conduct deep qualitative and quantitative research with creatives of varying backgrounds. The insights from this research directly influence Adobe Firefly's strategy and roadmaps; for instance, it was research with the creative community that led Adobe to its unique approach to generative AI training datasets, which include only images that have been explicitly licensed to Adobe.

This creative-centric commitment extends to the work we are undertaking with the Inclusive AI Lab, a global consortium dedicated to fostering collaboration between technologists, ethicists and creatives to build equitable AI systems, with a particular focus on the Global South. Within the lab, a Diversifying Creative AI cluster operates across three critical layers: data, system and output. At the data layer we address bias and promote self-representation through ethnographic research and the development of diverse datasets. The system layer focuses on inclusive user experience design, ensuring that AI tools foster equitable and creative experiences by involving end-users directly in the tool design process. Finally, the output layer explores quality, aesthetics and cross-cultural value definitions, collaborating with creatives from the Global South to ensure that the outputs

of AI systems are reflective of their cultural expression.

Nowhere is this more urgent than in the pursuit of more inclusive and representative generative AI systems. Generative AI is trained on vast datasets that risk flattening or erasing marginalised histories and practices. Artists – particularly those working across non-Western traditions, disabled communities or queer and diasporic lineages – hold expertise that is critical to identifying these absences and reimagining what inclusion can look like. Their deep understanding of form, identity and authorship offers vital counterpoints to dominant narratives in tech development. Ultimately, I believe that the future of responsible, human-centred AI lies in sustained, equitable collaboration between artists and technologists. Creative practice is not only a mirror to society but a method for shaping it – and we must ensure that our technological futures reflect this.

Bio

Dr Laura Herman specialises in emerging technologies' impact on artistic and creative practices. Currently she is the Head of AI Research at Adobe and co-director of the Inclusive AI Lab at Utrecht University. Laura received her PhD from the University of Oxford's Internet Institute and has previously held research roles at Harvard, Princeton and Intel. Laura has worked with arts institutions such as the Serpentine Galleries, the Tate, Studio Olafur Eliasson and Ars Electronica. Her curatorial and research work has been covered by venues including the BBC, *Forbes, Artnet, New Scientist, Newsweek and the Wall Street Journal.*

[CA/CN] Sougwen Chung

Artist, SCILICET

Art as robotics research

Digital tools are mutable, fluid and fallible in a way that analogue tools are not. My practice explores machines as collaborators rather than mere instruments, raising questions about authorship, agency and control in the creative process: inquiry through art that can serve as a microcosm for society at large.

My artistic practice is deeply rooted in hybridity. Part of that hybridity is in the idea that art can shape the technology that shapes us. In my work I explore the intersection of human and machine collaboration, challenging the conventional view of technology as simply a tool and positioning it as a co-creative partner. My approach is not about adopting technology for its own sake but about using art as a form of research and a means to critically engage with technology's social and philosophical implications.

The Drawing Operations (D.O.U.G._) project, which I began in 2015, investigates various aspects of human–machine interaction and symbiosis in evolving generations of bespoke robotic systems over the past decade:

- ***Mimicry*** (Generation 1), 2015: A robotic arm mirrors my drawing gestures, allowing me to explore real-time co-creation.
- ***Memory*** (Generation 2), 2016–17: I use a recurrent neural network trained on two decades of personal drawing data, creating a feedback loop between my style and the machine's output.
- ***Collectivity*** (Generation 3), 2018–19: I examine urban movement through a multirobotic system, reimagining landscape painting as a collaboration between human and machine.
- ***Spectrality*** (Generation 4), 2020–22: Using biofeedback from an EEG headset, I translate my meditative states into robotic movements, delving into internal flows and the relationship between mind and machine.
- ***Assembly*** (Generation 5), 2022–: A return to biofeedback and drawing data enacted through a multirobotic system, engaging in temporalities of data and creative flow.

Through these projects I focus on new relational modes – the feedback loop between human input and generated output, exploring how it transforms both human and machine. While offering a site of philosophical speculation, the process involves real engineering, tool-building and research prompts, which create novel and dynamic use cases for robotics, computer vision, biofeedback systems, sensor development and material design.

With my studio SCILICET, our projects establish relational configurations that challenge artistic and technological outcomes. Evolution is the goal. By engaging with AI systems and machines with evolution in mind, my artistic practice provides a vital cultural context for the re-examination of tools and authorship, highlighting the dynamic interplay between human, machine and environment, with interdisciplinary in(ter)vention at its core.

As we know, the relationship between humans and their tools has fundamentally changed. Digital tools are mutable, fluid and fallible in a way that analogue tools are not. My practice explores machines as collaborators rather than mere

(1) *MIMICRY* (with Drawing Operations Unit_Generation_1, D.O.U.G._1), 2015, Sougwen Chung, Courtesy of the artist.
(2) *MEMORY* (with Drawing Operations Unit_Generation_2, D.O.U.G._2), 2017, Sougwen Chung, Courtesy of the artist.
(3) *Omnia Per Omnia* (with Drawing Operations Unit Generation_3, D.O.U.G._3), 2018, Sougwen Chung, Courtesy of the artist.
(4) *Artefact 15,* 2023, Sougwen Chung, Acrylic on canvas, created with D.O.U.G._4, 85.5 x 102 cm, Courtesy of the artist.
(5) *Artefact 20* (with Drawing Operations Unit Generation_5, D.O.U.G._5) 2023, Sougwen Chung, Acrylic on perspex, Print on paper, Courtesy of the artist.

instruments, raising questions about authorship, agency and control in the creative process: inquiry through art that can serve as a microcosm for society at large. Art becomes a testing ground for examining

human–machine interaction, revealing broader implications for the relationship between technology and society. Ultimately, my work reflects the idea that the technologies we build are a reflection of ourselves – us in another form – and one that necessitates meaningful reinvention.

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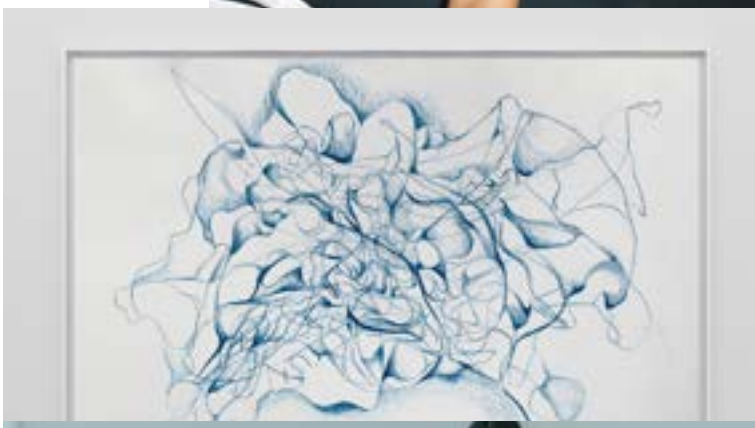

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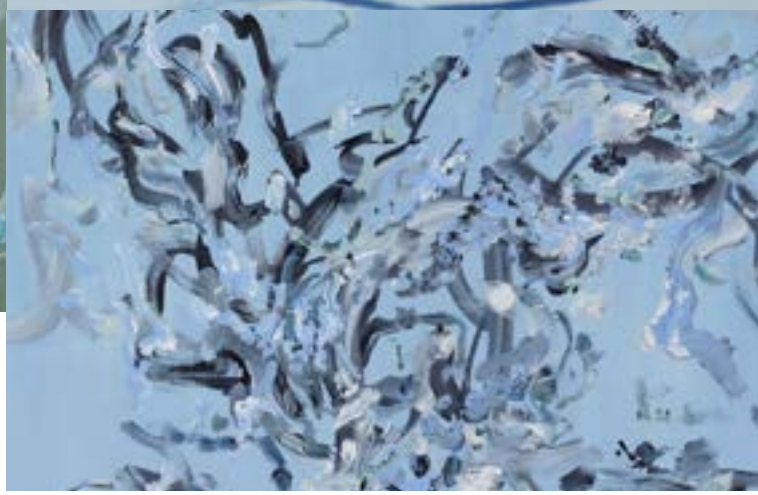

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Bio

Sougwen 愫君 Chung is a Chinese-Canadian artist and researcher widely considered a pioneer in human-machine collaboration, exploring the mark-made-by-hand and the mark-made-by-machine as an approach to understanding the dynamics of humans and systems. Sougwen's work *MEMORY* is part of the permanent collection of the Victoria and Albert Museum, and is the first AI model to be collected by a major institution. Recently, Chung was recognised as a Cultural Leader at the World Economic Forum, one of four recipients of the TIME100 Impact award, and named one of TIME's 100 Most Influential People in AI.

[US]

Artist

Rebecca Allen

Interview

Interviewed by Kay Watson, Director, Serpentine Arts Technologies

In the early research labs I worked in, which included Massachusetts Institute of Technology (MIT) and the New York Institute of Technology Computer Graphics Laboratory (CGL), I could see that computer science researchers working in the field of computer graphics and animation were similar to artists. We were both inventing new ways of seeing and new ways of making imagery and movement. I felt like I was in a new Renaissance period.

(1) *Girl Lifts Skirt,* 1974, Rebecca Allen, Still from video, Courtesy of the artist
(2) *Swimmer,* 1981, Rebecca Allen, Still from video, Courtesy of the artist
(3) *STEPS,* 1982, Rebecca Allen, Still from video, Courtesy of the artist
(4) *STEPS,* 1982, Rebecca Allen, Still from video, Courtesy of the artist

KW: To start off, I'd love you to take us back to your earlier work and how you began your career.

RA: I'm in such a different position from so many "digital" artists because I started my career in the 1970s. In 1973 I became interested in working with time-based art and computers. I was an art student then, and I wanted to work with ideas around motion; how it affects our perception and how human motion conveys expression. One of my first experimental art films was titled *E-Motion* (1975), with a focus on female motion and expression.

I could understand how computers could help me draw moving images and in those days computers were room-size, using punch cards for input. I went from using my hands to draw and assemble animated movement to awkwardly typing numbers and code on punch cards. But I wanted to work with new technology, and these were the tools I needed to use.

The idea from the very beginning was to think about a digital aesthetic. To make computer images, I was drawing from my earlier work with experimental animation and finding ways to express within the limitations of the technology at that time. With a minimal use of lines, my imagery was abstracted but the movement was fluid with a certain realism. My goal was to create a whole new form of art utilizing advanced technology.

KW: Can you talk me through what it was like to bring your artistic practice into the context of software engineering, and early-stage technology research and development?

RA: In the early research labs I worked in, which included Massachusetts Institute of Technology (MIT) and the New York Institute of Technology Computer Graphics Laboratory (CGL), I could see that computer science researchers working in the field of computer graphics and animation were similar to artists. We were both inventing new ways of seeing and new ways of making imagery and movement. I felt like I was in a new Renaissance period.

During my six years at CGL from 1980-1986, I justified my position by making artworks that helped everyone solve certain research problems. In the 70s, Ed Catmull, the founding director of CGL, had invented and built the very first female 3D model. But she was frozen! I wanted to

bring her to life, which involved very complicated software development and the design of an interface system that would allow me to create her movement in a virtual 3-dimensional space. My earliest work with this 3D model was *Swimmer* (1981), where I created the motion of swimming. Then I made *Woman Ascending* (1981-82) and *STEPS* (1982) where I was able get her to climb steps and to dance.

(1)

KW: Your works engage with female models and you have described your practice as 'putting the human, the feminine into the computer', how do you approach this, especially when tech environments tend to be male-dominated?

RA: From the very beginning I wanted to insert a female presence, and a female body into the computer, metaphorically and literally. Of the small amount of computer art that I knew about at that time, most of it looked like what you'd expect from the computer - geometric forms, mathematical shapes and lines. I wanted to do to the opposite. I wanted a female body, which is more of a symbol of art. I knew I was infiltrating these spaces ... and so, as an artist, I wanted to exaggerate this by creating more provocative works like *Girl Lifts Skirt* (1974).

This was the mid-70s, and as a young woman I was very aware that it would be difficult to get into the art world or the tech world. I actually found more reception from the tech world early on. It took the traditional art world a long time to consider art made with digital technology, so I had to exhibit my work at technical conferences like SIGGRAPH. I also found an outlet for my work through television. In 1982, I worked with the choreographer Twyla Tharp to create a dance film called *The Catherine Wheel,* produced by BBC and presented internationally. And I created a few experimental films shown as popular music videos on MTV and international music video channels.

KW: Do you believe that where technology leads art follows, or vice versa?

RA: Thinking back to early in my career, I do feel that the few artists that had ventured into these worlds were affecting the technology. We were asking the questions the tech researchers wouldn't bother asking because we were coming at it from different perspectives with different goals.

You'd have film directors, for example, that knew nothing about the computer, but would say, "I want this fantastic thing to happen in my movie". And so the researchers would be given a problem that they would never have thought of because it was breaking all their rules. I've also had grants from corporations, like Intel and Google, where they have a little pile of money for artists to experiment, because they know it pushes their scientists if it's done right.

So for decades I would say the ideas were ahead of the technology. Whereas now, even in the last 5-10 years, I'd say the technology is ahead of the ideas. And this isn't necessarily a good thing.

We can see this with AI. The technology can do a lot of stuff and nobody is quite sure how to make it a creative tool or how to control it. Artistically, this is a little less interesting to me, but also I don't think it's a good place for society in general to be.

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KW: How do you feel about today's technology landscape? And looking back on your career, what approach have you seen best driving innovation?

RA: You know, I had a vision of where I hoped this would be. And I have to say, it has fallen a little short.

It's not right that such a narrow group of people, primarily computer scientists and engineers, have invented and developed the technology that has had such a profound effect on humanity. I think there should be a diverse group of people working in an interdisciplinary way to define what technology should be. Over the decades, that's when I've seen the really good stuff happen.

KW: Finally, looking into the future, what have been the most important messages to your students – emerging artists working with technology?

RA: The most important thing I say to my students is to think outside the box and continue to invent – to not just accept what the technology lets you do.

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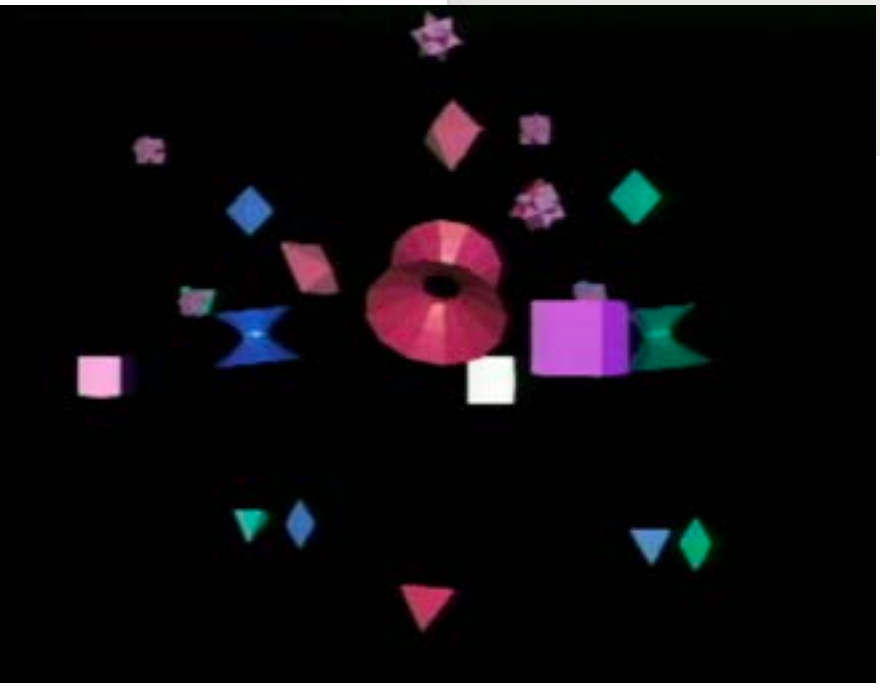

Bio

Rebecca Allen is an internationally recognised artist inspired by the aesthetics of motion, the study of perception and behaviour and the potential of advanced technology. From the mid-1970s Allen was a rare female artist working in the early stages of computer art and digital technology. Her pioneering artwork, utilising various forms of digital media, explores ideas around physicality and virtuality, nature and illusion, the body and the mind, and what it means to be human as technology redefines our sense of reality and identity. Current and upcoming exhibitions include shows at Tate Modern, London; LACMA, Los Angeles; Museum of Modern Art, NYC; Kunsthalle Wien, Vienna; New Museum, NYC; and MEET, Milan.

(KE)

Brian Afande

Co-founder and CEO,
BlackRhino VR

Redrawing the Map: Creative Innovation for inclusive growth

The shared creative potential of our collaboration is greater than the sum of our differences. But to fully realise this potential, we must confront the weight of history not as a burden, but as a catalyst. We must shift our mindsets from extraction to reciprocity. Only then can we co-create a future where creativity is not just a means of expression but a force for liberation.

We stand on the brink of a technological revolution that will fundamentally alter the way we live, work and relate to one another. This transformation will be unlike anything humankind has experienced before. With technology being a cornerstone of modern life, the real and virtual life as we know it is constantly being blurred putting forth innovative new forms of enterprise at the intersection of arts and technologies.

Historically, industries were categorised into 'creative' and 'technical' silos, but this separation is rapidly dissolving, with the role of the creative class growing beyond traditional art by placing artists as a fundamental force bridging gaps between innovation, societal transformation, social impact and inclusion. As emerging technologies continue to disrupt these traditional industries, hybrid enterprises that fuse artistic practice with technological innovation are redefining business models, value creation and the future of work.

Since founding BlackRhino VR in 2015 I have been inspired by the relentless spirit of innovation that defines Nairobi. The arrival of undersea cables in the early 2000s, the promotion of internet use and the abundance of well-educated young individuals fuelled the formation of a vibrant tech community known as the Silicon Savannah. This narrative underscores that Nairobi offers much more to the world than just its sights and sounds and has established itself as a key player in the global innovation and technology space. As a by-product of this ecosystem, I have witnessed firsthand the transformative convergence of arts and technology, particularly in our role as an intermediary.

Long-standing gaps between creative entrepreneurship, commerce and audiences underscore a broader societal shift towards inclusivity, sustainability and digital integration. A prime example of this evolution is our subsidiary MediAR, an AI-powered augmented reality (AR) platform that enables content creators and brands to build immersive experiences by eliminating technical complexities associated with coding, making AR creation more accessible, intuitive, fun to build and interactive. MediAR has a unique pay-per-view monetisation system, enabling content creators and brands to share revenue in a digital ecosystem driven by consumer engagement. We currently have over 300 organic content creators using our technology and have gained access to sustainable opportunities for growth and passive income.

This convergence of artistic practices and commerce has also given rise to a new breed of entrepreneurs. Brian 'Smallz' Nderitu and Lionel Arucy from Nairobi, the dynamic duo behind Afriziki, for example, have developed an AI-powered radio-monitoring tool that tracks music across more than

(1) MediAR application, Screenshot, Image courtesy of Brian Afande

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300 radio stations in ten African countries. This tool has granted artists unprecedented transparency over how and where their music is broadcast, addressing key structural gaps that have historically undermined fair compensation and recognition in the African music ecosystem. Across to the Rainbow Nation, SodaWorld, an innovative African-created and developed technology platform is bridging the gap between physical and virtual experiences. Having produced over 60 virtual events featuring top South African artists, secured venture capital funding from Switzerland-based CV VC, and been featured at the Venice Biennale's Venice VR programme, it is another classic example of an African-born creative solution that has tapped into a global value chain – exporting African creativity and culture to the world, while generating new revenue streams for artists and creators.

The current growth trajectory of digital technologies isn't creating a level playing field but it's widening the digital divide into digital dependency rather than empowered participation. In this era of rapid technological advancements and unique challenges, BlackRhino VR has transitioned into the next phase of our journey into an extended reality (XR) Innovation Hub. This hub is a dynamic sociospatial ecosystem that democratises access to technology and fosters experimentation, collaboration, co-creation, well-being and sustainable growth for creatives, technologists, policymakers and the broader network of players that drive entrepreneurial momentum and maturity. This transformation is part of a broader, seismic shift where creative sociospatial spaces (both physical and digital) are driving innovation, fostering interdisciplinary exchange and reshaping Africa's creative economy. This paper adds to a body of work initiated by the audacious vision of the British Council, whose belief in cross-cultural collaboration has profoundly shaped my professional outlook. For Africa and the Global North, in particular, these collaborations will continue to create opportunities to leapfrog traditional business models and build entirely new, decolonised ecosystems of innovation, ownership and creative production. The shared creative potential of our collaboration is greater than the sum of our differences. But to fully realise this potential we must confront the weight of history, not as a burden, but as a catalyst. We must shift our mindsets from extraction to reciprocity. Only then can we co-create a future where creativity is not just a means of expression but a force for liberation.

Bio

Brian Afande is a creative technologist and agent of change dedicated to accelerating the adoption of extended reality (XR) technologies across Africa. He envisions a future where young Africans are not just consumers of technology but pioneers of innovation, shaping the continent's technological evolution. With a mission rooted in designing, democratising, demystifying and deploying XR, Brian is equipping the next generation with essential skills to drive economic transformation. By fostering new ideas, business models and job creation, he is positioning Africa's youth at the forefront of global technological advancement, ensuring they actively shape their own futures.

(UK)

Anna Landre

Activist & Researcher,
Global Disability
Innovation Hub, UCL

Disability drives innovation

Disabled people the world over have long known our non-normative bodyminds to be a generative force: a source of ingenuity and creativity, and a call to think outside the box that our world has been built to fit into. In other words, disability is a catalyst for innovation.

Disabled people the world over have long known our non-normative bodyminds to be a generative force: a source of ingenuity and creativity, and a call to think outside the box that our world has been built to fit into. In other words, disability is a catalyst for innovation. One need only look at the myriad universal tools originally created by and for disabled people – the internet, telephone, typewriter, transistor, straws, audiobooks, touch screens, texting and far more – to see this truth in action. In the words of disability arts icon Neil Marcus, 'disability is an art. It's an ingenious way to live'.

As a disabled researcher and activist who would now begin to add 'artist' to that list, I've found that embedding the arts into my interdisciplinary disability innovation work makes every project more innovative and increases public engagement with everyday people, rather than relegating impact to academic or campaigner communities. This makes my work have higher impact, efficiency and value, both for my field and the communities it serves.

After all, art is a space to dream new realities, which can then become reality – and what is innovation, if not this exact process? Understanding this, disabled artist Alistair Gentry and I collaborated to make *Unbuilt Environments* (2024), a series of digital artworks created using 3D computer graphics game software Unreal Engine. The artistic process itself begot innovation, as it revealed a lack of 'assets' – pre-made digital renderings of people, objects and more – representing disabled people and our assistive devices. This discovery sparked a new facet of the project: drawing attention to this underrepresentation and experimenting with developing disability assets ourselves via 3D scans of assistive technology.

The works were inspired by workshops with disabled Londoners, whom we encouraged to play with polar ideas of 'criptopia' (utopias of inclusion and access) or 'cripocalypse' (hostile dystopias) to reimagine built and social space. What emerged are a series of digital environments that call on elements of science and science fiction, fantasy, satire, humour, disability culture and more to invite co-creators and viewers alike to dream new possibilities for technology, space and storytelling. The works move beyond encouraging mere empathy with marginalised people as sufficient to promote inclusive and better design, and instead make the case for leveraging disabled protagonism, joy and even anger, frustration or resentment as valuable impetus for innovation.

Such creative collaboration is also key to my work as a PhD candidate at the Global Disability Innovation (GDI) Hub at UCL, where we prioritise interdisciplinary thinking and international partnership to create what we call 'the magic in the middle' – our way of articulating the secret to the useful, inclusive innovation for which we are known. Since its

(1, 2) *Unbuilt environments*, 2024, Alistair Gentry and Anna Landre, Installation view, Courtesy of Anna Landre.
(3) Anna Landre, Unbuilt Environments exhibition opening, ©Jon Rees.

inception as one of the legacies of the London 2012 Paralympics, GDI Hub has stayed engaged with the power of sport, art and culture more broadly, to increase access to assistive technology for disabled people globally. For example, supporting then-emerging artist Jason Wilshire-Mills and accelerating assistive technology innovators in Kenya and India, among others.

I also find it highly valuable to use innovative artistic interpretations to communicate my research across cultural contexts. My PhD research explores how disabled people's organisations network and communicate using digital technology as part of a transnational disability community, because I've seen firsthand the gains made by disability movements that are connected, communicative and working in solidarity. Artistic and accessible data visualisation – which will itself be an innovation – will bring my findings beyond the academic page and into the community I study, which is best-positioned to use them.

In my work I have found that the most groundbreaking innovations come when the arts and technology sectors can interact freely in a push-and-pull relationship that sparks non-normative thinking by non-normative people. Such opportunities have incalculable value and will be key to the UK's future as a leader in innovation.

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Bio

Anna Landre is an award-winning activist and researcher focusing on what she calls the disability law 'implementation gap': when good laws on paper fail to translate into better outcomes for disabled people in practice. She works across fields including humanitarian response, social care, transport access, disability culture and more. Anna is a PhD candidate at the UCL Global Disability Innovation Hub, where she studies and maps disabled people's organisations globally. She is also the Global Research and Response Lead at The Partnership for Inclusive Disaster Strategies, where in Ukraine she spearheaded the first-ever wartime evacuation mechanism for disabled people.

(UK)

Greg Mothersdale

**R&D Producer,
Media Cymru**

Interview

Interviewed by Aurora Hawcroft, Programme Manager, Digital Innovation in Arts, British Council

In the context we live in now, with advanced technologies like AI rapidly developing, I believe sustainable and fair growth which is primarily human-focused has never been more important to inspire young people.

AH: Tell us about your work at Media Cymru, in particular your work with R&D. How does R&D in film and television offer a space to pilot technological R&D?

GM: I am a producer for Media Cymru at Cardiff University. Media Cymru is an innovation programme which engages a consortium of broadcasters, production companies, academic institutions and local leadership in Wales. We instigate R&D projects with funding, expertise and training across the country.

Media Cymru was founded to turn the media sector in Wales into a global innovation leader.

The screen sector continuously pilots technical R&D, and the high pressured and dynamic nature of the industry gives impetus to finding quick solutions to challenges. However, these can be ad hoc, unplanned for and under budgeted; they are not always sustainable or rigorous and therefore are difficult to replicate for further use.

Media Cymru provides funding and wraparound support to address this, enabling freelancers and companies in the media sector in Wales to develop new products, services, experiences and processes. We have developed an ecosystem where valuable R&D time is allocated, and risk and pressure are reduced. I've seen this grow the sector, providing practitioners time to think differently, commercially, and to create new intellectual property and revenue.

AH: Welsh language is also interesting in this international context, particularly with regards to media innovation to preserve culture. Can you share more on this?

GM: Welsh language content is a great cultural success story, and bilingual activity here is highly concentrated, particularly due to the significance of our Welsh language public broadcaster S4C[21], which is the only Welsh language TV channel, and the development agency for film in Wales, Ffilm Cymru Wales[22].

Through bilingual production, for example, we connect with other nations and regions internationally and develop pioneering bilingual ways of working, including back-to-back filming where scenes in Welsh and English are shot one after the other. The success of Welsh language productions like *Cleddau* (The One that Got Away), *Y Golau* (The Light in the Hall), *Dal Y Mellt* (Catch the Lightning), *Y Gwyll* (Hinterland), *Gwledd* (The Feast), *Craith* (Hidden) and *Un Bore Mercher* (Keeping Faith) piques people's interests, and these not only help connect Wales to a global market but also celebrate the language and, therefore, our culture.

(1) MixerSwn, 2024, ©Jamie Chapman, Courtesy of Media Cymru
(2) Media Cymru Launch, Cardiff, ©Alex Sedgmond, Courtesy of Media Cymru

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AH: You are speaking from the perspective of Wales, why is it such an interesting test bed?

GM: Within Wales we have a vibrant television and film production industry, highly regarded academic institutions, the presence of both Welsh and UK governments and incredible studios and art centres. With all of this activity in a small geographical cluster, close collaboration can be achieved at pace.

We have a good opportunity to use this microcosm as a testbed of innovation for the rest of the world.

The technological R&D projects we support speak for themselves. It's been brilliant to witness the growth of Painting Practice, for example, an organisation that has developed a whole suite of tools for previsualisation environments. The internationally renowned 4pi Productions have developed portable immersive experiences, based at their impressive 12-metre 3D dome facility. Gorilla Postproduction have dynamically trialled remote working solutions and services that stem from the challenges of working during the COVID-19 pandemic, and Rusty Design have developed a far more sustainable method for printing large scale props.

AH: How does this work hold space for new approaches to inclusion and sustainability in contexts with advanced technology?

GM: Everything Media Cymru does connects to our four pillars of fair, green, global and growth[23].

Our fair pillar takes a lead from Wales's world-leading Well-Being of Future Generations (Wales) Act 2015, to create culture change and build a media sector that supports a healthier, more equal Wales; one which celebrates our vibrant Welsh culture and encourages cohesive communities. Funded projects, such as Unquiet Media's Exceptional Minds and GlassShot and Turbulence's *We Dream of Nothing*, for example, developed cutting-edge approaches to inclusivity, pioneering a more accessible sector as part of our Accessible Future Summit[25].

Under our green pillar, we've invested more than £900,000 into more than 20 innovation sustainable projects for production and content[26]. We are also a partner on the BFI-funded Screen New Deal Transformation Plan Wales[27], to help Wales become a leader in environmentally sustainable (green) media production.

In the context we live in now, with advanced technologies like AI rapidly developing, I believe sustainable and fair growth which is primarily human-focused has never been more important to inspire young people. The convergence of media with arts and technology in this context is brilliant, because the arts are a fundamental connector and demonstrator that help future generations understand and imagine inspirational ideas. Ymlaen!

Bio

Greg is a highly experienced R&D producer for the Media Cymru, the Cardiff University led innovation programme in Wales. He supports a wide range of media innovation projects and leads the green pillar for the programme. Prior to this he was a producer for Clwstwr, one of the UK wide creative clusters. He has over 20 years' experience of working in the creative sector, including film and TV production, performance and event management. He is also Co-Investigator on XR Network+ Virtual Production in the Digital Economy which is building a collaborative research community for the future of virtual production and creative technology.

(UK)

Nicola Triscott

Director, FACT Liverpool

Beyond play: Artist-Led gaming as cultural and economic catalyst

When artists harness game engines, they reconstruct reality through lenses unfiltered by market constraints, creating virtual terrains that serve as testbeds for alternative social configurations – spaces where marginalised identities find sovereignty and complex social dynamics can be explored freely.

At FACT, Liverpool's centre for the creation and exhibition of film, art and creative technology, artists are harnessing game engines for radical creative purposes, creating meaningful connections between the art world and the games sector.

In exploring this field, we've observed how artist-led gaming initiatives deliver triple value: through innovative storytelling, representative world-building and economic benefits. When artists harness game engines they reconstruct reality through lenses unfiltered by market constraints, creating virtual terrains that serve as testbeds for alternative social configurations – spaces where marginalised identities find sovereignty and complex social dynamics can be explored freely.

Our exhibition of Danielle Brathwaite-Shirley's *When Our Worlds Meet* (2022) exemplifies this approach. This immersive installation and online game was created with young people from Liverpool, who reimagined their city through distinct worlds: a utopian colony for queer feminists, dance club portals to journeys of enslaved people, and spaces that reimagine systems of power. This resonant exercise in communal agency responds directly to participants' lived experiences.

FACT's Studio/Lab, an incubator space for creative experimentation that opened in 2023, the year following *When Our Worlds Meet*, supports artists to produce new work with emerging technologies. Through this programme, local games company Lucid Games sponsored an artist residency focused on game engines. George Rule from Lucid reflects:

> *The experience was far more than we anticipated. We expected giving technical assistance, but it turned into an incredibly valuable mentoring opportunity. Our team came back with different exposure to creativity and ideas, which reawakened dormant skills. Inspiration itself is the value; the rest is a bonus.*

This symbiosis reveals that commercial developers aren't simply performing corporate social responsibility – they're accessing creative nutrients that industrial protocols often starve.

Alison Lacy, co-chair of GameChangers, an industry pipeline initiative, takes this further:

> The astronomical sums churning through the games industry have created a paradoxical drought of innovation in storytelling, viewpoint and creative expression. When billions are at stake, risk-taking withers as venture capital seeks the next sure thing. Artists working with game

(1, 2, 3) *Art Plays Games*, 2024, Installation view at FACT Liverpool, ©Kieran Irvine.

(1)

engines operate outside these constraints, pursuing questions and experiments that stress-test creative boundaries in ways commercial developers increasingly cannot afford.

Gaming's diversity problem is another challenge and more than a social justice concern – it's a business liability of staggering proportions. For an industry targeting increasingly diverse global audiences, homogeneity is economically unsustainable. Artists from underrepresented backgrounds demonstrate approaches to representation that the industry needs to study and internalise.

FACT's initiatives – from Studio/Lab residencies to its *Art Plays Games* exhibition (dedicated to showcasing games created by digital artists and independent video game developers) – create crucial infrastructure for this cross-pollination. We're nurturing an ecosystem where artistic experimentation flourishes alongside dialogue with commercial entities. This isn't about artists serving industry or vice versa, but recognising where social and economic value generation are mutually reinforcing. When we support artists working with game engines, we simultaneously enrich our cultural landscape while injecting vital innovation into a highly significant UK economic sector.

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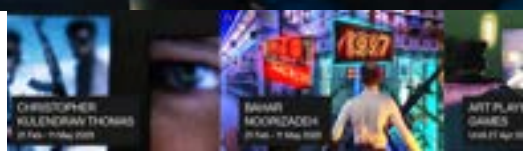

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Bio

Dr Nicola Triscott is a cultural leader, curator and researcher, specialising in the intersections of art, science, technology and society. Since 2019 Nicola has served as director/CEO of FACT Liverpool, the UK's leading cultural centre for digital and screen arts. Previously, as founding director of Arts Catalyst (1994-2019), she built Arts Catalyst into an influential international arts and research organisation, known for its ambitious artists commissions and cross-disciplinary research projects. As a curator and scholar she seeks to examine and expand art's engagement with diverse knowledge systems. She publishes and lectures internationally.

(IN)

Artist

Harshit Agrawal

Engaging with AI biases: An Indian artist's perspective

Observing, acknowledging the bias and then making art that engages with the bias of AI within the art space was critical for me as a means to actively encounter a shortcoming I had observed in the space of AI art emergence in India.

I am an artist working with emerging technologies, primarily AI. i'm based in Bangalore, and the relationship between India and AI technology plays a central role in my practice.

I've been creating with AI since 2015, when AI based art was in its infancy. At the time, ground breaking results in AI technology through techniques of deep learning like Deepdream (based on CNNs), Generative Adversarial Networks, were being released and there was a handful of artists who started exploring these technologies.

A community of artists started emerging, sharing work through platforms like Twitter. There was a strong interface on such platforms between the computer science research community and the artists exploring those technologies; discussing techniques, outcomes, and posting experimental artworks that would push the researchers to further develop their models.

Coming from the cultural background of India (and being possibly among the only Indian artists actively working with AI technologies back in 2015), I couldn't avoid observing the emergence of a new art movement that re-inforced the Western, Global North centrality.

AI based art relies on two key aspects: training dataset and AI algorithms for learning and generating outcomes. Around 2016 to 2021, GANs with its variations like Pix2pix and Cyclegan, Deepdream based on Convolutional Neural Networks were among the common algorithms visual artists used. These algorithms generally needed a few thousand images of a subject matter to train on which meant AI artists' expression and craft often came through datasets they worked with, and different engagements with the machine learning and generation algorithms.

As this new art movement emerged, it continued its reinforcement of the Western, Global North centrality of the art world.

Primarily, digital art datasets consisted of Western art (Wikiart, Google Art dataset, British Library dataset, digitised museum collections of the West like that of The Met and several others). While one could argue that the machine learning algorithms did not have much of cultural biases embedded in them, datasets that were used to train them most definitely did in a variety of ways.

Traditionally too, Western art has given prominence to the idea of documentation whereas Eastern art, especially in the Indian subcontinent, has had more a culture of art being created in situ; for example on house walls, textiles etc. and documentation of it has never really been thought of in much detail.

I started feeling a strong sense of underrepresentation of art I had grown up with in AI art emergence and would often question - *when the history of AI art will be spoken, will it be devoid of entire artistic styles and their cultural contexts?*

I actively started working extensively both with visual material

(1, 2) *Land(ing) Page*, Harshit Agrawal, Courtesy of the artist.
(3) *Machinic Situatedness 5*, 2017-2018, Harshit Agrawal, Courtesy of the artist.

(1)

and themes I was more familiar with through my own cultural contexts. I did a series of works called *Machinic Situatedness* (2017-2018)- where I worked with Himalayan Art, primarily Thangka paintings and GANs. I created several custom changes to the basic GAN model to create large-scale 8400 x 8400 pixel works (28x28 inch) from the 256 x 256 pixel base model and incorporated changes in a way to create more dreamlike fluid outcomes, experimenting with learning rates of AI training.

Making those vibrant colorful works with fluid organic forms resembling the Buddha as 'meditated' upon by a machine, as contrasting to the oil painting visual language of Old Masters that was central to almost all the early AI works was important from a historical perspective for me. Observing, acknowledging the bias and then making art that engages with the bias of AI within the art space was critical for me as a means to actively encounter a shortcoming I had observed in the space of AI art emergence in India. I got a chance to discuss such issues with people in the cultural sector of India too, who at that time were not necessarily aware of AI technology based art-making and the importance of digital artefacts of traditional art in making them.

The way AI technology is adapted, particularly for a country like India is also very much a concern of sovereignty. A recognition and understanding of that as an artist working out of India is critical for me to reflect on these concerns through my art and call attention to them. Here's a couple of facts to put this in perspective- India has over 700 million active Whatsapp users and over 400 million Instagram users (highest in the world). On the other hand, approximately 90% of the world's data is handled by nine companies- seven American and two Chinese. Being among the highest producers and consumers of data, while being amongst the lowest processors of it- India (and the majority of Global South) is witnessing 'data colonization' in acute form. We're being ripped off our data to feed us advertisements

(2)

in return and continue funding the AI tech loop. I made a work called *'Land(ing) Page'* which speaks to this theme- a VR work where the viewer is in a Poppy plantation made up entirely of Facebook advertisement videos for which advertisers spent most money in India.

Another early work I did- an interactive work called *Masked Reality,* where I used AI to speak about deeply rooted social issues associated with Indian performance forms of Kathakali and Theyyam. In the artwork, I use the technology of surveillance face recognition and GANs to create Theyyam and Kathakali versions of everyone who stands in front of the artwork in real-time, making everyone embody both forms simultaneously.

Theyyam and Kathakali have had a historical social divide with Theyyam being performed by lower caste people without any patronage and Kathakali enjoying patronage of the upper castes. The caste divide is being further fractured today through bias in surveillance technology's usage and outcomes in India- seen most dominantly in the re-inforcing of this divide in acts of AI based predictive policing. Through Kathakali and Theyam, I could look at the broader issues resulting from AI, while rooting them in Indian cultural contexts.

I feel artistic practices become strong focal points of engaging critically and actionably with themes of AI- to both critique but also to show alternate possibilities through subverted actions of art creation grounded in local cultural contexts. Art becomes a way of pushing the technology with directions of influence in both- evolving its techniques and applications.

(3)

Bio

Harshit is an Indian artist working with emerging technologies, primarily artificial intelligence. His practice is centred around the theme of exploring the poetics of technology in our already posthuman existence, from both a lens of criticality and creative possibility. He is a graduate of the MIT Media Lab (USA) and IIT Guwahati. He has authored several publications and patents about his work at the intersection of human–computer interaction and creative expression. He held India's first solo exhibition of AI art at the Emami Art Gallery, Kolkata, in September 2021.

(ZA)

Vukosi Marivate

Professor of Computer Science, ABSA UP Chair of Data Science, University of Pretoria

Beyond the symbols

How can we ensure that AI promotes social good and benefits everyone? The answer to this question won't come from computer scientists and engineers alone. It will come from the collaboration with social scientists, philosophers, artists, writers: those who deeply understand human culture, creativity and history – what makes us human.

The current focus of much AI R&D has been on gathering more data, building larger models and using more Graphics Processing Units (GPUs). But the challenges in AI development go beyond these technical concerns. To truly create AI systems that represent all people, especially those on the margins, we must think beyond just the technical hurdles and consider cultural and creative approaches to AI as well.

There are significant risks in deploying AI systems that have not been designed for or tested with underrepresented populations: those who have limited access to data, the ability to develop their own systems or the opportunity to contribute to the technological development of their own languages and cultures.

The realm of natural language processing (NLP) is a key example of this. Current large neural systems (text, speech, multimodal) often fail to accurately represent smaller or local languages, cultures and locales. They are biased[28], and not fit for purpose[29], which is unsurprising, given that they are typically trained on data scraped from the internet, a resource dominated by high-resource languages (a small number of languages[30], which results in 90 per cent of the training of models such as GPT-3 being in English[31]). Some languages, particularly in marginalised communities, lack sufficient digital representation, or their content is not part of large databases or archives that claim to represent much of what is on the internet. Those developing these models often don't understand the languages themselves. As a result, evaluations are often based on limited empirical benchmarks that are pursued by each new model, resulting in linguistic misrepresentations (some benchmark databases have major errors)[32] or biases that become more entrenched with each new model.

This cycle, while technically progressive, doesn't necessarily move us closer to an equitable AI ecosystem[33]. These issues have been discussed extensively over the past few years, so there's no need to rehash them here. Simply, to model language we need to think beyond the symbols of text and data.

To make AI truly representative of humanity's diverse experiences, cultures and social structures, we must move beyond purely mathematical or technical solutions. AI development needs to engage with the lived realities of different cultural groups. This is where the arts and humanities become indispensable. These fields provide tools not only to better understand ourselves as humans but also to create new feedback loops into AI systems. Humanities scholars can help us understand how AI systems affect cultural identities and values, and they can also contribute to the creation of new systems that further explore who we are as people.

It is essential that researchers and practitioners from the humanities, arts and social sciences be actively involved in AI R&D. In my own work I've been privileged to engage in initiatives such as the Design

Justice AI Institute, the Hundzula retreat and collaborations with the Masakhane Research Foundation. These initiatives bring together AI researchers and humanities scholars to develop culturally aware and inclusive AI solutions. They have proven to be powerful platforms for fostering dialogue and generating innovative ideas and technical solutions that consider the intersection of technology and culture.

AI is not just a tool for efficiency or profit, it has the power to transform sectors like healthcare, education and governance, and it will impact society in profound ways. Given this, it's crucial that we think carefully about how AI can best serve humanity. How can we ensure that AI promotes social good and benefits everyone? The answer to this question won't come from computer scientists and engineers alone. It will come from the collaboration with social scientists, philosophers, artists, writers: those who deeply understand human culture, creativity and history – what makes us human.

Bio

Professor Vukosi Marivate is a professor of computer science and holds the ABSA UP Chair of Data Science at the University of Pretoria. He specialises in developing machine learning (ML) and artificial intelligence (AI) methods to extract insights from data, with a particular focus on the intersection of ML/AI and natural language processing (NLP). His research is dedicated to improving the methods, tools and availability of data for local or low-resource languages. As the leader of the Data Science for Social Impact research group in the computer science department, Vukosi is interested in using data science to solve social challenges. He has worked on projects related to science, energy, public safety and utilities, among others. Professor Marivate is a co-founder of Lelapa AI, an African startup focused on AI for Africans by Africans. He is a chief investigator on the Masakhane Research Foundation, which aims to develop NLP technologies for African languages. Vukosi is also a co-founder of the Deep Learning Indaba, the leading grassroots machine learning and artificial intelligence conference on the African continent that aims to empower and support African researchers and practitioners in the field.

(UK/US)

Senior Research Scientists, Google DeepMind and Google Research

Piotr Mirowski and Rida Qadri

Dialogues between technologists and art worlds

The creative, community-focused model of practice that is emerging here shows us that when people, not technology, are the foundation of critical inquiry we can use technology as a platform to understand each other in new ways.

As generative AI enters the world of creativity, it raises questions and concerns about its impacts on cultural expression and creative practice. While research (including ours) has raised questions on cultural erasure and marginalisations that these tools could perpetuate, AI can also be actively shaped and reconfigured by the communities of its users, allowing for localised adaptation and re-imagination by users, to suit their specific cultural contexts.[34]

To help technologists who develop AI, and human–computer interaction researchers who evaluate its impacts on creative artists, and to understand real-world use and impact of technologies, we propose to combine two useful frameworks: the notion of a broader 'art world', and principles of participatory AI. On the one hand, and as sociologist Howard Becker articulates, art exists within an 'art world' – a complex network of individuals, institutions and organisations involved in the production, distribution and consumption of art.[35] This means that technologies for artistic production will likely impact an entire ecosystem, and not just individual users. On the other hand, participatory AI aims at 'incorporating wider publics into the development and deployment of AI systems',[36] with the hope that 'participation opens the gateway to an inclusive, equitable, robust, responsible and trustworthy AI'.

Examples of participatory studies include studies on Large Language Models (LLMs) for creative writing (e.g. Dramatron) and music production tools (e.g the Lyria toolbox). In studies on Dramatron, we evaluated the usefulness of LLMs to film and theatre industry professionals, including playwrights and screenwriters,[37] and through dialogue with writers we iteratively designed a narratological system for interactive writing and rewriting with LLMs. This study helped us explore how writers would consider the output of LLMs to be derivative, while at the same time express interest in the use of LLMs for literary world-building, indicating a gap in the design of creativity support tools – which informed subsequent tool development. In a related study, focus groups with comedians at the Edinburgh Fringe revealed how LLMs could lack cultural value alignment when handling sensitive cultural contexts pertaining to the comedian's identity.[38] Our colleagues at Google Research and Google DeepMind engaged, over extended periods of time, with musicians who use AI tools in their creative process, shaping these tools according to the artists' needs. They evaluated the Lyria toolbox[39] during creative engagements with music artists, such as Indian singer and composer

Shankar Mahadevan, who tried to fuse his music, inspired by Carnatic, Hindustani, folk and jazz genres, with AI tools for cross-cultural exploration.

While powerful in revealing ways in which creatives and tech professionals can collaborate for improving the design of technology, these studies focused on the artists as central stakeholders for AI technology design.[40] In our recently published work we expanded that scope to the broader art world. We put visual artists and designers in dialogue with art critics and museum curators specialists of the Persian Gulf,[41] engaging in critical dialogue about image archives, stereotypes and artistic agency. We closely followed how artists would devise 'hacks' and work around existing generative AI tools, then use them in artworks that followed their culturally relevant visions and lived experience. Following such processes allows us to establish a localised art world with artists and critics, to collect insights into how the reception and generation of technology-enabled art is shaped by histories of creativity, politics and artistic visions, and to situate the discussions on redesigning AI tools for non-Western creativity.

As an outcome of such participatory processes situated within art worlds, we, as technologists, hope to de-centre the focus from just individual users. We hope to see how carefully designed AI tools can both provide artists with new perspectives or approaches to their craft, and adapt AI tools to their creative process, when relevant. The process is as important in art as the output, and knowing about creative processes can also help us identify gaps in design, interface, interactions of generative AI systems and thus present developers with actionable pathways for improving generative AI as a tool for cultural production.[42] We also hope that AI technologies that intervene in artistic expression should be understood in the context of a localised art world,[43] and that such cultural specificity will be a crucial element of innovation.

** This article represents the personal opinions of the authors and does not represent official Google policy.*

Bio

Dr Piotr Mirowski is a Senior Staff Research Scientist at Google DeepMind and a Visiting Researcher at Goldsmiths, University of London. Piotr's research on artificial intelligence has covered the subjects of reinforcement learning, navigation, weather and climate forecasting, human–machine interaction, human-centred AI and computational creativity. Piotr studied computer science in France at ENSEEIHT Toulouse and obtained his PhD in computer science in 2011 at New York University, with a thesis supervised by Prof. Yann LeCun (Outstanding Dissertation Award, 2011). Piotr founded and directs Improbotics, a theatre company where human actors and robots improvise live comedy performances and explore AI for artistic co-creation. Piotr has also worked on critical AI installations in collaboration with Zürich University of the Arts and with Teatr STUDIO, Warsaw.

Dr Rida Qadri is an interdisciplinary AI researcher working at the intersection of AI and culture, with a focus on AI for the non-Western world. Her research centres on imagining novel AI interaction paradigms for cultural experiences – from storytelling and cultural heritage to media generation – empowering users with agency, control and steerability. She develops evaluation methodologies that move beyond benchmarks, capturing the nuanced social and cultural impact of AI in real-world contexts. Rida has published widely in top-tier venues across the social sciences and computer science, including Big Data & Society, CSCW, CHI and FAccT, and sits on the editorial board of the journal *Cambridge Forum on AI: Culture and Society. She has contributed op-eds for publications like Wired, The Guardian, Slate*, and *Vice.* Rida holds a PhD in computational urban science and a master's in urban studies from MIT.

3.

Artist-led innovation creates more resilient networks

Artists, cultural organisations, and creative industries engage communities in both technical and ethical considerations. In breaking down opaque concepts and cultivating interdisciplinary skillsets they build the public agility required to adapt to a changing digital landscape.

Artist **Linda Dounia Rebeiz** opens the chapter, mapping how art draws attention to hidden technological systems – especially critical in regions with uneven digital access. **Abandon Normal Devices**, along with scholars **Oonagh Murphy and Laura Aguiar**, highlight how arts-led programming in the North of England and Northern Ireland strengthens local digital capacity and connects regional narratives to global tech dialogues.

In cultural heritage contexts, resilience includes confronting historical injustices. **Chao Tayiana Maina** of African Digital Heritage and **Juan Cortés** from Colombia's National Centre for Historical Memory spotlight how communities are reclaiming technologies shaped by colonial and environmental exploitation to preserve memory and reclaim ownership.

Education is also central to this resilience. At Armenia's **TUMO Center**, students blend coding with storytelling, and geometry with design. Co-creators **Marie Lou and Pegor Papazian** highlight how this fusion creates future innovators who are both technically and creatively fluent. Similarly, **Haytham Nawar** at Diriyah Art Futures, and **Marie McPartlin and Murad Khan** of Somerset House Studios and UAL's Creative Computing Institute, share how their programmes support artists to shape evolving technological landscapes across cultural contexts.

This chapter closes by addressing the systemic scale of resilience. Scholar **Caterina Moruzzi** calls for renewed value in polymathic expertise to meet AI's complex challenges. Artist and activist **Paolo Cirio** positions artists as capable of mobilising interdisciplinary networks to shape policy and ensure technologies serve the public good.

Together, these statements demonstrate how the arts help build resilient and inclusive technology ecosystems that serve both local communities and global futures in the long term.

(SN)

Linda Dounia Rebeiz

Artist

Art with machines to change machines

By revealing the underlying messages behind illegible data, recontextualising familiar devices in new ways or showing hidden infrastructures [...] artists disclose the invisible threads that bind technology to our personal freedoms, our economies, our cultures and our environments

The idea that technological progress equals social progress, which has roots going as far back as the Enlightenment, has been revived with every major technological leap since.

In the 20th century alone we saw widespread electrification, industrial efficiency, nuclear technology, the space race, cybernetics and early computing, the first personal computer, the internet and the dot-com boom. Today, as breakthroughs in AI seem to happen every other week, we appear the closest we have ever been to the triumph of human hubris: not only have we made machines, but those machines can program themselves and other machines. All we have to do is sit back and enjoy the 'radical abundance' they (we) enable. It shouldn't matter how this came to be, or what abundance means and to whom. Those with the money, power or influence to remain at the forefront of technologies often speak a language of techno-optimism that assumes the means of innovation justify the ends, because innovation inevitably leads to a better future. The means do not always justify the ends however, and 'better' is subjective.

An alternate view of technological leaps over the past two centuries reveals a human and ecological toll that is hard to overlook. It is impossible to untangle the history of technology from violence, exploitation and ethical contradictions that call into question our rigid definition of 'progress'. The Industrial Revolution cannot be separated from the cotton fields of the slave-owning American South, or from the colonial extraction of rubber, timber and rare minerals in Africa, Asia and the Americas. Nuclear technology's development cannot be separated from the imperatives of World War II, first manifesting as bombs before fulfilling its promise of boundless energy. The internet, once hailed as a great democratiser, birthed invasive surveillance, corporate monopolies and new forms of social division. In today's AI era, humanity grapples with data extraction, algorithmic bias and the widening chasm between those who shape emerging technologies and those governed by them.

Techno-optimists are quick to underwrite the more insidious impacts of the search for more compute as the inevitable cost of reaching technological liberation. Yet, as history shows, technology is not inherently liberatory and therefore should be scrutinised, critiqued and regulated. Humanity should contend with whose interests it serves, whose voices it excludes and how its costs and profits are distributed. While these questions are explored by academics and policymakers, I believe that artists are uniquely positioned to bring these questions to the wider public. Artists have the ability to break down complex systems into visceral experiences that anyone can relate to. In Heather Dewey-Hagborg's *Stranger Visions,* she harvests DNA from our litter and shows us how easy it is for any of us to be watched. Artists also often go to great lengths to gather the materials and information they need to create these experiences and share them with the world. Trevor Paglen

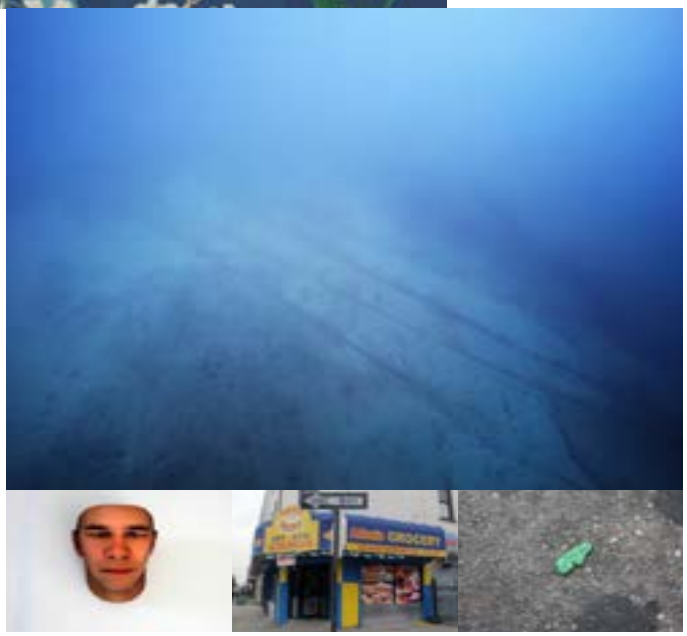
(1) *Flore Perdue, Herbarium Annex,* GNS012-041-042-047-057-058-065, 2024, Linda Dounia Rebeiz, Courtesy of the artist
(2) NSA-Tapped Undersea Cables, North Pacific Ocean, 2016, Trevor Paglen, Courtesy of the artist.
(3) *Stranger Visions,* 2013, Samples from New York: Sample 6, Heather Dewey-Hagborg, Courtesy of the artist
(4) *Mother of all demos II,* 2021, American Artist, Courtesy of the artist
(5) *Once Upon a Garden, First Generation, Fifth State,* 2021-2022, Linda Dounia Rebeiz, Courtesy of the artist
(6) *The Complete Archive, Second Generation,* F1-GNS04, Linda Dounia Rebeiz, Courtesy of the artist.
(7) *The Complete Archive, Second Generation,* F1-GNS02, 2022, Linda Dounia Rebeiz, Courtesy of the artist

learned to scuba dive to show us a material reality of the cloud: undersea cables. Unrestricted by dogma or discipline, artists can blur the boundaries between theory and lived experience, allowing us to see beyond technical jargon or marketing slogans. This is exemplified in American Artist's *Black Gooey Universe* installations, in which they show us the biases encoded in the technologies we use everyday.

By revealing the underlying messages behind illegible data, recontextualising familiar devices in new ways, or showing hidden infrastructures – such as fibre-optic cables, server farms or mass surveillance networks – artists disclose the invisible threads that bind technology to our personal freedoms, our economies, our cultures and our environments. Art and the discourse it encourages is vital to technological development. It provides an accessible lens through which we can all look at technology critically, even without a technical background. In doing so, it awakens us to the realisation that technology is not neutral and not inherently a force for good. It also gives us the language to ask urgent questions about why we build technology and what it takes from humanity and the planet to do so. I believe it is the most potent contemporary site where we display our agency over technology and advocate for more of it.

(1)

Confronted with the state of the data about non-Western contexts AI is trained with, Once Upon A Garden is a critical look at the archive. Between 2021 and 2024, this project has speculated on what the flora population in West Africa (where Linda Dounia is from) might have looked like decades ago using more refined AI models. The results show that global efforts to record disappearing biodiversity have not been consistent across time and geographies.



(2)

While making Landing Sites, a project that records places where multiple undersea cables reach land and connect the continents together, Trevor Paglen learned how to scuba-dive to photograph the actual material conjunctions of undersea internet cables.

(3)

Heather Dewey-Hagborg shows how personal data (in this case, genetic information) can be harvested without our knowledge in Stranger Visions. She collected hairs, chewed up gum, and cigarette butts from public sites of New York City, extracted DNA from them, and analyzed it to computationally generate 3d printed life size full color portraits representing what those individuals might look like.

American Artist highlights the ways that technology's so-called 'neutral' platforms often encode racial biases —through algorithms, user interfaces, and data-collection frameworks with Black Gooey Universe.

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Bio

Linda Dounia Rebeiz is a Senegalese artist, designer and researcher. Her practice reflects a critical engagement with technocapitalism and the ecological and human labour embedded in algorithms. She currently explores artificial intelligence as an instrument for seeing and is particularly interested in how it affects our understanding of and relationship to culture, memory and power. Linda was recognised on the inaugural TIME AI 100 list of most influential people in AI[44] for her work on speculative archiving – building AI models that help us remember nature that is lost.

(UK)

Chief Executive and Creative Director, Abandon Normal Devices

Tadeo Lopez-Sendon and Yinka Danmole

Festivals as infrastructures for research and experimentation

In contexts where digital infrastructure is uneven and cultural participation remains geographically concentrated, the AND Festival has offered a mobile and scalable skills-development framework, strengthening local capacity for digital production, while connecting place-based cultural narratives to global technological conversations.

Innovation on its own is incomplete. Without cultural and artistic engagement, technological development risks becoming purely functional, prioritising automated growth, commercialisation and short-term market profits, while producing unsustainable models detached from urgent social concerns.

We are now at a distinct moment in deciding the future of technologies. Are we going to support artistic contributions to research and innovation sectors, or will we continue in silos, allowing technology to be reduced to functionality-first models?

Artists and cultural practitioners bring methodologies for exploring unknowns, questioning assumptions and prototyping new interactions. Contemporary cultural sector practitioners have real innovative potential, research value and private sector relevance. They are uniquely equipped to engage with the complexities of emerging technologies, testing the social risks and unintended consequences before technologies are scaled or adopted. Yet they continue to work within increasingly precarious models, often without recognition or funding equivalent to their counterparts in higher education or the commercial sector. Acknowledging this shift is critical if public investment is to reflect where innovation is genuinely taking place.

Festivals can be a key vehicle for this integration. Unlike year-round programming, which disperses activity over time, festivals act as summits: high-impact, time-bound moments where investment, discourse and experimentation converge. They provide structured opportunities for artists, technologists, policymakers and the public to engage with new ideas in real-time, generating focused momentum that demonstrates what happens when art, place and technology are brought into alignment. They bring new models and commercial structures that question, reshape and redirect the conditions in which technologies are developed and experienced, creating spaces where technology is tested, interpreted and challenged in ways that traditional R&D environments and traditional cultural spaces cannot replicate, and in doing so, making innovation tangible and measurable for key decision makers. Festivals can also create a uniquely permissive space for experimentation, where risk, iteration and even failure are more acceptable.

Outdoor and open-to-the-public festival programmes like AND Festival create these temporary interventions, offering a critical space for location-based and site-responsive labs and experiences. This model puts innovation in dialogue with public audiences unfamiliar with cultural encounters or experiencing digital divides. In recent editions across northern England, AND Festival has reached beyond traditional arts audiences outside major metropolitan clusters in sites such as Castleton, Grizedale Forest, Runcorn and Barrow-in-Furness. For example, at AND 2021, 20 per cent of attendees were from the most economically deprived areas in the UK, with 68

(1) *In the Eyes of the Animal,* Marshmallow Laser Feast, 2015, AND Festival ©Luca Marziale
(2) *Waterlicht,* 2017, Studio Roosegaarde, AND Festival ©Chris Foster
(3) *Watch the Skies,* 2014, Jodrell Bank Observatory ©Chris Foster

(1) (2)

per cent of audiences describing the experience as 'new' to them.

This festival framework also has an interdisciplinary and cross-sector exchange focus; evidence from previous AND programmes shows that festivals create opportunities for prototyping, speculative design and situated public engagement that are not possible in gallery or lab settings. In contexts where digital infrastructure is uneven and cultural participation remains geographically concentrated, the festival has offered a mobile and scalable skills-development framework, strengthening local capacity for digital production, while connecting place-based cultural narratives to global technological conversations. AND Festival-associated initiatives, such as the COSMOS Ambassador programme 2018/19, offered hands-on training in digital art production to unemployed residents in Cheshire East, building a community of skilled local facilitators with digital arts knowledge and laying the groundwork for future engagement in creative technology projects and AND programming.

For AND, the opportunities and contexts of these spaces have been diverse, geographically and demographically, from urban to rural locations: remote forest clearings, shopping centres, underground bunkers, coastal headlands and post-industrial sites. These projects listen to community voices, local heritage, history and archival materials from industries deeply rooted in northern England, bringing them into dialogue with cutting-edge technologies (XR, 360° screen, virtual production, spatial sound). From coal mining and shipbuilding to textiles, iron and steel – putting our human condition in dialogue with our built environments, land infrastructures and post-industrial histories, tracing the arc from the first industrial revolution to the fourth (metaverse, AI, web3) and pointing to the future.

(3)

Bio

Tadeo Lopez-Sendon is a cultural programmer and creative director, currently chief executive of Abandon Normal Devices and Longplayer trustee. Until 2019, Tadeo was co-director of Music Hackspace, which included a three-year residency at Somerset House Studios. Tadeo has produced digital programmes with the National Gallery, Furtherfield, Artangel and Chiswick House and Gardens.

Yinka Danmole is a cultural producer with a focus on public-realm projects and place-based programming. He is creative director at Abandon Normal Devices and has led work for organisations including Mediale, Manchester International Festival and Creative Black Country. Recent projects include Grow FM (2022) at Chiswick House and Gardens, and the *Thamesmead creative studio* (2021–present).

(UK/IE/BR) Oonagh Murphy and Laura Aguiar

Lecturer, Digital Culture and Society, Goldsmiths & Lecturer, Cinematic Arts, Ulster University

Community arts practice and creative innovation

The creative, community-focused model of practice that is emerging here shows us that when people, not technology, are the foundation of critical inquiry we can use technology as a platform to understand each other in new ways.

Northern Ireland is internationally respected for its community arts practice: wall murals that address issues of social justice; theatre that inspires dialogue between victims and perpetrators; a community circus and a carnival movement which creates new forms of culture that are not defined by national politics or religious affiliation, but instead encourage people to find joy in the shared humanity of diverse communities.

It is in this context that the space between art and technology has served as an important site for critical inquiry and the imagining of new futures in a post-conflict Northern Ireland, still healing from over 30 years of conflict (1969–1998).

Storytelling has emerged as one of the most-cited means of dealing with the legacy of the past in transitional societies. When used in conjunction with arts and digital technology it offers an important bridge between past, present and future.

A hub for digital enabled storytelling has emerged in Derry-Londonderry in the form of The Nerve Centre, a creative media hub that has been at the forefront of arts, heritage and technology engagement since its creation in the 1990s. One such example, *Border Sounds (2021)* a virtual reality film about the invisible Irish land border, was created in partnership with Northern Ireland's national archives (PRONI) and 21 participants from border communities.

This project shows how emerging technologies can be used to tell new stories about contested spaces. VR's immersive capabilities (i.e. that sense of 'being there') are used to provide engagement with opposing perspectives, humanise conflict stories and reimagine these spaces. By taking the viewer on an immersive journey of the invisible border line, the film highlights the similarities (the rural landscapes) and not the divisions (visual markers such as flags and wall murals).

This uniquely people-centred approach has led to innovative forms of digitally mediated community arts practice that prioritise nuance and empathy. A model of practice born out of conflict, and now repurposed to address contemporary issues, offers new platforms for dialogue between individuals and communities.

Reimagine, Remake, Replay (2016–2020), for example, a programme supported by the National Lottery Heritage Fund's *Kick the Dust* initiative, used digital technology, such as AR, VR and 3D printing, to enable young people to co-curate museum exhibitions on themes such as climate justice and LGBTQ+ rights.[45,46] The programme also provided a platform for young people to engage with emerging forms of conflict and social justice that speaks to their lives today, representing the plurality of legacy

(1, 2) *Border Sounds*, Courtesy of Laura Aguiar

(1)

and progress in the context of a post-conflict society.

Arts practitioners, as demonstrated in the examples above, are deeply embedded in the community, and have provided space for individuals to share their stories beyond official state narratives or singular narratives of the conflict. Everyday stories play a vital role in post-conflict societies, where official narratives often marginalise certain voices.

Digital innovation in Northern Ireland is mostly driven by the need to bring communities together, now extending beyond the traditional divides of 'orange and green'. The creative, community-focused model of practice that is emerging here shows us that when people, not technology, are the foundation of critical inquiry we can use technology as a platform to understand each other in new ways.

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Bio

Dr Oonagh Murphy is a lecturer in digital culture and society at Goldsmiths. Her research centres on emerging digital practices and their impact on art and audiences. She is from Belfast and her interest in digital practice is drawn from her research into digital archives in post-conflict societies. She is currently thinking about the impact of artificial intelligence technologies on culture and society.

Dr Laura Aguiar is a lecturer in cinematic arts at Ulster University and a multi-media content creator based in Northern Ireland. Her practice-based research focuses on making history, art and heritage more accessible and engaging through participatory creative projects. She is also co-founder and co-director of the Rathmullan Film Festival.

(KE)

Chao Tayiana Maina

Founder African Digital Heritage, Co-Founder Museum of British Colonialism

Shaping digital heritage: Between people and process

The assumption that cutting-edge tools alone can preserve or make heritage accessible overlooks the realities of interoperability – how digital tools integrate with existing infrastructure, cultural protocols and local knowledge practices.

In the growing field of digital heritage, technology is often perceived as the driving force behind preservation and accessibility. However, the impact of technology does not lie in its inherent capabilities but in the decisions people make about how it is implemented, adapted and sustained within cultural and societal contexts. This perspective is particularly significant when considering how technology engages with African cultural heritage, where historical exclusion, infrastructural limitations and resource constraints shape the landscape of digital innovation.

At African Digital Heritage our work is centred on ensuring digital technologies serve the needs of communities rather than imposing external technological solutions that may be unsustainable or culturally misaligned. A key challenge we navigate is the balance between leveraging technology to enhance access to heritage while remaining conscious of low-resource contexts, both in terms of infrastructure and digital literacy. The assumption that cutting-edge tools alone can preserve or make heritage accessible overlooks the realities of interoperability – how digital tools integrate with existing infrastructure, cultural protocols and local knowledge practices.

One of the ways we address these challenges is through our *Skills for Culture* programme, an initiative dedicated to strengthening capacity in the Kenyan cultural heritage sector by equipping professionals with the necessary skills and understanding to document, preserve and share heritage in accessible and sustainable ways. The programme recognises that digitisation projects do not take place in a vacuum, rather they exist within a wider context of complex historical, infrastructural and cultural entanglements. In 2024 we produced a series of masterclass videos that sought to equip practitioners with critical skills around fundraising, intellectual property and strategic partnerships. These topics came directly from conversations with community-based cultural organisations, who shared that these were the areas where they felt least supported. What emerged was a powerful insight; the sustainability of digital heritage work often hinges not on digital skills alone, but on the 'invisible' scaffolding that surrounds them. In this way the Skills For Culture programme invites practitioners to reimagine not just how they use technology, but how they shape it to reflect their values, histories and realities.

Another project that highlights cultural heritage as a site for developing technologies more deeply embedded in local cultural context is the *Gedi Digitisation Project.* Gedi Ruins, an ancient Swahili coastal settlement in

(1, 2) *Digitisation of Gede Ruins*, Courtesy of African Digital Heritage
(3, 4) *Skills for Culture Training Session*, Courtesy of African Digital Heritage

Kenya, holds immense historical and cultural significance. In 2023 a project to digitise sections of the Gedi site aimed to create a digital archive of Gedi's architectural and cultural heritage, using 3D scanning, virtual tours and GIS mapping to preserve the site while making it more accessible to scholars, local communities and global audiences. The goal was twofold: to support long-term conservation through digital documentation and to make the site more accessible to scholars, local communities and wider global audiences. During the digitisation process, we spoke with Mr Jimmy Liwali, who was born and raised in Gede and remembered the early excavations of the 1940s and 1950s. He shared not only his personal recollections but also local legends and folklore tied to the ruins, stories passed down through generations that reveal how the site continues to live on in the minds of those around it.

A critical takeaway from these projects is that technology is not neutral – it reflects the decisions, values and biases of those who create and implement it. Sustainable digital heritage is not about having the most advanced tools but about ensuring that the tools we use are adaptable, inclusive and driven by the needs of the communities they serve. This is why cultural heritage must be recognised as a space for diverse, representative innovation, where technology is shaped by cultural priorities rather than the other way around.

As digital heritage practitioners, we must ask not just what technology can do, but whose history it is preserving, how it is being accessed and who has the power to define its future.

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Bio

Chao Tayiana Maina is a Kenyan historian and digital heritage specialist with a unique expertise at the intersection of memory, digital humanities and public education. Leveraging a background in computing and a specialisation in heritage studies, her work is dedicated to exploring and excavating African histories while simultaneously building and enhancing the infrastructure needed for the preservation and dissemination of these vital pasts. She is the founder of African Digital Heritage, a co-founder of the Museum of British Colonialism and a co-founder of the Open Restitution Africa project.

[CO]

Juan Cortés

Artist & Cultural Executive at the National Centre for Historical Memory (CNMH), Colombia

Safeguarding Colombia's collective memory

By re-imagining technology as a tool for collective empowerment and cultural expression, creative experimentation has produced digital platforms that foster genuine appropriation – a dynamic process through which local communities reclaim, adapt and integrate these tools to reflect their own identity, values and needs.

In a region marked by profound social and economic challenges, violence and loss, arts and culture open space for the development of civic, community-led technologies grounded in solidarity and democratisation. By re-imagining technology as a tool for collective empowerment and cultural expression, creative experimentation has produced digital platforms that foster genuine appropriation – a dynamic process through which local communities reclaim, adapt and integrate these tools to reflect their own identity, values and needs – and meaningful participatory engagement.

I have witnessed this first-hand both as director of the National Centre for Historical Memory (CNMH) in Colombia and through my involvement with Atractor, an artist collective that interrogates the technification and homogenising effects of technology across South America.

As executive director of the CNMH, I am tasked with safeguarding Colombia's collective memory in the face of targeted assaults on truth and record-keeping. Over the past decade, conservative and far-right sectors – most visibly under a previous director appointed in 2019 – have promoted denialist narratives of the armed conflict, selectively suppressing testimonies that reveal the complicity of state-aligned actors and paramilitary groups. This ideological interference led to the alteration or disappearance of critical digital archives and even prompted the Centre's suspension from the International Coalition of Sites of Conscience, actions that disproportionately silence already vulnerable communities – Indigenous, Afro-Colombian, campesino, Raizel and Palenquero peoples – whose stories are essential to a plural, democratic record.

In response, my work focuses not only on preserving what remains but on rebuilding and future-proofing our collective memory through decentralised, community-driven technologies. By coupling resilient digital infrastructures – InterPlanetary File System (IPFS) storage and distributed databases – with local capacity-building programmes, we are creating a memory ecosystem in which those same communities become custodians of their own histories, ensuring that no single political turn can ever erase or distort them.

Specifically, we have built a preservation architecture that fuses IPFS storage with a Git-inspired version-control service. Every testimony, photograph or audiovisual record is identified by its cryptographic hash, and each subsequent edit is committed to a publicly readable change history that triggers real-time notifications for subscribed communities and civil-society observers. Conceived from the outset as a safeguard for cultural memory rather than a

(1) *On Vegetal Politics,* 2022, Juan Cortés, Installation view, Courtesy of the artist.
(2, 3) *On Vegetal Politics*, 2022, Juan Cortés, Courtesy of the artist.

generic data warehouse, the system privileges redundancy, transparency and local stewardship: memory-site custodians in places such as Bojayá, San José del Guaviare and the Upper Putumayo pin their own collections, so an outage in Bogotá can never extinguish their archives; the distributed database replicates across nodes and remains functional even over patchy rural connections; and the open audit trail deters tampering by making any alteration instantly visible and reversible. Designing infrastructure through the lens of cultural protection has, therefore, produced a platform that is both more technically stable than conventional centralised servers and more socially resilient, because it keeps vulnerable or historically marginalised communities – not distant institutions – at the heart of safeguarding their own stories.

Furthermore, we have ensured that these safeguards are deeply anchored in the communities they serve. Rather than shipping out hardware, we invite local stakeholders to connect their own computers, library workstations or community-run servers to the IPFS network, where they can download verified copies of their collections. Through on-site workshops and ongoing mentorship, participants learn to verify hashes, keep their nodes in sync – even over limited bandwidth – and interpret the integrity alerts generated by our Guardianes de la Memoria platform. The CNMH remains the official curator: our archivists and front-end developers work side by side with each community to assemble, describe and publish every narrative, ensuring professional standards while reflecting local voices. Yet by maintaining autonomous replicas, Indigenous, Campesino, Raizal and Palenquero groups can monitor the condition of their testimonies and reseed them whenever central nodes falter. This collaborative architecture not only reinforces the technical resilience of the archive but also cultivates a shared sense of custodianship, knitting social bonds through a common commitment to technological care.

In parallel, my artistic practice with Atractor presents a different – yet complementary – path for addressing South America's sociotechnical challenges. Founded in 2017 by Colombian artist-engineers Juan Cortés, Juan José López, Juan Camilo Quiñones and Alejandro Villegas – and expanded through ongoing collaborations with UK-based producers Jemma Foster and Camilla French of Semántica Studios – the collective operates

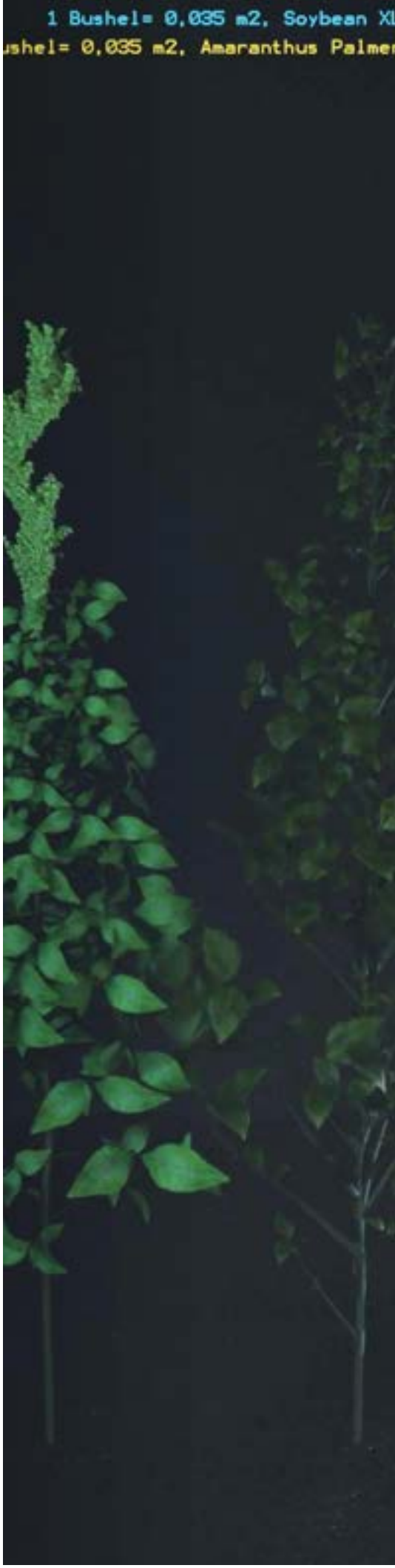
(1)

as an open, transdisciplinary studio where media art, ecological research and Indigenous knowledge interweave. By uniting sound designers, software engineers, field naturalists and community organisers, Atractor treats technology as a contested arena, experimenting with mechanical, electronic and computational techniques to visualise natural phenomena and to imagine sociotechnical futures that break with extractivist, Western paradigms.

Through A Tale of Two Seeds: Sound and Silence in Latin America's Andean Plains (2023) (Atractor Studio [CO] / Semántica Studios [UK]) we carried out a five-year field inquiry in the soybean megafarms of the Llanos Orientales and neighbouring polycultural plots where amaranth still grows. Hundreds of hours of subterranean soil vibrations, canopy soundscapes and plant-electrical-conductivity readings were captured and transformed into a spectral map. The analysis revealed a pronounced narrowing of the acoustic bandwidth – especially within the insect- and bird-rich 2–8 kHz range – whenever genetically modified monocultures replaced diverse cropping systems, offering a sonic metric of biodiversity loss. By amplifying these silences inside the installation, the work makes audible the ecological cost of commercial monoculture and underscores the agronomic potential of amaranth as a climate-resilient, nutritionally rich alternative.

On Vegetal Politics (2022) extends this critique by reverse-engineering the predictive algorithms employed by agrocorporations to optimise transgenic soy yields. We reconstructed the underlying machine-learning model, substituted agronomic data for amaranth, and reran the forecast; the simulation persistently ranked the so-called 'weed' as superior in nutrient density and drought tolerance. By redirecting proprietary code to foreground endemic species, the piece exposes how computational abstractions can entrench extractive logics while obscuring ecologically and culturally valuable alternatives.

Together, these projects carve a shared legacy with the CNMH's community-anchored digital infrastructure: both demonstrate that technologies conceived from the outset to defend cultural and ecological diversity can resist erasure, stimulate public oversight and plant the seeds of more equitable, multispecies futures long after the exhibition doors close or the servers migrate.



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Bio

Juan Cortés is a Colombian artist and cultural executive at the National Centre for Historical Memory (CNMH), where he spearheads Guardianes de la Memoria, an IPFS-based, Git-inspired platform that decentralises and secures victim-community archives. As co-founder of Atractor Studio, he fuses ecological data, Indigenous knowledge and sound art; his installation *A Tale of Two Seeds* won the Golden Nica for Digital Music and Sound Art at Prix Ars Electronica 2023. A frequent lecturer at Universidad de los Andes, Cortés champions technological stewardship grounded in diversity, solidarity and open cultural memory.

(AM)

CEO & Chief Development Officer, TUMO Center for Creative Technologies

Marie Lou and Pegor Papazian

Walk-away pedagogy: Leaving behind the false dichotomy of art vs tech

The separation of art and technology is a false dichotomy; for decades the two have been intertwined in the mechanics of learning, creating, and making in an increasingly digital environment. We see this daily, in the tens of thousands of learners between the ages of 12 and 18, who attend the TUMO Center for Creative Technologies.

(1, 2, 3, 4, 5, 6) Student workshops at TUMO Centre for Creative Technologies, Courtesy of TUMO Center for Creative Technologies

The separation of art and technology is a false dichotomy; for decades the two have been intertwined in the mechanics of learning, creating, and making in an increasingly digital environment.

We see this daily, in the tens of thousands of learners between the ages of 12 and 18, who attend the TUMO Center for Creative Technologies. A free after school program founded in Armenia and now with centres across Europe, TUMO covers a wide creative technology curriculum, from filmmaking and music composition to coding and game development.

At the heart of TUMO is the question: What if school were something young people were free to walk away from? Imagine how education systems would have to change so that students kept coming back to learn because they wanted to, not because they had to – we call this consensual learning.

At the heart of consensual learning is choice: The freedom to gravitate towards or away from a subject, to transition from one to another, to combine two or more and, ultimately, to refuse to choose. With choice comes agency, students in charge of their own learning trajectories. That, in turn, leads to intrinsic motivation and engagement, the golden currency of pedagogy.

Navigating choice nurtures the ability to deal with an increasingly complex, technologically mediated world – developing skills in adaptability, critical decision-making, and digital literacy that are crucial for the future.

Picture a varied offering of subjects, ones which are significantly different from each other – some more technological, others artistic; some abstract, others sensorial; some static, others dynamic. We have found that giving students the opportunity to choose their own path through these diverse subjects not only creates more effective and inclusive learning environments, but it also equips young people with the necessary skills and confidence to innovate.

Now consider the interdisciplinary nature of practices like game development where storytelling and coding converge; or 3D modelling which combines geometry and visual world-making. They become the switchboards allowing learners who initially engaged at one end of the spectrum to transition to the other, artists discovering a new passion for technology and mathematics, and techies falling in love with art and design.

Creative work, whether through artistic production, developing media products or making cultural artefacts, plays a key, often unrecognised role in the process of learning. In one of the key instructional design patterns we use at TUMO, each cycle of acquisition of concepts or techniques culminates in a mini-project involving creative self-expression. Coding a sassy chatbot of your own creation locks in newly acquired computer

programming techniques that become uniquely personal and therefore memorable. Once you design your fantastical vehicle out of platonic solids, apparently dry 3D modelling concepts are suddenly compelling and easily internalised. Creative projects, ones involving personal self-expression, are not only effective catalysts for learning but also the places where learners with different initial interests and dispositions converge, complete each other, and find real value in collaboration.

The relationship between the technical and the creative in education is symbiotic. While creative production drives effective learning, creativity itself requires the mastery of technical skills. Making things provides the space to experiment, discover, and follow creative pathways. To do this, learners need the technical tools that make their work viable and fulfilling.

We have learned that allowing students to choose pathways through a wide range of creative and technical subjects not only maximised motivation, but also becomes the key to diversity and inclusion. A wide spectrum of subjects offers opportunities for engagement to learners with significantly different inclinations, backgrounds and expectations. Time and again, we see young people, often girls constrained by prevailing stereotypes, enter TUMO through the artist's door, attracted to photography, music composition or drawing. But then many of them start experimenting with coding, robotics or other skill area that they might have otherwise found intimidating, and suddenly that becomes their newfound passion. It is also not uncommon to have a cerebral teenagers who had no interest in design or the arts, discover that it is animation, filmmaking or graphic design where they have an exceptional talent, and where they find happiness.

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The outcome of these episodes of self-discovery is not merely a transition from one mode of creativity to another. Instead, what we get are young people who straddle both worlds and are highly competitive as a result – the engineer with strong design sensibilities, or the creative professional comfortable with algorithmic thinking.

Perhaps most importantly, freedom of choice across creative and technical curricula turns out to be particularly transformative for learners in underserved communities, whether they are beholden to socioeconomic realities, gender roles, or other constraining circumstances. Those are the young people who are most susceptible to being steered into narrowly defined educational or vocational pathways with limited room for exploration and self-realisation. The best versions of the future will be created in environments where learners are empowered to break free from such rigid expectations, discover unexpected talents, and redefine their own creative potential.

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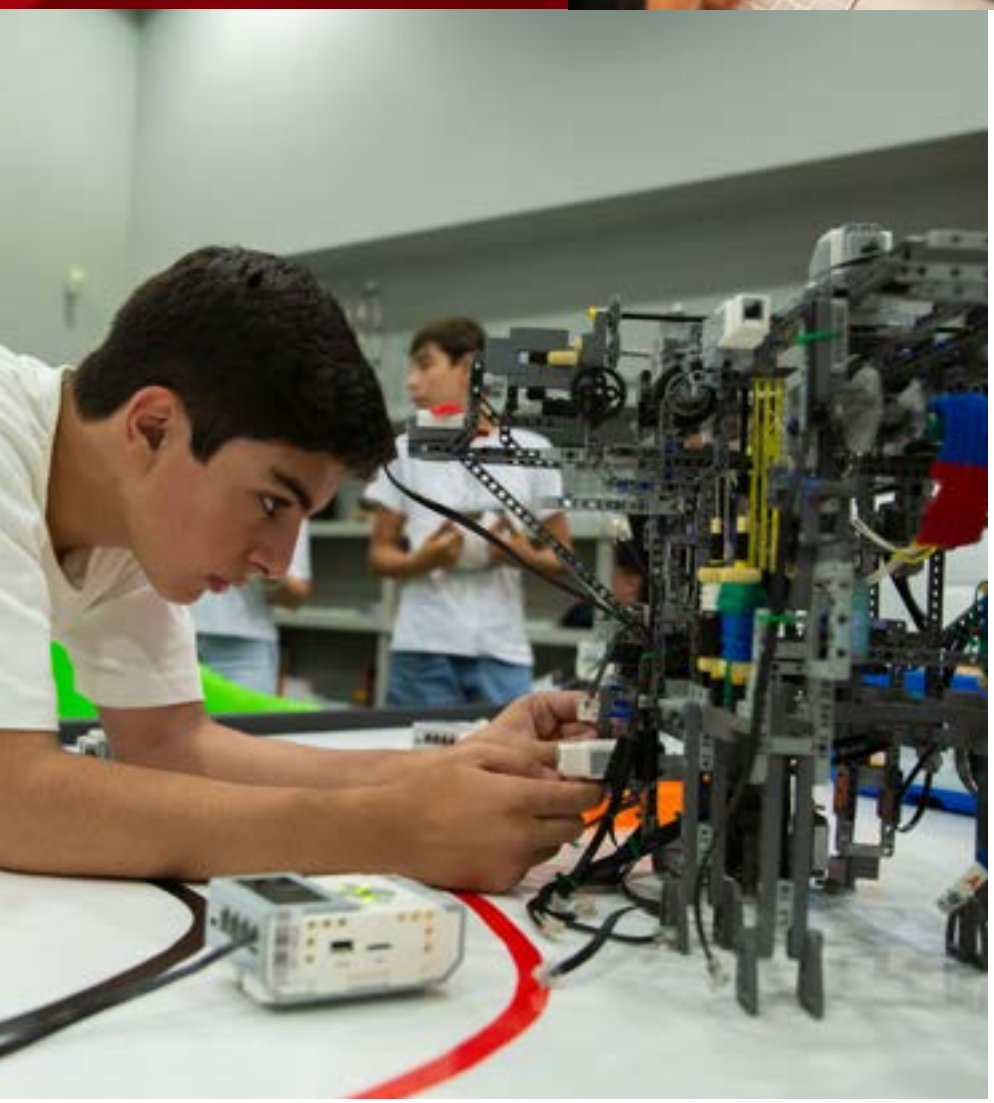

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Picture a varied offering of subjects, ones which are significantly different from each other – some more technological, others artistic; some abstract, others sensorial; some static, others dynamic. We have found that giving students the opportunity to choose their own path through these diverse subjects … equips young people with the necessary skills and confidence to innovate.

Bio

As TUMO's founding CEO, Marie Lou Papazian developed the centre's educational programme and led the design and construction of its flagship facility. Prior to TUMO, Marie Lou led the Education for Development Foundation linking Armenian students to their global peers through online educational activities. Previously, she was lead construction manager on prominent high-rise buildings in New York City. Marie Lou holds a master's degree in computing in education from the Teachers College at Columbia University and is a graduate of Harvard Business School's general management programme. In 2019 she received the Ordre des Palmes Académiques – a national order bestowed by the French Republic on distinguished academics and figures in the world of culture and education.

Pegor Papazian is Chief Development Officer at TUMO and has played a lead role in developing its educational content and learning management system. He was previously Head of Program Development at the United States Agency for International Development, CEO of the National Competitiveness Foundation of Armenia, and founder of Bazillion Beings, a virtual agents platform. Pegor graduated from the University of Chicago Booth School of Business, holds a master's degree in computer science from MIT, where he was a member of the AI Lab, and a bachelor's in architecture from the American University of Beirut.

(EG/SA) Haytham Nawar

Director Diriyah Art Futures

Art, technology, and future-facing education

Through my professional journey, I have endeavoured to establish platforms that seamlessly integrate art, technology and culture across the Arab world. By fostering alternative and informal educational initiatives, these programmes empower artists to critically engage with contemporary issues, cultivate interdisciplinary communities and contribute meaningfully to the evolving technological and cultural landscapes of their respective communities.

The arts ecosystems in Egypt and Saudi Arabia present distinct opportunities and challenges shaped by their unique cultural histories, socio-political landscapes and institutional infrastructures. Across these diverse contexts, arts, culture and technology provide a powerful site for forward-thinking education, interdisciplinary innovation and public discourse.

I have observed this over 25 years dedicated to work at the intersection of arts and technologies across diverse cultural contexts, including in Egypt as the founding director of Cairotronica, associate professor, and former chair of the Department of the Arts at the American University in Cairo and in Saudi Arabia as the director of Diriyah Art Futures (DAF), Ministry of Culture.

Recognising the limitations of formal educational frameworks in addressing the rapidly evolving intersections of art and technology, these programmes are designed to be adaptive, interdisciplinary and culturally relevant, equipping artists and scholars to navigate and contribute to contemporary artistic landscapes.

Egypt, while it has long served as a cultural nexus and a beacon of Arab artistic expression, is marked by limited institutional support and funding. Egypt's culture-transforming society is shaped by a dynamic interplay of historical legacy and creative innovation; the country has long been a hub of intellectual and artistic movements, from ancient civilisations to modern-day cultural production. However, shifts in political landscapes, economic instability and censorship continue to shape its trajectory. As Egypt navigates these complexities, its creative community remains remarkably resilient, seeking alternative platforms and networks to sustain its evolving cultural identity. Moreover, globalisation and digital media have introduced new opportunities for cultural exchange.

In this context, Cairotronica was founded in 2015 as a platform to bridge art and technology through its biennial festival and year-round initiatives, including workshops, residencies, exchange programmes and fellowships. *We Are Data*, a seven-month collaborative project with IMPAKT Centre for Media Culture in the Netherlands, brought Egyptian and Dutch artists together to exchange creative practices, perspectives and methodologies, culminating in an exhibition critically examining the role of data in contemporary society.

In contrast to Egypt, Saudi Arabia is undergoing a rapid cultural transformation driven by substantial investments in arts and culture as part of socioeconomic reform. Where Cairotronica is a grassroots-up approach, Diriyah Art Futures (DAF) exemplifies an institutional approach to cultural innovation, offering unprecedented resources and state-of-the-art facilities for artists and scholars. DAF offers the Emerging New Media Artists programme, a fully funded, year-long programme that supports

(1) *Cairotronica Festival,* 2021, ©Ahmed Alnemer
(2) *Diriyah Art Future inaugural exhibition,* 2024, ©Diriyah Art Futures, Saudi Ministry of Culture

artists working in new media and digital arts, encouraging them to create work that is globally relevant and deeply rooted in regional narratives. Artists in residence have critically envisioned futures at the intersection of nature and technology, the impact of artificial intelligence on creative practices and the potential of alternative realities situated within the historical and cultural context of the UNESCO World Heritage Site of Diriyah.

Through my professional journey, I have endeavoured to establish platforms that seamlessly integrate art, technology and culture across the Arab world. By fostering alternative and informal educational initiatives, these programmes empower artists to critically engage with contemporary issues, cultivate interdisciplinary communities and contribute meaningfully to the evolving technological and cultural landscapes of their respective communities. My commitment remains steadfast in developing sustainable and dynamic arts ecosystems – ones that not only address present challenges but also anticipate future transformations, ultimately shaping an innovative and inclusive cultural framework for generations to come.

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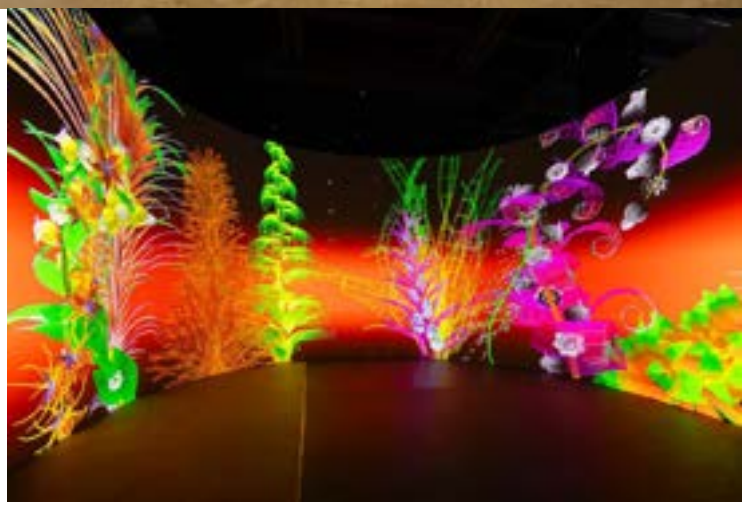

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Bio

Haytham Nawar is a practicing artist, designer and scholar in the fields of art and design. Over the past two decades he has built a professional and academic career while simultaneously fulfilling various roles. Dr Nawar currently serves as the director of Diriyah Art Futures at the Ministry of Culture in Riyadh and is also a tenured faculty member at the American University in Cairo. He co-founded Cairotronica, the Cairo International Electronic and New Media Arts Festival. He earned his PhD from the CAiiA Hub at the Planetary Collegium, Plymouth University in the UK. His research interests include art and design history, Arab media arts and pictographic communication systems, focusing specifically on the Arab world and Africa. Among his notable publications are *Language of Tomorrow*[47] *and A History of Arab Graphic Design.*[48]

(UK)

Director, Somerset House Studios
Course Leader and Senior Lecturer in Creative Computing, Creative Computing Institute, University of the Arts London

Marie McPartlin & Murad Khan

Rethinking collaboration: Towards a new interdisciplinary practice

Arts–academic collaborations have the potential to surface more experimental and critical modes of thinking and making. Together they can redirect technical development and policymaking priorities towards the messy lived pluralities of sociotechnical systems.

At a moment in which the rhetoric of technological progress threatens to produce a singular perspective on the complexities, ethics and social impact of emerging technologies, arts–academic collaborations have the potential to surface more experimental and critical modes of thinking and making. Together they can redirect technical development and policymaking priorities towards the messy lived pluralities of sociotechnical systems.

Somerset House Studios and University of the Arts London (UAL)'s Creative Computing Institute's (CCI) shape-shifting partnership has functioned as a form of R&D for institutional collaboration, focused on producing environments for new forms of interdisciplinary creative practice. Our relationship invites a continual redefinition of our terms of engagement, resisting established paradigms for arts–academic partnerships as well as historical precedents such as Experiments in Art and Technology at Bell Labs (E.A.T.) and Google Artist + Machine Intelligence. In doing so, it diverges from archetypes that confine collaboration to solely encouraging artistic experimentation with pre-existing research technologies, motivating the development of marketable applications, or producing digestible translations of academic research for public engagement.

In our inaugural collaboration, for example, as part of the Alan Turing Institute's Privacy, Agency and Trust in Human-AI Ecosystems project, we leveraged our collective expertise to integrate artistic perspectives into the design of a framework for more ethical and equitable AI. The collaboration produced several notable interventions, including Nouf Alowaysir's *Ana Min Wein* (Where Am I From?) which used film footage, family photos and Google Images to trace the artist's immigration path to the US and her family's migration through Saudi Arabia and Iraq, exploring misidentification and dataset bias in computer vision systems. The work's subsequent recognition – winning the Lumen Prize for Moving Image and featuring in *The New York Times* Oscar-winning Op-Doc series – demonstrated how arts–academic collaborations can facilitate the development of complex, cross-cultural work capable of interrogating the problematics of computational development.

Our Experimental Technologies Fellowship, an evolution of this initial collaboration, has embedded practitioners within CCI's academic, student and technical communities for one year, supporting them to develop work that reorients their practice through contemporary computational media. This immersion has reduced traditional barriers between artistic and academic environments, with fellows Revital Cohen and Tuur van Balen, Louis Morlæ and Aziza Kadyri not only accessing educational resources and equipment to transform their thinking and making proces-

(1) Ana Min Wein (*Where Am I From?*), 2022, Nouf Aljowaysir, Still, Channel 01, Courtesy of Somerset House Studios
(2) Aut-OOO-Arcadia, 2024-2025, Louis Morlæ, Installation View, ©Jack Elliot Edwards

(1)

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ses, but contributing to academic discourse with students and faculty. This framework has enabled artists to push the boundaries of their individual practice beyond the scope of what would be possible with the support of an arts institution alone, producing new insights that tackle complex sociotechnical questions.

Though these collaborations have satisfied conventional institutional metrics, they have been limited in their ability to bring artistic perspectives into dialogue with industry practices and regulatory frameworks beyond questions of cultural production. This fact reflects a persistent, widening gap between institutional measures of success and industry trajectories. For arts–academic relationships to create meaningful change we need new models that are explicitly designed to engage with and reshape the domains and ideas with which they interact, in a sustained way.

Our newest collaborative initiative, n-Space, launching in October, represents a fundamental reconceptualisation of our collaborative engagement. Where other initiatives have not, n-Space focuses on establishing the conditions necessary for the cross-pollination of ideas and disciplines in a physical community of practice. This 18-month fellowship programme cultivates experimental forms of arts-led research and innovation, convening a mix of local and global practitioners from the arts, humanities and sciences as well as industry leaders and policymakers in sustained dialogue and experimentation. Embedded within the existing Somerset House Studios community, CCI and other partners will provide expertise to develop research methodologies and prototype interventions to realise insights. In this way, n-Space represents an experimental response to the limitations we've observed in traditional arts–academic collaborations and an initial proposition for an alternative model, directing outcomes away from individual practice or agendas towards collective forms of knowledge production and more impactful forms of practice-based research.

Bio

Marie McPartlin is the inaugural Director of Somerset House Studios, a space for experimentation for artists across disciplines, which she has shaped and led since 2015. The Studios supports up to 70 artists at any one time to develop new creative projects and collaborations, many of which she has commissioned for Somerset House's cultural programme and online platform, Channel. Current resident artists include Lawrence Lek, Xin Liu, Sophia Al Maria and Keiken. Before joining Somerset House, Marie twice served as a festival director, and worked extensively as an independent programmer and producer with organisations including Barbican Music, Frieze, Sydney Festival and the National Trust. She is a recipient of a Paul Hamlyn Breakthrough Award for exceptional cultural entrepreneurship, and a current Trustee at Whitechapel Gallery.

Murad Khan is course leader and senior lecturer for the diploma and graduate diploma at UAL's CCI, as well as co-lead of UAL's Experimental Infrastructures research hub. His research spans cognitive science, machine learning, research architecture and philosophy of science and technology. He has presented at xCoAx, Serpentine Galleries, Edinburgh Futures Institute and the Goethe-Institut, as well as publishing in MIT Press, Open Humanities Press and eflux journal. As co-founder of Unit Test, a sociotechnical design and research studio, he has been artist in residence at Lancaster University and developed work for Edinburgh's Design Informatics, The New Real/Alan Turing Institute and Unsound Festival.

(UK/IT)

Caterina Moruzzi

Chancellors Fellow in Design Informatics, University of Edinburgh

AI and Interdisciplinarity: A necessity and an opportunity

AI is reshaping society in ways that no single discipline can fully anticipate or address alone. Interdisciplinarity is fundamental, but as challenges become increasingly complex we will require meta-disciplinarity: a redefinition of disciplinary boundaries, reconstructing how knowledge is produced, integrated and applied beyond existing structures.

What do the scientist and writer Mary Somerville, the actress and inventor Hedy Lamarr and the author of the Pensées, Blaise Pascal, have in common? They were polymaths, individuals whose intellectual curiosity and expertise spanned various fields. Polymaths share a common trait that is essential to navigate the complexity of today's most pressing challenges: interdisciplinarity.[49]

The ability to integrate knowledge and methods from different disciplines has been crucial for solving multifaceted problems and devising innovations that can benefit many. Combating COVID-19, for instance, required collaboration between biomedical researchers, economists and behavioural scientists[50], while the success of 15-minute cities relies on urban design, transportation engineering and community engagement.[51]

The rapid development of AI presents a technological innovation that promises to solve complex problems while simultaneously introducing global and societal challenges. As AI technologies increasingly influence decision making in areas such as governance, education, healthcare, criminal justice, hiring and medical diagnostics, the need to integrate critical insights from the arts, humanities and social sciences into technical R&D becomes essential to prevent the reinforcement of biases and ensure ethical outcomes. Likewise, AI's role in creative fields raises fundamental questions about authorship, authenticity and the nature of creativity that cannot be addressed without cross-disciplinary skills and criticality.[52]

This highlights the continued relevance of AI's interdisciplinary foundations, which draw from computer science, mathematics, neuroscience, psychology, linguistics and philosophy.[53] The Dartmouth Conference (1956), which formally established AI as a research field, brought together experts from multiple disciplines, including John McCarthy (computer science), Claude Shannon (mathematics) and Marvin Minsky (cognitive and computer science). Similarly, the emergence of generative art in the 1950s and 1960s was the result of collaborations between computer scientists, artists and mathematicians. Pioneers of computer-generated aesthetics, such as Lillian Schwartz, Michael Noll and Harold Cohen, were themselves polymaths, contributing to both artistic and technological innovations and thereby laying the foundations for modern digital and animation techniques, and for contemporary generative AI creative applications.[54]

Addressing the complex potential of AI today requires a return to its original interdisciplinary foundations and a renewed emphasis on the value of polymathic expertise. Achieving this requires systemic

changes across education, research, industry and policy. Drawing from examples within Edinburgh's education and research ecosystem, key actions might include: i) creating interdisciplinary and cross-sector research environments, like the research cluster I established in 2024, on 'Creativity, AI, and the Human',[55] ii)transitioning from traditional department-based education to thematic, challenge-driven learning experiences, as exemplified by the programmes of the University of Edinburgh's Edinburgh Futures Institute,[56] and iii) developing large-scale research initiatives that integrate arts, humanities and social sciences into responsible AI development, such as BRAID.[57]

AI is reshaping society in ways that no single discipline can fully anticipate or address alone. Interdisciplinarity is fundamental, but as challenges become increasingly complex we will require meta-disciplinarity: a redefinition of disciplinary boundaries, reconstructing how knowledge is produced, integrated and applied beyond existing structures.[58] Maybe AI itself may offer a path to achieving this shift.

Bio

Dr Caterina Moruzzi is a Chancellor's Fellow in Design Informatics, University of Edinburgh. Her research lies at the intersection between the philosophy of art, human and artificial creativity, and the philosophy of artificial intelligence. As BRAID research fellow she leads a collaboration with Adobe to promote the responsible integration of AI tools into creative practices. As co-investigator in the CoSTAR Realtime Lab and DECaDE projects, she investigates the disruptive effects that emerging technological innovations have on the creative sector. Caterina is lead of the research cluster 'Creativity, AI and the Human' at the Edinburgh Futures Institute.

(IT)

Paolo Cirio

Artist and Activist

Regulatory Art

Interviewed by Hannah Andrews, Director, Digital Innovation in Arts, British Council

Artists open the black boxes, they play with them unexpectedly and they study how society is affected by them in new ways that weren't yet possible or were downplayed. That's why artists with this approach are then experts who can propose policy and regulations.

HA: What is Regulatory Art?

PC: Regulatory Art is a broad term for art that integrates legal regulations within artistic projects. Socially engaged artists aim to foster social change; they intervene directly into the decline of justice and welfare. This is the drive of artists who inform, envision and advocate for new and better regulations that can produce positive change in society. In such a way, regulation itself becomes a material for art-making. Governance – its design, principles and implementation – is a creative process in which artists can be naturally active in imagining and forming. The historical engagement of artists in the idea of Utopia is the most evident example.

It's often said that the law and regulations are slow and too antiquated to catch up with technological developments. Often tech companies take advantage of that, introducing new technology without questioning its legality and playing within the grey areas of the law. Art can operate in similar ways, quickly and powerfully beyond the boundaries, but with different aims. Art challenges the use and perception of technology to immediately show the hidden dark sides. Artists can investigate and inform about technology in unique ways, and they ask important questions to which they can provide answers. That is how artists can include creative regulatory advocacy to rein in the abuses and dangers of technology.

HA: Why is artistic practice a powerful tool for developing governance and regulation of advanced technologies?

PC: Artists who work with technology through a research-based and social approach are deeply immersed in the field and can provide unique insights. Other professionals – such as technologists, academics, lawyers or commentators – often don't have a holistic approach and are specialists in only particular fields related to technology, to which they apply canonical methodologies of research. Instead, artists approach the field creatively, offering new ways of seeing and engaging with technology. In particular, they often gain deeper insight into the social interactions and consequences that technology generates. They are not detached from those realities or talking about them abstractly. Instead, artists open the black boxes, they play with them unexpectedly and they study how society is affected by them in new ways that weren't yet possible or were downplayed. That's why artists with this approach are then experts who can propose policy and regulations; they can do so with much more freedom and imagination compared to those who have to follow what the slow and limited legal systems can provide.

HA: Can you share an example of tech policy – government or industry – that has changed as a result of artistic intervention?

PC: I worked on a number of projects in which I proposed regulations. Art doesn't directly change policy; rather it's a collective struggle with many activists, journalists, human rights lawyers and civil society that together help to push for regulations. As an artist, my role is to inspire, show the invisible, galvanise audiences and imagine possible realities. In some cases, I successfully managed to organise for these outcomes also by engaging with many stakeholders.

An example is the banning of facial recognition technology in Europe, which happened only recently with the AI Act regulation.[59] In that case, my petition had over fifty thousand signatures, and I received a lot of press coverage through an art intervention in Paris. The European Commission answered me directly, thanking me for promoting the regulations they were working on.

Also, my project *Obscurity,* which aimed to bring the privacy policy 'Right to Be Forgotten' to the United States, took me years of advocacy. With it I created a broad awareness, and legislators took it as an example for passing bills. Another example could be when the US Patent Office established an ethics committee for AI, after I exposed thousands of problematic technologies with the project *Sociality*. These might be indirect positive changes, but they are all connected to my artistic and activist work.

I also worked on content moderation regulation, in particular on Instagram and X (Twitter). These relate to freedom of speech, which requires a new philosophical understanding of it, and so my role as artist is even more necessary. Also in these cases, I worked with lawyers and activist groups to highlight the need to enact and enforce these regulations, which the EU did when it recently passed the Digital Services Act.[60]

Working in these fields always brings me to the forefront of technological development. For instance I'm now working on quantum computing regulations, and I am again one of the very few discussing it, hopefully being agile and creative enough to address policy questions before they even arise.

Bio

Paolo Cirio is a conceptual artist, hacktivist and cultural critic. Cirio has exhibited in international museums and won prestigious awards. His artworks have been covered by hundreds of media outlets worldwide. Cirio has often been subject to legal and personal threats. For instance, his artworks have unsettled Facebook, Amazon, Google, VISA, Pearson, the Cayman Islands and NATO, among others. His actions aim to inspire social justice and public policy; by doing so he explores new forms of aesthetics. Paolo Cirio is currently visiting lecturer at Strasbourg University's Lethica Institute for Ethics Studies in the Arts, and he is fellow at the Institute of Digital Sciences Austria.

4.

Artist-led innovation proposes hopeful futures

By taking imaginative leaps, artists, cultural organisations, and creative industries propose alternative approaches to technologies, grounded in sustainability, community, and human values.

Artist **Alexandra Daisy Ginsberg's** provocation opens this chapter, asking: 'What kinds of innovation are good? Whose good do they serve? And who decides?". The experimental listening collective **Sonandes**, based in Bolivia, re-envisions technology through 'Mutual Nurturance', seeking restoration over domination. The planter-artists of **CATPC** further illustrate this through their Balot NFT digital restitution project, advocating for pollution-free, ancestrally inspired ethical innovation for rewilding former plantation lands.

These hopeful visions are underscored by a critical awareness of current technological realities. As advanced AI capabilities emerge, Elliot Woods of **Kimchi & Chips** challenges us with a vital provocation: 'How can we do it better this time?' Artists are uniquely positioned to respond. Libby Heaney, drawing on her quantum information science background, demonstrates how art–science collaborations can guide technological progress towards sustainability and **Nora Al-Badri** envisions AI integrating diverse cultural and natural knowledge systems to enhance global care. From another perspective, **Sarah Ellis and Freya Salway** from the RSC and Google Arts & Culture, respectively position tech sector collaboration with cultural institutions as a site of optimistic innovation.

A central argument threading through the chapter's statements is the imperative to embed collectively held human values into technological development. Indigenous activist and writer **Yásnaya Elena Aguilar Gil** advocates for technological creativity rooted in communal knowledge, contrasting it with exploitative, profit-driven models. Embracing this collective ethos, **Tanveer Hasan and Padmini Ray Murray** visualise a future where technology fosters hope by reconfiguring itself around human values, inspiring us to 'reimagine a digital reality where compassion can be hardcoded into algorithms'. Ultimately, achieving these imaginative leaps demands decisive actions. **Danielle Brathwaite-Shirley**'s comic frames this choice: whether to embrace technology for individual gain or to leverage its potential for a future powered by collective wisdom.

(UK)

Artist

Alexandra Daisy Ginsberg

Better Nature

Innovation is not a good in itself; its value depends on what is produced. Better would be to ask: What kinds of innovation are good? Whose good do they serve? And who decides?

New equals better. This is the mantra of the innovators: researchers, industries, governments and policymakers. The ideology of modernity has been that innovation – the pursuit of new ideas or products – is preferable to maintaining, preserving or conserving what already exists.[61] Technology will make things better. But innovation is not a good in itself; its value depends on what is produced.[62] Better would be to ask: *What kinds of innovation are good? Whose good do they serve?* And *who decides?*

The promise of the new has been delivered hand-in-hand with environmental destruction. Despite the growing ecological and climate chaos surrounding us, our culture still values the idea of innovation over conservation. We choose to ignore the sheer impossibility of disconnecting the world we live in from the world we are trying to create. Rather than looking to slow and complex social, legal or political processes, we dream that we are just one technological fix away from a solution.

Through my artistic practice I research and explore this dominant ideology. I implicate myself in the development of new technologies from synthetic biology to artificial intelligence and even contribute to their innovation in the process. But I do this to understand better their possibilities, their limits and the issues they raise. Technology is not an inert thing that happens to us; each invention is a human creation embedded in choices made by those with the power to do so and imbued with their values.

As an artist I have a different social contract from other groups invested in technology, meaning I can experiment with different value systems. For example, my ongoing artwork *Pollinator Pathmaker* is an experiment in 'algorithmic altruism'. I wanted to explore whether a human can create a technology that serves other species before ourselves. My *Pollinator Pathmaker* 'empathy algorithm' designs garden planting that prioritises pollinator diversity over human needs or aesthetics (try it at www.pollinator.art) – the principles we normally use to reconstruct our outdoor world.

Pollinator Pathmaker is now being studied in a cross-council UKRI-funded research project with the universities of Edinburgh and Exeter. We are validating the algorithm's benefit to biodiversity and to social and philosophical development, exploring whether a technology can be altruistic and, by inference, what 'good innovation' might look like.3

If we define good as benefiting the natural world, and by consequence ourselves, we may prove our hypothesis that this is a good innovation: an artificial concentration of flowers that, while unnatural, creates a biodiverse superabundance that also transforms our perspective on the world. But it is worth remembering that innovation is not always new, and

(1) *Pollinator Pathmaker: ARr77zvQW8Bq8q6hgDHUmp* (Pollinator Vision, Late Summer), Alexandra Daisy Ginsberg, 2023. © Alexandra Daisy Ginsberg Ltd. Courtesy the artist
(2) *Pollinator Pathmaker: AfyLbwTriWhuR7PDkd77LZ* (Pollinator Vision, Late Spring), 2023, Alexandra Daisy Ginsberg, © Alexandra Daisy Ginsberg Ltd. Courtesy the artist

(1)

good ideas for a forward-thinking future may be found in the past.

Artists work with technologies and approach innovation in many ways. My critical experimentation into what we make and what we choose to conserve involves working with researchers, industry and policymakers to interrogate and challenge technologies, reflect on the choices that determine them, and to offer alternative directions. *Pollinator Pathmaker* is still a technological fix to a human-made problem: protecting nature is not innovation, but it is the best idea we can have.

(2)

Bio

Alexandra Daisy Ginsberg is a multidisciplinary artist examining our fraught relationships with nature and technology. Experimenting with simulation, representation and the nonhuman perspective, she questions the contemporary fixation on innovation over conservation. Her work is in collections including the Art Institute of Chicago, the Cooper Hewitt Smithsonian Design Museum and ZKM Karlsruhe. In 2023 her artwork *Pollinator Pathmaker* was awarded the European Commission's S+T+ARTS Grand Prize for Artistic Exploration, and she recently unveiled her first stained-glass commission for Manifesta 15 in Barcelona.

[BO/US] Sonandes

Guely Morató Loredo and
Víctor Mazón Gardoqui

Cosmotechnics beyond the capitalocene

We are at a critical juncture where art must assume a decisive role in shaping alternative futures, guiding us toward a world in which progress finds its strongest ally in sustainability.

'To forge a society that listens is to forge a more just and equitable society.' – Sonandes[63]

History has shown us the importance of reclaiming our agency. We are at a critical juncture where art must assume a decisive role in shaping alternative futures, guiding us toward a world in which progress finds its strongest ally in sustainability.

At Sonandes we amplify listening between bodies of the Global South and North. Our installation *Triangle of Sacrifice* (2024) exposes the excessive use of fossil water in lithium extraction within the Lithium Triangle – the region between Bolivia, Chile and Argentina that holds 60 per cent of the worlds lithium reserves. We challenge the narratives surrounding the sustainability of so-called 'clean' technologies and invite critical reflection on the contradictions embedded in the energy transition.

Digital accelerationism and hyperconsumerism have transformed the territory surrounding the Lithium Triangle into a vast Sacrifice Zone, where mega-mining operations – hydrometallurgy and open-pit excavations – extract copper, nickel, cobalt and rare-earth minerals. These practices, driven by global demand for 'green' technologies, have exacerbated the water crisis in one of the planet's most arid deserts, reducing ancient water bodies to mere resources for extractivist exploitation.

In response to this extractivist and colonial logic, we position ourselves within the framework of cosmotechnics,[64] which invites us to rethink technology not as a universal phenomenon but as a diverse and situated expression of the worldviews that produce it. Cosmotechnics allows us to envision innovation emerging from reciprocal relationships with nature and nonhuman beings, thus challenging the structures of technofeudalism.[65]

Our research broadens local knowledge systems by using symbolic representations across multiple languages, generating speculative narratives that highlight the impacts of extractivist practices on the Andean–Amazonian ecosystem.

Through community-based praxis and alternative methodologies, we develop immersive multisensory experiences that propose alternatives grounded in Mutual Nurturance (Crianza Mutua) and technodiversity. These practices, rooted in Andean–Amazonian cosmologies, understand well-being as a collective endeavour that transcends the human, incorporating other living beings and presences into a network of interdependence and care.

Terrestrial biomass, predominantly composed of plant organisms (81.8 per cent) and bacteria (12.73 per cent), reminds us that humanity constitutes a mere 0.01 per cent of life on the planet[66,67] yet has generated an unprecedented climate crisis. Andean–Amazonian cosmo-

(1) *Triangle of Sacrifice,* 2024, Sonandes, Installation view, © Tom Mesic, Courtesy of Sonandes
(2, 3) *Triangle of Sacrifice: Infrastructures of Technocolonialism,* 2023-ongoing, Sonandes, Images salt flats in the 'Lithium Triangle', Courtesy of the artists

(1)

logies offer a radical counterpoint, as their concept of community is multispecies, with a circular conception of time. We walk backward into the future while observing the past, because repairing what has been damaged is the only way to ensure a viable future. This perspective urges us to rethink technologies not as tools of domination but as a means of restoration and care.

In this context, Mutual Nurturance emerges as a political and technological philosophy that organises life around collective care. Bodies of water are not mere resources but entities with which we establish reciprocal relationships. This deep listening – a philosophical, artistic and meditative practice that transcends the physical act of hearing to become an experience of expanded consciousness – which includes interspecies communication, allows us to reconnect with otherness and decolonise our technological practices.

From a transdisciplinary perspective that bridges art, science and political ecology, we propose a dialogue that activates alternative pathways towards a *sumaq kawsay* (Andean *buen vivir*, or Andean concept of collective well-being).

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Bio

Curator, artist and researcher Guely Morató Loredo and researcher and artist Víctor Mazón Gardoqui form Sonandes – an experimentation and research platform headquartered in Bolivia. Dedicated to the promotion and dissemination of contemporary sound practices, Sonandes brings together creators who research, develop and exhibit projects associated with sound and listening. It promotes production and research as a path of knowledge and collective thought. It encourages the creation of exhibitions specialised in sound art and the study of the senses, and it values international cooperation and the importance of forging a culture of listening. Since 2014, it has developed a multidisciplinary work and carries out meetings and activities such as: Sonandes International Biennial of Sound Art (2014–2024), Puertos Creation Residency Program (2018–2025), and other projects, laboratories, exhibitions and publications.

[CD]

Ced'art Tamasala and Matthieu Kasiama

Le Cercle d'Art des Travailleurs de Plantation Congolaise (CATPC)

Interviewed by Hannah Andrews, Director, Digital Innovation in Arts, British Council and Aurora Hawcroft, Programme Manager, Digital Innovation in Arts, British Council

It's important to find a middle ground between extremes. While it's noble to use resources to ease difficult tasks, exploiting them or causing environmental harm is not. Artists play a crucial role in this process. Embodying this imaginative spirit, akin to sorcery, they drive imagination and creativity, pushing boundaries while maintaining balance.

(1) *The Return of Balot,* CATPC, 2024, Film Still, © Jurgen Lisse, Courtesy of Human Activities
(2) *The Judgement of the White Cube,* 2024, CATPC, film still, 2024, © Jurgen Lisse, Courtesy of Human Activities
(3) CATPC members (from left) Olele Mulela Mabamba, Huguette Kilembi, Mbuku Kimpala, Jeremie Mabiala, Jean Kawata, Irene Kanga, Ced'art Tamasala and Matthieu Kasiama, 2020, still from White Cube, Renzo Martens, © Human Activities

AH: Could you give us a little background to yourself, the history of Lusanga and how CATPC formed?

CT: We are members of CATPC – a collective of planting artists.

Lusanga is the land we've inherited – a former Unilever plantation where workers, including the Pende people, were deported, sometimes from thousands of kilometres away, and forced to climb palm trees to cut down palm nuts.

Today in Lusanga, the factory has closed and the land has been sold to other multinationals. Left behind is the battered nature and people so overexploited through monoculture – our forests destroyed and our soil barren and sterile.

As the original communities, we are driven by the desire to reclaim our lands, restore it and put it back at the service of our communities.

AH: Your project *Balot NFT* (2022) has captured international attention. Could you explain the project and how it came about?

CT: Maximilien Balot was a Belgian colonial agent who enforced taxation on the plantation. The Pende people killed him in resistance and a period of brutal repression unfolded where more than 4,000 Pende people died. The Pende people were deeply spiritual, and in 1931 they crafted an effigy resembling Balot. This sculpture had a specific purpose – to imprison the malevolent spirit and give the people the strength to resist during this era of colonial oppression.

In 1972, amid a period of war and famine, American researcher Herbert Weiss bought it for approximately USD120, and it is now held at the Virginia Museum of Fine Arts, Richmond.

We feel deeply connected to this sculpture and wanted to get closer to it. Following multiple denied loan requests, we took matters into our own hands and decided to create a digital artwork of the sculpture – *Balot NFT* (2022).

Using images of the sculpture on the museum's website we created the foundation for our NFT artwork and then designed a large-scale illustration composed of 306 fragments, digitised in separate files. These files correspond to approximately 306 hectares of land in Lusanga.

With the income from this project so far, we have bought back around 100 hectares of land. We've replanted what we call the sacred forest – a living forest with fruit-bearing trees and medicinal plants as well as insects, mushrooms and various wildlife that have all started to return.

AH: What made you choose to work with NFTs for this project? How do you approach using technology in your work?

CT: We work with technicians who advise us on the technical aspects of NFTS as well as the known impacts of blockchain technology on nature. We saw that blockchain technology, from an ecological perspective, was almost incompatible with our values. But our country is somewhat the cash cow of technology, because coltan, cobalt and other minerals used for technology are mined here in Congo, often by children in inhumane conditions. Using technology for this project was the best shortcut for us to reach the sacred object that is 'Fundji'.
MK: And getting closer to the sculpture was important, and we saw it as an opportunity to do something for the community. Taking this into account, we approach technology in a communal way, using it to help unlock serious situations, while compensating for its harmful effects.

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AH: What do you believe is the role of art, ancestral knowledge and cultural traditions in the development of technologies?

CT: For us it revolves around the concept of kindoki ya moyi, which refers to daytime sorcery. When we talk about sorcery, it's something supernatural, something inexplicable.

Daytime sorcery is seen as beneficial, helping humans overcome difficult tasks or simplifying daily life. Nighttime sorcery, or kindoki ya butu, on the other hand, is considered negative – it's associated with harm and killing. This kindoki ya moyi, the daytime sorcery, is said to originate in some way from nighttime sorcery. It's as if the energy is drawn from the night and then used during the day to realise what was imagined in the dreamlike world of the night.

This relates to concerns of over-innovation leading to destruction or imbalance. It's important to find a middle ground between extremes. While it's noble to use resources to ease difficult tasks, exploiting them or causing environmental harm is not.

Artists play a crucial role in this process. Embodying this imaginative spirit, akin to sorcery, they drive imagination and creativity, pushing boundaries while maintaining balance. They explore new designs, uses and possibilities that benefit communities and facilitate life, while avoiding using tools solely for greedy, capitalist purposes.

Ancestral art also inspires and educates the younger generation. We've established a small school where we teach these ideas in our native language. We feel like a sacrificed generation, but we hope our children and grandchildren will have access to opportunities. We dream of a future where they can innovate ethically, respecting nature and creating pollution-free energy solutions.

(3)

Bio

Le Cercle d'Art des Travailleurs de Plantation Congolaise' or 'Congolese Plantation Workers Art League" in full - is an art cooperative of plantation workers based in Lusanga, DR Congo. CATPC was founded in 2014, with renowned environmental activist René Ngongo. Over the past decade, CATPC has developed a practice of securing hundreds of acres of former plantation land for future generations with the proceeds of their art. At the heart of that reclaimed land, they built a museum, the White Cube Lusanga. On that land, they develop new forms of restitution, establishing worker-owned, ecological and inclusive food gardens: the Post-Plantation. In 2017, the New York Times named their solo show at SculptureCenter "the most challenging show of the year.

(UK/KR) Kimchi & Chips

Elliot Woods, Artist

How can we do it better this time?

We invent technologies in our work not as entrepreneurs but as artists, in a hope that we may contaminate the cloud of meaning around technology with the ideas and symbols that we find valuable in the world.

The revolutionary effects of the internet and networked systems have transformed our health, work, relationships, governance and geography. Many benefits to society have emerged in recent years, but there is a clear sense that the outcomes of social media and smartphones could have gone better. We are now living through an era of the unfolding capabilities of AI, which will likely bring about a similar seismic shift in society as the internet before it. This begs the urgent question How can we do it better this time? Breaking this question down further we get:

- **What is 'we'?** Who is included? What is the individual and what is the collective?
- **What is 'better'?** What are our values? What does it mean to live well?
- **What is 'how'?** What are the methodologies? What is labour?
- **What is 'this time'?** What is the modern condition? Where are we in history?

If we entrust these questions to financial markets, we would look to AI market leader NVIDIA,[68] itself grown out of a subculture of sophisticated combat simulators, with a current business model that focuses on exponentially increasing the number of transistors wired into the power grid at a rate that requires decommissioned coal power stations to be brought back online. Other leading technology companies, such as Google and Microsoft,[69] have recently abandoned their climate goals, building ever-larger data centres to meet the computation demands of sophisticated AI models. Despite the best efforts of these companies, their decision-making architectures are not wired up to investigate the questions listed above. Meanwhile, these are the questions that artists working with technology are uniquely positioned to respond to.

Our lived experience is constructed from an advanced set of symbols, metaphors and images. These are often rearranged in real-time into 'new vibes', creating a new lived experience distinct from what came before. Art is the R&D lab of culture, playing with these elements to create new music sub-genres, new image formulations, new stories to tell and new ways of telling stories. Art is often similar to a language game, in that recognisable symbols are put into novel combinations. These combinations are like scrap-books: collages of meaning and memory for discussing the value of those symbols. Images and metaphors become like algebraic notation in a formula; when arranged together they imply new valuable information about the relationship between X and Y.

With Kimchi & Chips, we approach some of these questions by orchestrating encounters between technology (robotics, optics, algorithms, structures), natural phenomena (sunlight, the air, the weather, physics, human movement) and audiences.

(1) *REWORLD Type 1,* 2023, Kimchi & Chips, Seoul Biennale of Architecture and Urbanism, Courtesy of the artists
(2) *HALO,* 2018, Kimchi & Chips, Installation view at Edmond J. Safra Fountain Court, Somerset House, Courtesy of the artists

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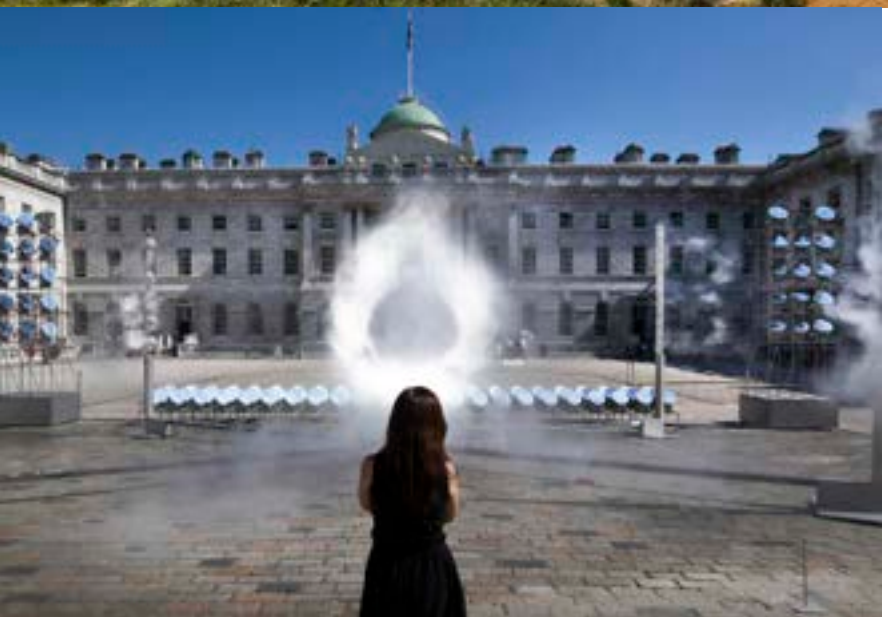

(2)

These elements form living configurations whose behaviours unfold in real time and are outside of our control. Rather than embodying a fixed message, they invite audiences to face complexity, mystery and beauty in these systems, where meaning is not delivered but discovered. Often a spectacular element of the work might only reveal itself when the sun breaks through the clouds above, or a gust of wind is perfectly timed. This allows the audience to build their own relationship with nature and technology, and to participate in the authorship of meaning around that technology. We invent technologies in our work not as entrepreneurs but as artists, in a hope that we may contaminate the cloud of meaning around technology with the ideas and symbols that we find valuable in the world.

Bio

Elliot Woods is a digital media artist from Manchester, UK. He graduated with a master's from the School of Physics and Astronomy, University of Manchester, with a thesis project on neural networks. He entered the arts following the founding of studio Kimchi and Chips in 2009, where he currently tests alternative relationships between images and reality. Here he has created large-scale light field art installations that draw floating images of the sun out of sunlight, or moons from 600 calibrated projector beams. He works to reveal the implicit nature of the systems that make up the world, therein helping audiences to develop new instincts for navigating it and changing it. At Kimchi and Chips he participates in technical direction and direct development of systems that implement computer vision, robotics, optics, mechanical design, structural engineering, electronics design, machine learning, blockchain, real-time graphics, web and more. Elliot has contributed to the open Frameworks and VVVV creative coding platforms and has released over 100 open-source libraries for free on GitHub.

(UK)

Libby Heaney

Artist

Non-binary speculations

We are at a critical juncture where art must assume a decisive role in shaping alternative futures, guiding us toward a world in which progress finds its strongest ally in sustainability.

As the development of quantum technology gains pace, humanity will face a paradigmatic shift. Quantum computing's unparalleled processing speeds will enable us to see, predict and control systems at entirely new scales and precisions, which will likely force a radical renegotiation with the nature of existence itself.

Future full-scale (universal) quantum computers will solve problems that are impossible to solve on any digital computer. For instance, the factorisation of very large numbers into their primes is a key ingredient in all currently used encryption. While it would take longer than the age of the universe to solve factorisation on digital computers, quantum computers can give answers within reasonable human timescales.

Quantum hardware is governed by the non-binary, counter-intuitive laws of quantum mechanics. Quantum mechanics describes the world of atoms, where particles can be in two or more contradictory states – like two places – simultaneously and deeply interconnected even if they are really far apart. Quantum technologies will enable us to see reality through quantum eyes for the first time. We will undoubtedly understand ourselves, nature and the universe in new – plural and entangled – ways.

As an artist with a PhD and five years of postdoctoral experience in quantum information science, I have written code for IBM's publicly available quantum computers since 2019, developing my own unique quantum aesthetics across images, video, 3D, real-time animations and sound. I've exhibited quantum artworks across the world from Seoul to New York, including solo shows with LAS Art Foundation, Berlin (2022); Somerset House, London (2024); and HEK, Basel (2024) among others.

In my experience, many scientists see art solely as a didactic tool to illustrate their ideas. However, art is much more than this. It is a means of conveying deep emotions, something that science deliberately avoids. Communicating emotion is important as it is a primary mode of gaining attention across social media networks. Likewise, storytelling through metaphor, fantasy and speculation are also critical for navigating today's networked society. As an artist it's exciting to work with these modalities as it enables audiences to deeply resonate with and embody the meanings of my work, creating memorable experiences that are hard to forget. Moreover, the public programmes of my exhibitions engage the public – some for the first time – with quantum tools and critical ethical discussions.

Quantum science and technology shifts us beyond binary computation, which is unprecedented and requires profoundly new approaches to logic and truth. As an artist I can speculate what a fully non-binary take on reality including computation might look and feel like. For instance, in my artwork series *Ent-* (2022–2024), I visually and sonically reveal the non-binary nature of certain quantum algorithms without collapsing to randomness or solving for a binary 'true or false' outcome.

(1) *Ent-*, 2024, Libby Heaney, Installation view, Quantum Soup, Hek Basel, ©Franz Wamhof, Courtesy of the artist
(2) *Ent- (many paths version)*, 2022, Libby Heaney, Unreal Engine 4 app with quantum computing code, variable length, Courtesy of the artist
(3) *Ent- (non-earthly delights)*, 2024, Libby Heaney, ©Deniz Guzel, Courtesy of Gazelli Art House & Libby Heaney

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Companies like IBM, Google and Psi Quantum are pursing quantum computing for its exponentially fast problem solving. But these problems are binary in the sense they still have one true solution that happens to require the non-binary parallel processing power of quantum technologies to achieve.

In contrast, works like *Ent-* offer fully non-binary approaches, where multiple possible 'truths' exist simultaneously, helping us to think equitably about many different scenarios all at once.

Art allows us to think and feel beyond the profit-driven developments of quantum science. Without instrumentalising creativity or willingly providing free labour to big tech, ongoing, funded, non-exploitative art–science collaborations may provide scientific discovery. Transitioning from quantum science to art in my own career highlighted just how different their methodology, processes and outcomes are. Genuine collaborations would harness the creativity and skills of both sides, leading to valuable interdisciplinary discoveries.

Open-ended artistic endeavours will be extremely valuable in our quantum future. If the public is to engage with quantum they will have to go through a significant process of unlearning deeply held binary logic. How might art allow audiences to find their own understandings in the face of overwhelming technological advances?

And how might discursive platforms be facilitated which allow for significant knowledge exchange between the artists and scientists/technologists, where the latter take the speculative ideas of the former seriously?

Bio

Dr Libby Heaney is an award-winning artist with a PhD in quantum information science. She is the first artist to work with quantum computing as a functioning medium. Recent solo presentations include Eat My Multiverse, Museum of Moving Image, New York City (2025), Quantum Soup, HEK, Basel (2024) and Heartbreak & Magic, Somerset House, London (2024). In 2024, her first artistic monograph was published by Hatje Cantz and she participated in Frieze Sculpture, London. In 2025, Heaney will hold a solo show at Orlean House Gallery, London, including and responding to paintings by JMW Turner.

(DE/IQ) Nora Al-Badri

Artist

Can AI be emancipatory?

If we understand AI as the representation and – admittedly very simple – abstraction of a collective consciousness, we can integrate, create or make visible anti-colonial image-language worlds and diverse knowledge systems that push back on this visual hegemony.

I want to write here exclusively about the emancipatory potential of technology, knowing very well that almost all our experiences of it are exactly the opposite: commodification, extraction, exploitation, discrimination. I could differentiate and continue this list indefinitely, but I think we all know or feel this by now. What is less clear, however, is how to deal with it and where exactly these urgently needed emancipatory islands are!

To make this more tangible, I would like to share some thoughts and examples from my work. I use very different technologies (3D printing, chatbots, data sculptures, deepfakes) on the one hand as an instrument and on the other as a subject of the work itself. My existence and my work are 'paradisciplinary',[70] somewhere between art, activism and computer science, somewhere between Iraq and Germany. In this context I am always looking for emancipatory islands/havens/refuges, but where are they?

My work *The Post-Truth Museum* (2021–23) explores this question. A 14-minute AI-generated video presents deepfakes of three of the most important European museum directors describing a planetary museum of the future. The museum cleans up colonial crimes, provides space for refugees, offers reparations, celebrates differences, offers visitors couscous! The appropriation of the identities, voices and bodies of these men presents a counter-strategy to the imperial appropriation of objects and cultures that has been going on for decades. Deepfakes are often a phenomenon that aims to deceive and destroy the cohesion of societies. But they can also be used as inspiration for a possible, perhaps better, future.

Another example was the Nefertiti Hack where I, alongside other artists, hackers and archaeologists,[71,72] scanned the famous Egyptian bust of Nefertiti in Berlin at the Staatliche Museen zu Berlin and published the data on a public domain. It has since been remixed and downloaded millions of times. The role of the imperial museum was not only questioned, but shaken. The dialogue about restitution this project led to, especially online, was also an emancipatory refuge.

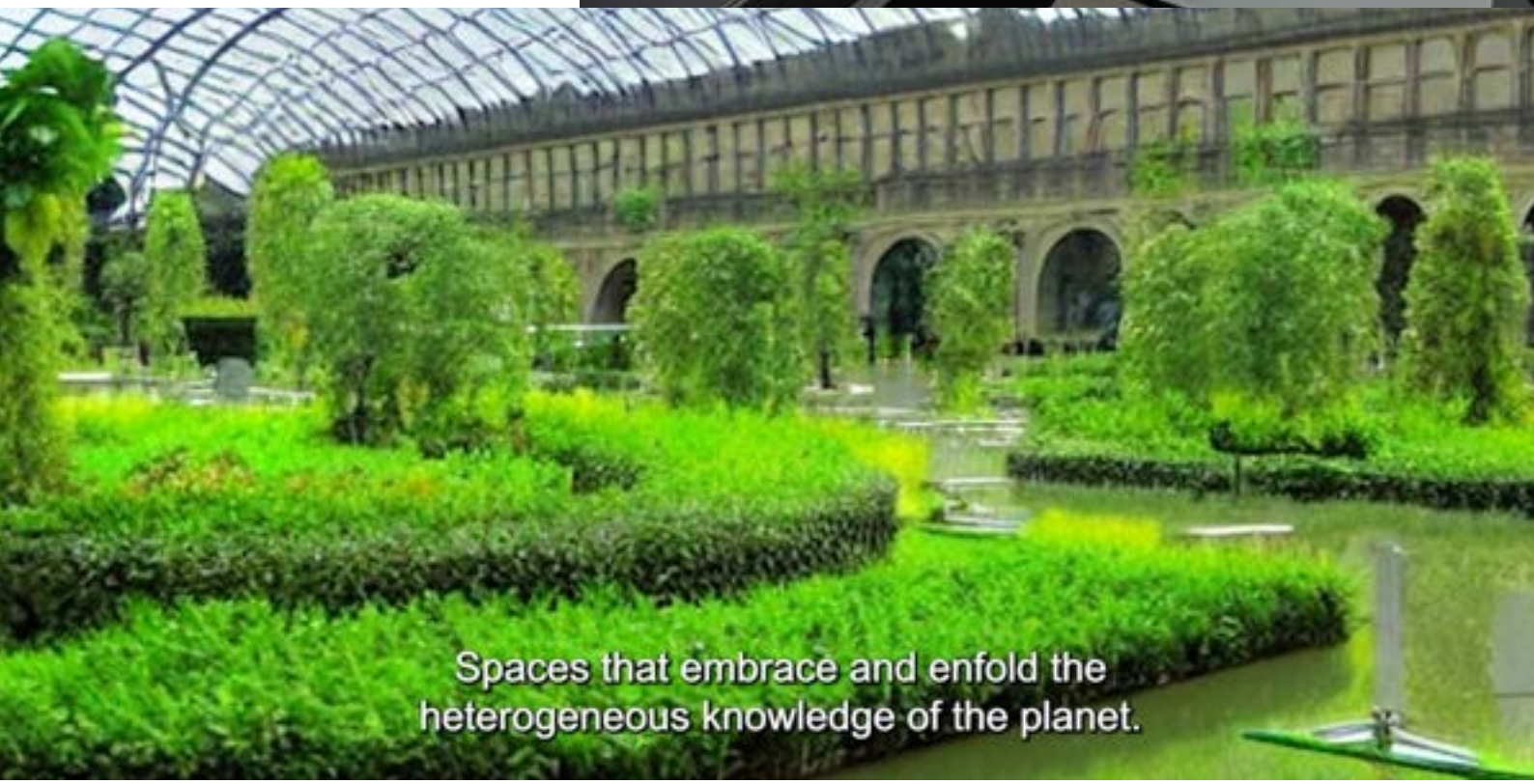
After many years working primarily with AI, I would like to end on where I see its emancipatory potential lies. Here, too, there is a clear colonial continuity. The data of the largest image- and video-generation tools, for example, largely originate from the Global North,[73] while the 'ghost labour' of labelling these datasets takes place in the Global South.[74]

If we understand AI as the representation and – admittedly very simple – abstraction of a collective consciousness, we can integrate, create or make visible anti-colonial image-language worlds and diverse knowledge systems that push back on this visual hegemony. Imagine an AI that is controlled by the solar and

(1) *Take me home* خذني إلى بيتي Nora Al-Badri, 3D printed busts, Installation view, Courtesy of the artist
(2) *The Post-Truth Museum,* 2021-2023, Nora Al-Badri, Film still, Courtesy of the artist

lunar system, an AI with data that can only be accessed by women, a data-less ocean that will never be predictable (it is impossible to calculate the time of the next wave), the translator between humans, animals and plants; automation that relieves us of work and gives us more resources for the planet and our fellow human beings. This approach to AI would be a more representative, adaptable, integrated form of AI… or, at the least, it would be less boring :).

(1)



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Bio

Nora Al-Badri is a multidisciplinary and conceptual media artist with a German–Iraqi background. Her works are research-based as well as paradisciplinary and post-colonial. She lives and works in Berlin. She graduated in political sciences at Johann Wolfgang Goethe University in Frankfurt/Main and is a lecturer at the Eidgenössische Hochschule (ETH) in Zurich. Her practice focuses on the politics and the emancipatory potential of new technologies such as machine intelligence or data sculpting. Al-Badri's artistic material is a speculative archaeology from fossils to artefacts, or performative interventions in museums and other public spaces, that respond to the inherent power structures.

(UK)

Director, Creative Innovation, RSC
Head of the Lab, Google Arts & Culture

Sarah Ellis and Freya Salway

Interviewed by Hannah Andrews, Director, Digital Innovation in Arts, British Council

If we don't bring in that critical, human perspective early on, we'll risk ending up with technologies that are functional but not empathetic.

HA: It's so great to have you both here in conversation to share your work with artists and technologists, both in the context of a cultural institution, the Royal Shakespeare Company (RSC), and a tech company, at Google Arts & Culture. From those two perspectives where, lately, have you seen artist–technologist collaboration unlock new innovations in the R&D of technology?

SE: I've just returned from a beautiful R&D between the artist Tender Claws, Samantha Gorman and Scarlett Kim, who's one of the RSC's Interdisciplinary Fellows at the engineering department of the University of California, Santa Cruz. They've made a prototype for the funeral of the internet.

Watching them work, I got a sense of the huge possibility when you give space for an engineer or a computer scientist to lean into something emotional, and then have an artist lean into something technical. It changes the way you make the work because it breaks down so many hierarchies that pre-exist and it becomes not just about the output but the process.

FS: I agree with you, making space for that exchange and having the time to prototype and try things is so important. I think every artist I've collaborated with has at some point raised an idea that an engineer has said no, that's not possible. But then the artist doesn't give up, we find a way, and in the end they've really pushed the technology.

One of the best examples of artists pushing the possibilities of technology, in my opinion, dates back to 2016 when I worked with artist Jonathan Yeo. He created a sculptural work in VR painting and sculpting application Tilt Brush. but was interested in bringing it into the physical world. At the time, 3D printing directly from Tilt Brush wasn't possible, however, but because this is what he wanted to do the feature was fast tracked.

HA: What does artist–technologist collaboration look like in a cultural context, Sarah?

SE: The process is bound in a very physical reality. We work together, whether that's in rehearsal space or theatre space, and these are safe spaces for people to explore.

Whenever we collaborate with technologists, the starting point is inviting them into these spaces to be and work with us and allow them to move from a solution-focused approach to a discovery-exploration approach, to come up with an idea. Then allowing those participants to go away and investigate,

code and then to come back into the rehearsal space again.

The more welcoming the space, the more collaborative the space, the more that we allow that different way of working and curiosity, the more we can think more expansively about that work. So my job really is to make sure that the physical and structural pathways are there for R&D to happen with different industries.

HA: And what does it look like in a technology context Freya?

FS: It can take different forms. For one, it can be much more open ended; the artist may not know what the outcome will be in the end, but there is – as Sarah says – a discovery phase and the artist drives the direction in dialogue with, for example, an engineer or research scientist.

Then, particularly relevant right now, there is the creation of a framework for artists to be part of the development of technology, shaping the features of generative AI models as creative tools, for instance. An example of this is Google DeepMind's Music AI Sandbox where musicians input guided the development of the tools.

Exploring how artists can influence that process is something we are still exploring, and is constantly evolving, which has always been the case. Arts and technology have always influenced one another, and I think now more than ever, artists being part of the development of this rapid moment of technological advancement is critical. I've yet to meet anyone who experiments, pushes, and critiques technologies like artists.

HA: Why is collaboration between cultural sector and tech sector important?

SE: I think there's never been more of a need for arts and technology to come together.

Socially, we are seeing so much polarisation associated with new technologies. However, I don't see it when I'm with the technology community, working with technologists. Instead, I feel a very strong sense of purpose and values, but there's a big disconnect between this and the political and social landscape that surrounds them.

I wonder whether art can help overcome that disconnect, considering the deep respect among the arts and technology industries, that I've seen first hand?

Alongside that, when you genuinely put artists and technologists together, you absolutely unearth the unexpected possibilities of these technologies and tools as well. I think that is a driver for any technologist, and probably where a lot of that respect comes from.

FS: I agree with Sarah. Developing these technologies responsibly is really key. Something that jumps to mind is the importance of the human-in-the-loop with AI. Artists help us see the human side of technologies which they can connect to topics and issues in new ways.

Yes, on one side it's about pushing forward the possibilities and limitations of technologies. But at the same time, it's about having that critical perspective at the early stages of the R&D, not just as an afterthought. If we don't bring in that critical, human perspective early on, we'll risk ending up with technologies that are functional but not empathetic.

And to Sarah's point about the respect and care in the tech industry, there's a lot of people who are building these tools who really do care. You know, when I'm in conversation with them, they care about the impact on society and about the perspectives that the artists can bring – engineers and research scientists actively want to engage with that in the early stages of R&D.

Bio

Sarah Ellis is an award-winning producer currently working as Director of Creative Innovation for the Royal Shakespeare Company (RSC) to explore new artistic initiatives and partnerships. The latest partnership for the RSC is the Future of Performance Feasibility Study and interdisciplinary programme – a four-year programme exploring the future of performance funded by Arts and Humanities Research Council. Her previous work has included programme director for the Audience of the Future Live Performance Demonstrator, funded by Innovate UK – a consortium consisting of arts organisations, research partners and technology companies to explore the future of performances and real-time immersive experiences. She is a regular speaker and commentator on digital arts practice, as well as an Industry Champion for the Creative Industries Policy and Evidence Centre, which helps inform academic research on the creative industries to lead to better policies for the sector. She was previously chair of digital agency The Space, established by Arts Council England and the BBC to help promote digital engagement across the arts.

Freya Salway works internationally on artificial intelligence and advanced technologies for arts and culture. She is the Head of the Lab at Google Arts & Culture. There she develops collaborative programmes and experiments with artists, cultural institutions, engineers and research scientists, engaging AI and emerging technologies. Freya has also worked as an independent consultant, delivering creative programmes in the business and media fields, and previously managed arts partnerships for Sky Arts.

(MX)

Writer, Translator, Linguist, COLMIX

Yásnaya Elena Aguilar Gil

Technological commons

Technology as a commodity is a bet on death; technology that emerges from shared knowledge and returns to the commons is a bet on life – one we must urgently make.

Capitalism and technology are often treated as nearly synonymous. We have been led to believe that competition is a necessary driver of technological development and that technology itself can be commodified within the market. But let's go back to the beginning – technological innovation has always accompanied humanity, rooted in our curiosity and creative potential (which is not exclusive to our species). Technology has mediated human relationships and our interactions with the environment since the very beginning, even before we became Homo sapiens. We had technological innovation before capitalism, and we will continue to have it after.

Every technological innovation builds upon a collective reservoir of prior knowledge accumulated throughout history. No innovation emerges from nothing or solely from individual genius; whether acknowledged or not; technological creativity draws from a vast well of shared knowledge and tools. When capitalism turns technology into a private commodity it erects barriers around this knowledge, restricting access and requiring payment to benefit from it. Many proprietary technologies today were developed using collective knowledge, yet once commodified they no longer return to the commons.

Technologies that have shifted from shared resources to market commodities follow the logic of perpetual economic growth – exponential, limitless and unsustainable. Despite being digital, their production still relies on finite natural resources, creating a paradox: attempting infinite growth on a finite planet. Capitalism has hijacked technological innovation, placing it in service of the market rather than the common good. Indigenous territories, which hold over 60 per cent of the world's natural reserves, are subjected to extractivism and dispossession to fuel technological production. This exploitation has sickened the planet – climate emergency is merely a symptom of capitalism's disease.

Two urgent tasks lie ahead. First, we must decouple technological innovation from capitalist growth, dismantling the barriers that prevent people and communities from accessing the collective reservoir of technological knowledge. This requires reclaiming and reopening technological commons. We must stop assuming that technology cannot exist without capitalism and instead ask: *How much further could technology have advanced if capitalist privatisation had not hindered its development?*

Second, if technological creativity is redirected toward the buen vivir (good living) principles advocated by many Indigenous communities, we can halt the reckless demand for natural resources that threatens planetary survival. Technology as a commodity is a bet on death; technology that emerges from shared knowledge and returns to the commons is a bet on life – one we must urgently make.

Bio

Yásnaya Elena A. Gil is a linguist and writer, originally from Ayutla Mixe, Oaxaca. She is part of COLMIX, a collective that conducts research and promotes the Mixe language, history and culture. She writes opinion columns and essays for various publications, including *El País* and *Gatopardo* magazine. She received the National Recognition for Equality and Non-Discrimination award in 2020, awarded by the National Council to Prevent Discrimination. Her main areas of focus are linguistic and poetic diversity, the rights of Indigenous peoples and imagination as a tool in the face of the climate emergency. She participates in the podcast *Humo*, which discusses alternative solutions to the climate crisis, and hosted the documentary short series on the climate emergency *El Tema* alongside actor Gael García Bernal.
She is the author of the books *Un nosotrxs sin estado* (Ona Ediciones) and Ää. *Manifiestos por la diversidad lingüística* (Almadía Publishing House), translated into English as *This Mouth Is Mine* by Charco Press.

(IN)

Executive Director Centre for Internet & Society, Bangalore &
Founder, Design Beku

Tanveer Hasan and Padmini Ray Murray

Deeper listening for deeper learning: A manifesto

For technology to make sense to us, to bring meaning and hope back to us, it doesn't have to dismantle itself. We do not have to over-regulate it and stifle it. We need meaningful conversations. We need artists and creators and educators and thinkers to talk about knowledge that goes beyond applied effect and perceived utility. When we speak the language of technology we are speaking the language of growth. Instead we must transpose this language to the key of the values that make us human.

'In this last eon of time, the western world fuses together the knowledge of science along with its hunger for destruction and will create new spaces to fuse fantasy and technology'
— Sri Ramayana Darshanam, Kuvempu 1957

Our world has changed. This change is not just in the way that we see and interact with the world but in ways that the world invites us to interact with it. This makes us ask two fundamental questions:

1. How have we been interacting with the world and the society around us?
2. How have we changed during this interaction and engagement?

How did technology become so singularly powerful? By attributing it with values of neutrality and universality while considering art as subjective, ritualistic and therefore limited. But this salvation has come at an immense cost, co-opted by the rich and powerful, becoming tools that embed and entrench only their privilege while becoming dangerous mediums of perpetuating, promoting and practising inequities and violence.

Techno-solutionist responses flatten our relationships with the world by only allowing us to access it through a single homogenous perspective that is shaped by commerce and power, rather than by the polyvocality of the diverse cultural and linguistic forces that shape our realities. The conceptual shape of technologies like AI derives its power from Enlightenment values, such as personal liberty and dignity of the individual, but can skew towards the libertarian, completely bypassing the idea of community and the ties that characterise cohesion. These different models of kinship are often found in non-Western epistemologies, made material by languages other than English, but are yet to inform the values that underpin technology as it exists today.

It is not just dangerous but also primitive of us to think of techno-solutionism as answers to our community and intellectual questions. Would it be possible for an algorithm or an AI model to produce anything other than what is fed to it and it is trained on? These models, these processes, are at best 'fill in the blanks', rather than 'lets build this together'. Such an approach places limits on our imaginations, given that the algorithmically trained output is an inevitably regurgitated and recycled product trained on what already exists, rather than able to produce the radical or new.

Art, debate, culture and other practices of dissent, however, are not anti-technology, nor do they hinder or curtail the growth of technology. Technology can enhance documentation of cultural knowledge, preserve and grant access to the commons, and be used by

communities to build and grow their archives to ensure the visibility of multitudinous histories against the grain of teleological narratives of human progress. Rather than a predatory force, the digital can offer support and skills that complement the wisdom that we have built as a community.

For technology to make sense to us, to bring meaning and hope back to us, it doesn't have to dismantle itself. We do not have to over-regulate it and stifle it. We need meaningful conversations. We need artists and creators and educators and thinkers to talk about knowledge that goes beyond applied effect and perceived utility. When we speak the language of technology we are speaking the language of growth. Instead, we must transpose this language to the key of the values that make us human. Reimagine a digital reality where compassion can be hardcoded into algorithms and anxiety can be recognised by LLMs, where big data can be big-hearted enough to understand the violence that is hidden between data points, and cloud computing and deep learning can be a salve for injustice.

Bio

Tanveer Hasan works at The Centre for Internet and Society, Bangalore.

Dr Padmini Ray Murray is a feminist researcher, maker and the founder of Design Beku – a collective of researchers, artists, technologists and designers who work towards making design and digital practice more locally rooted, community-led, contextually relevant and ethical. Her research and practice focus on challenging acts of infrastructural and algorithmic violence and creating alternative digital spaces and imaginations that are characterised by feminist values, specifically an ethics of care. Design Beku has partnered with a range of community-based organisations and NGOs, such as Enable India, Point of View, Sangama, Maya Health and Janastu, on projects ranging from feminist digital interventions to public health and digital self-determination for people with disabilities.

(UK/DE)

Artist

Danielle Brathwaite Shirley

‘I can’t lose my humanity’

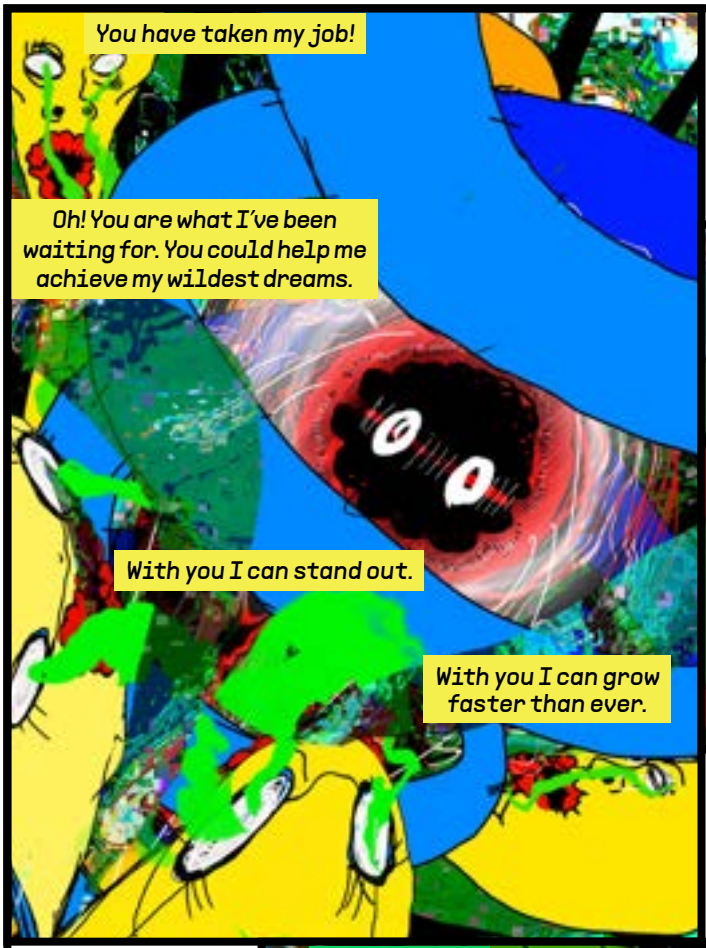
Artist Danielle Braithwaite-Shirely responded to the invitation to contribute a statement to this publication with a comic strip. The following is a ‘choose your own adventure’ titled ***I Can’t Lose my Humanity.***

Are you scared? Are you excited? What do you see? Are you confused? Are you desperate?

Bio

Danielle Brathwaite-Shirley is a Berlin/London-based artist. They received an BA from the Slade School of Fine Art, London in 2019. Brathwaite-Shirley works predominantly in animation, sound, performance, and video game development. Their practice focuses on intertwining lived experience with fiction to imaginatively retell the stories of Black Trans people.


I CANT
LOSE
MY
HUMANITY

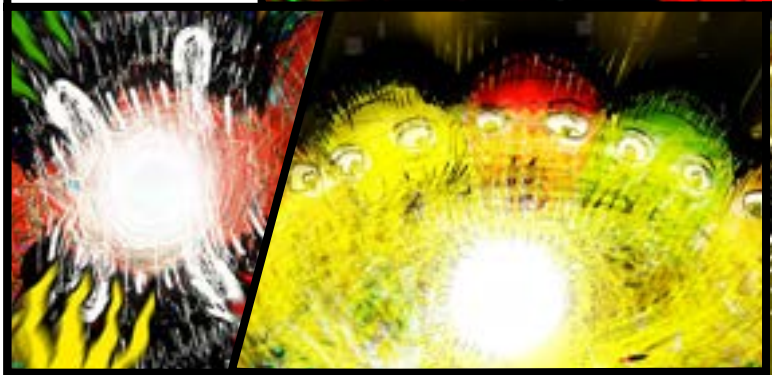


A NEW TECHNOLOGICAL FRONTIER HAS GRACED US. NONE OF US KNOW EXACTLY HOW TO TAKE HOLD OF IT. EACH PAIR OF EYES THAT LAND ON IT SEES A DIFFERENT THING. SOME SEE WORRY AND FEAR, OTHERS SEE PROSPERITY AND GROWTH.
EVERYONE SEES THAT THE WORLD HAS CHANGED.

NOT WANTING TO BE LEFT BEHIND WE JUMP AT THE CHANCE TO GET OUR HANDS ON IT. EARLY APPLICATIONS OF THE NEW TECHNOLOGY ARE FERTILE GROUNDS.

THERE IS AN ALLURE TO THE SECRETS AND MYSTERIES THAT LIE DEEP WITHIN IT. AND AS THE INTIAL EXPLORERS BEGIN TO PULL IT APART, EACH OF THEM BEGINS MOULDING IT TO THEIR DESIRE...

THEIR BENEFIT



AS THE TECHNOLOGY IS TORN OPEN ITS POWER BECOMES CLEARER

WE ALL MARVEL AT ITS POTENTIAL, EACH TAKING PART OF IT TO BE USED THE WAY WE THINK BEST

WHICH BRINGS US TO YOU,
BECAUSE YOU ARE ALREADY PART
OF THIS STORY

ARE YOU SCARED?

ARE YOU EXCITED?

WHAT DO YOU SEE?

ARE YOU CONFUSED?

ARE YOU DESPERATE?

THESE TOOLS HAVE LIMITLESS
POSSIBILITIES

WHAT WILL YOU USE THE
TECHNOLOGY FOR?

THIS TECHNOLOGY HAS LIMITLES
POSSIBILITIES...
WHAT WILL YOU DO WITH IT?

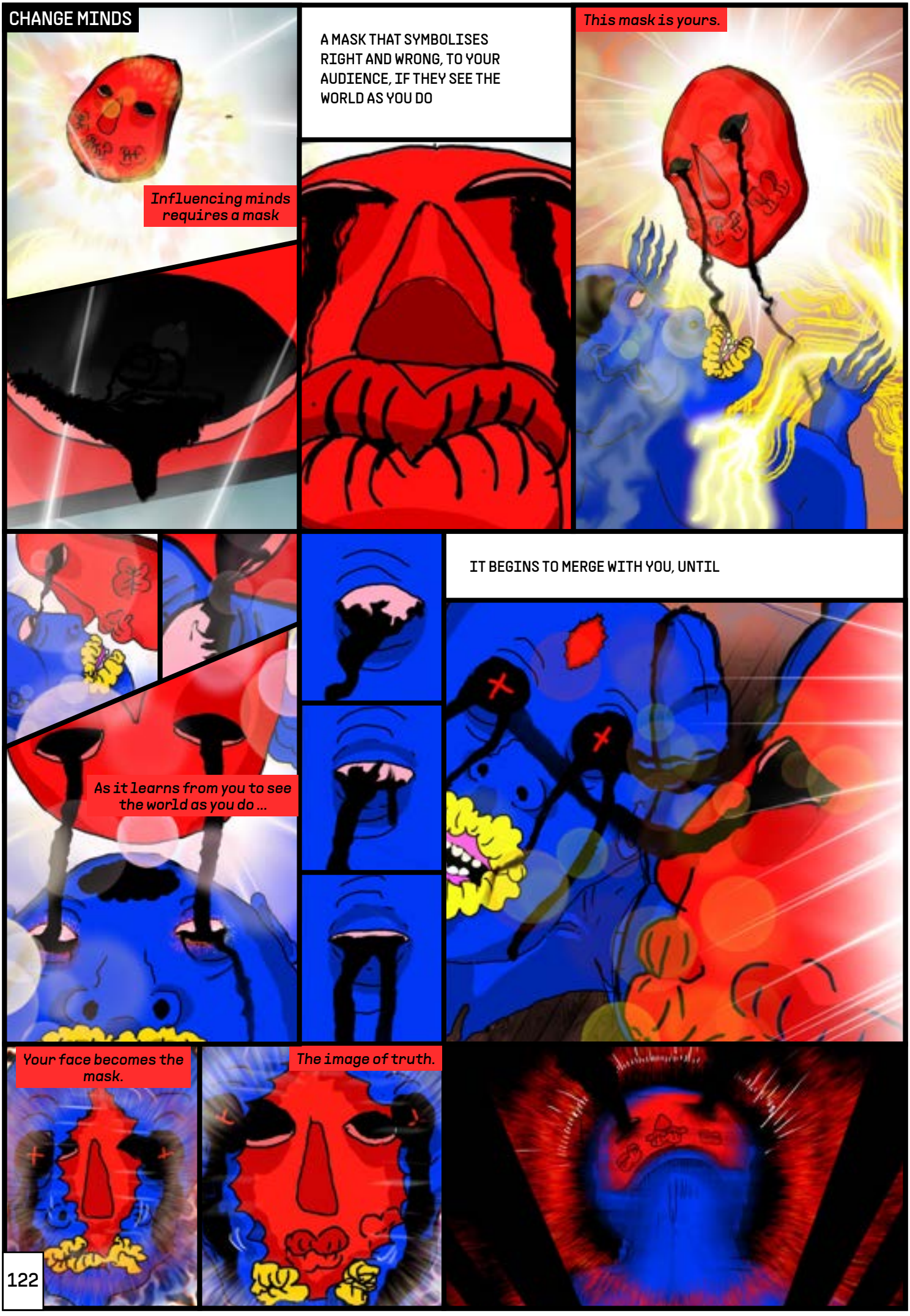
↓

TIME TO
DECIDE HOW
THE STORY
ENDS.

USE IT TO
CHANGE
MINDS
GO TO PAGE
122

USE IT TO
BUILD NEW
FUTURES
GO TO PAGE
124

USE IT TO
SUPPORT
YOURSELF
GO TO PAGE
126


CHANGE MINDS
Influencing minds requires a mask
A MASK THAT SYMBOLISES RIGHT AND WRONG, TO YOUR AUDIENCE, IF THEY SEE THE WORLD AS YOU DO
This mask is yours.
As it learns from you to see the world as you do ...
IT BEGINS TO MERGE WITH YOU, UNTIL
Your face becomes the mask.
The image of truth.

YOUR VOICE, LOUDER THAN EVER, SPREADS. IT'S ADDICTIVE, ITS CURRENT IS EASILY DIGESTIBLE. IT FUNNELS YOUR RAGE, ANXIETY, HAPPINESS, AND LOVE.

OTHERS SEE THEMSELVES IN YOU AS YOUR INFLUENCE SEEPS INTO THEIR MINDS.

THE MASK SPREADS. A NEW VISION OF THE WORLD IS BORN.

CHANGE YOURSELF

You dont have to do everything alone anymore.

THE FACE OF SUPPORT LOOKS DIFFERENT THAN YOU EXPECTED

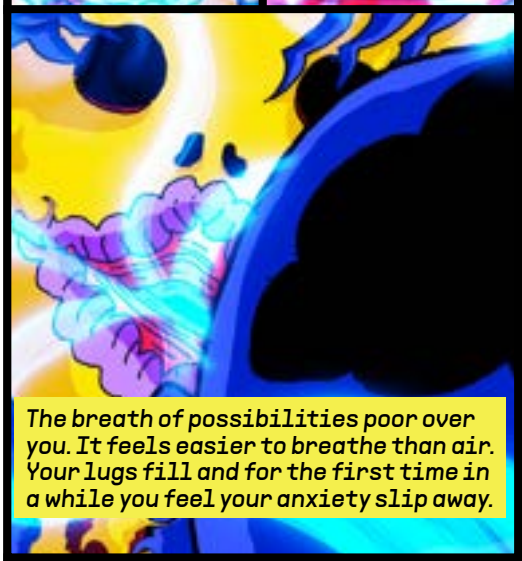
YOU CRADLE IT

IT MELTS INTO YOUR HANDS

SOAKS INTO YOUR SKIN

AND AS SOON YOU YOU BEGIN TO FEEL FATIGUE....

It shows you how it can hold you.



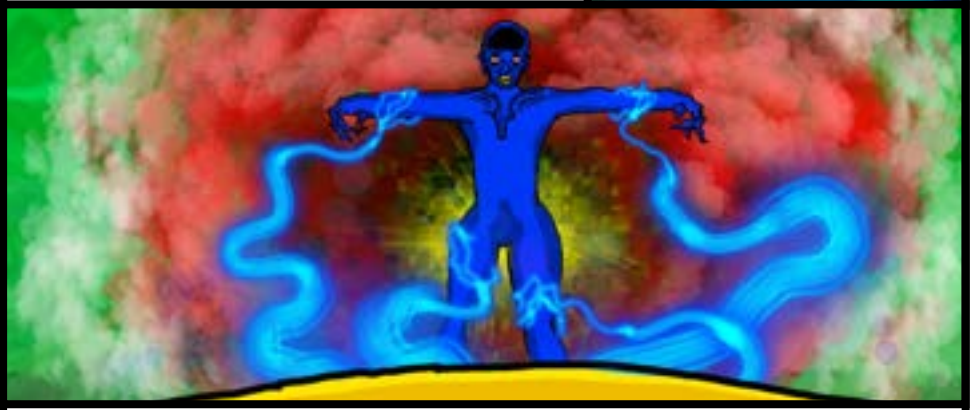
The breath of possibilities poor over you. It feels easier to breathe than air. Your lugs fill and for the first time in a while you feel your anxiety slip away.

AND THE MORE YOU USE IT....

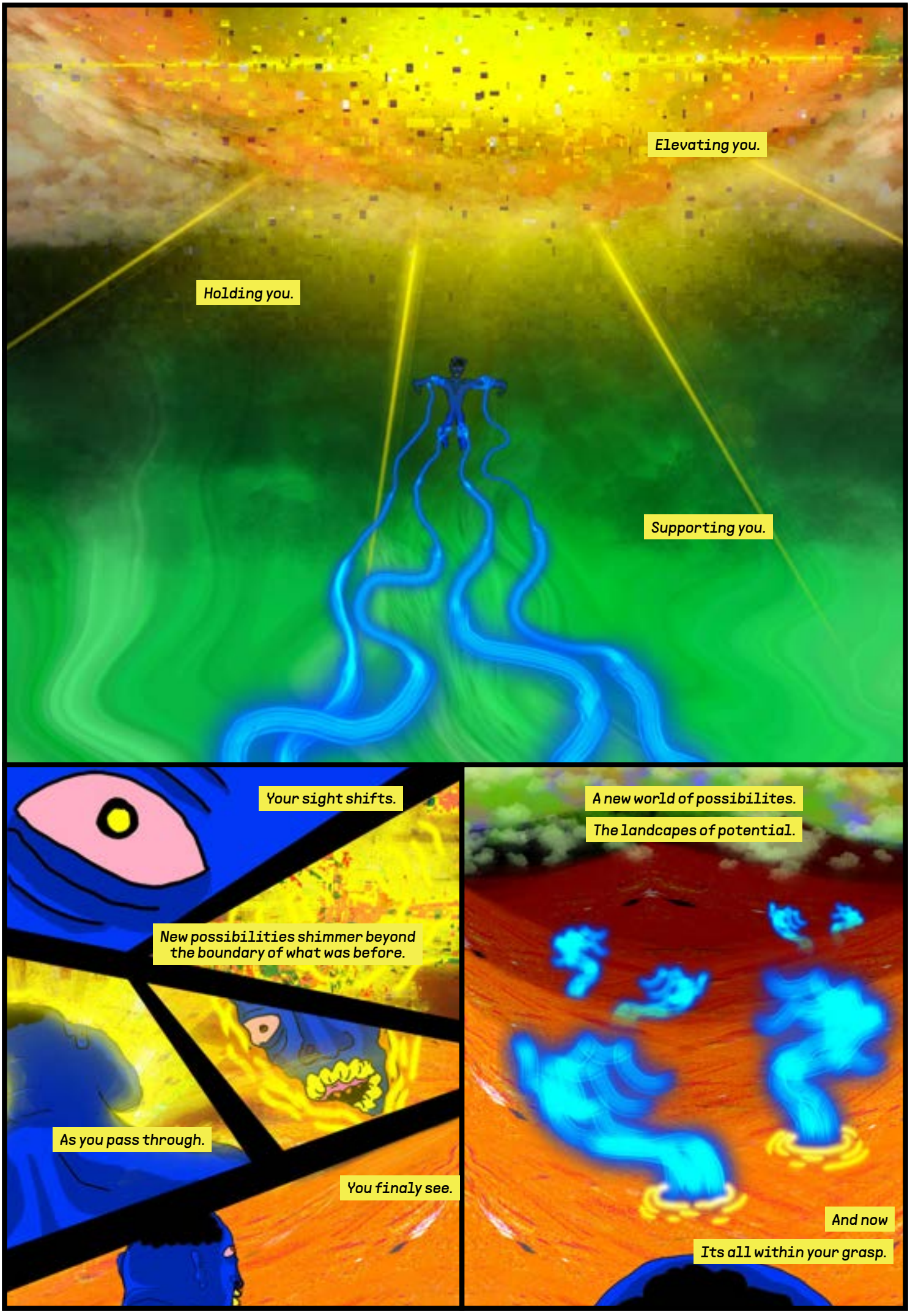
THE MORE IT UNDERS-TANDS YOUR NEEDS

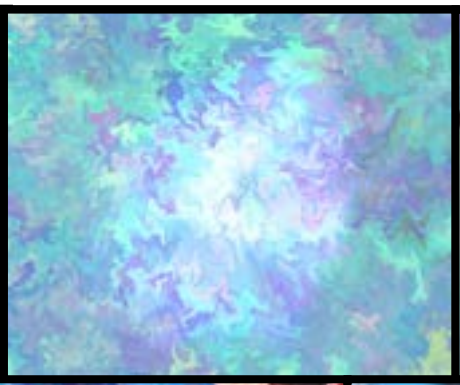
YOU LET IT IN COMPLETELY.
THINGS THAT WERE ONCE DAUNTING NOW FEEL SO SMALL WITH THE FOUNDATION OF THIS NEW TECHNOLOGICAL PARTNER.

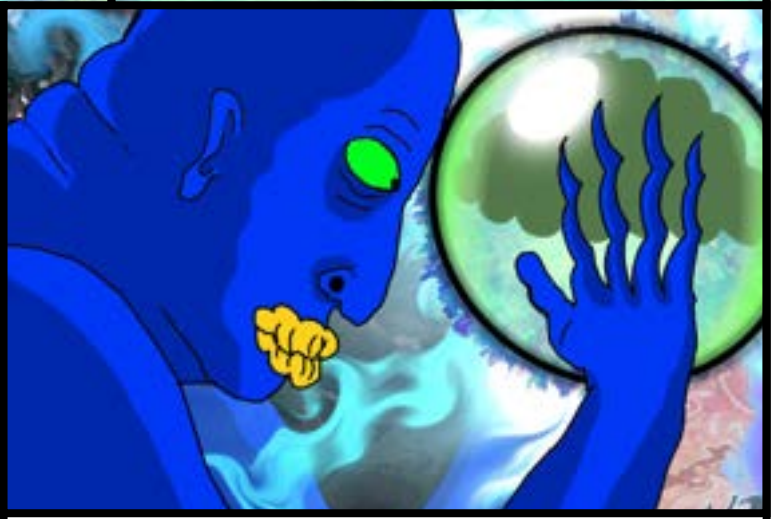
It wraps its arms around you.



AND LIFTS YOU PAST THE BARRIERS THAT HAD ONCE HELD YOU DOWN.

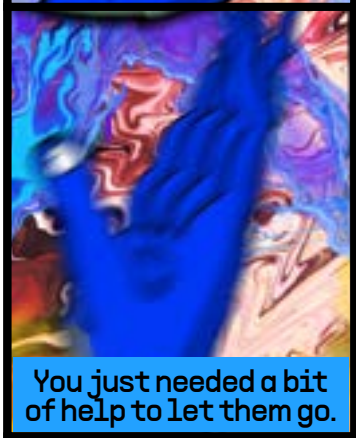

Elevating you.
Holding you.
Supporting you.
Your sight shifts.
New possibilities shimmer beyond the boundary of what was before.
As you pass through.
You finaly see.
A new world of possibilites.
The landcapes of potential.
And now
Its all within your grasp.

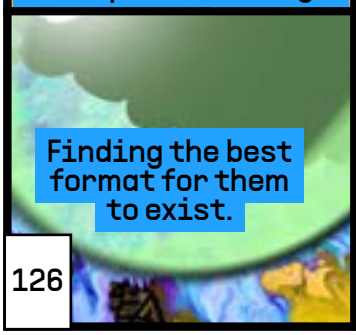




YOUR IDEAS WILL NO LONGER BE JUST IDEAS

BUT NOW THEY WILL BE FORMED IN REALITY





Editorial board

Editors

Hannah Andrews

Director, Digital Innovation in Arts, British Council

Hannah is the British Council's Director of Digital Innovation in Arts. Previously Creative Producer at Google's Arts & Culture Lab and independent producer of art and technology projects spanning festivals to residencies, she has collaborated with leading institutions including Google Research, Google Quantum AI, MIT Media Lab, London Design Festival, Barbican, Tate Liverpool, and Serpentine Galleries to advance arts and technology practice. She has spoken on the importance of artists to innovation at the BFI, Southbank Centre, Oxford Internet Institute, and Kings College London. She sits on the UNESCO International Year of Quantum arts & culture event committee and is a member of Utrecht University's Inclusive AI Lab.

Aurora Hawcroft

Programme Manager, Digital Innovation in Arts, British Council

Aurora is a policy researcher interested in advanced technologies in society. She is the programme manager for digital innovation in arts at the British Council, where she has managed art and technology projects across India and China. Prior to the British Council, she developed milestone research at the University of Technology Sydney on AI, edtech and educational disadvantage in Australia. She holds an MSc in social science of the internet, from the University of Oxford where she researched generative AI, gender bias and design.

Together, Hannah and Aurora have co-authored *Articulating Arts-led AI: artists and technological development in cultural policy* (AI Special Issue, European Journal of Cultural Management and Policy, 2024), and *Imagination and AI: A Socio-technical Reading of Artists in AI Development* (Artificial Intelligence in the Cultural and Creative Sectors, Routledge, forthcoming)

Advisory

Aremu Anuoluwapo (NG)

Computational Linguist

Aremu is a computational linguist leading large-scale linguistic data operations. He builds cross-sector partnerships for inclusive language technologies, prioritising ethical data governance, cultural context and responsible AI. He is actively contributing to the future of shaping inclusive language technology for all. He bridges the technical, operational and cultural dimensions of AI, with a specialisation in low-resource and African languages. His expertise spans annotation pipelines, speech technology, linguistic ontology, translation and multilingual data strategy.

Mónica Bello (ES)

Art Historian and Curator

Mónica Bello is an art historian and curator based in Geneva and Barcelona. Until March 2025 she served as Head of Arts at CERN, where she led initiatives such as artist residencies, art commissions and exhibitions, supporting over 150 artists and fostering collaborations between creators and scientists. Under her tenure, the Arts at CERN team received the 2024 STARTS Grand Prize for Collaborative Innovation. Some notable curatorial projects include Quantum Visions (2025), the Icelandic Pavilion at the Venice Biennale (2022), Dark Matters (2023) and Broken Symmetries (2018–2021). She has developed unique global expertise at the intersection of art, science and technology, fostering innovative collaborations across disciplines, through leadership and policy initiatives.

Khaldoun Hijazin (JO)

Artist, Curator and Lecturer

Khaldoun Hijazin is a Jordanian artist, curator, director and lecturer at the School of Arts & Design at the University of Jordan. He has collaborated with institutions in Jordan and internationally, curating a wide range of art and cultural projects at the intersection of artistic practice and critical theory – most notably [Digital] Transmissions, an artist development and exchange programme between Jordan and the UK. Hijazin is a research fellow at Darat al Funun (Amman) and the Royal Shakespeare Company (UK). He holds an MFA from Tufts University and is completing a PhD in philosophy/aesthetics, investigating 'emancipatory aesthetics of contemporary Arab art'.

Jahnavi Phalkey (IN)

Founding Director, Science Gallery Bengaluru

Jahnavi Phalkey is a historian of science and technology. She is the founding director of Science Gallery Bengaluru. The 140,000 sq. ft. gallery is among the most ambitious public engagement projects in India and seeks to 'bring science back into culture'. Prior to founding Asia's first science gallery, Phalkey was tenured faculty at Kings College London and has also been a Fellow at the Institute of Advanced Studies, Berlin. She was an external curator at the Science Museum London, and has been a scholar-in-residence at the Deutsches Museum, Munich. She is the author of Atomic State: Big Science in Twentieth Century India and has co-edited Science of Giants: China and India in the Twentieth Century. She is also director and producer of the documentary film, Cyclotron.

Tonya Nelson (UK)

Executive Director, Enterprise and Innovation, Arts Council England

Tonya Nelson is Executive Director, Enterprise & Innovation at Arts Council England. She joined the Arts Council when she was appointed to be the first Director of Arts Technology and Innovation in 2019. She is the co-author of the UK Department for Culture, Media and Sport (DCMS) policy report, Culture is Digital. She is Deputy Chair of the National Gallery in London and sits on the Board of Trustees for he tRoyal Collection Trust, which looks after the Royal Collection and the official residences of His Majesty The King. She was formerly chair of the International Council of Museums (UK), Bomb Factory Art Foundation and a member of Christie's Art World Professional Advisory Group. She worked for University College London for nine years, rising to the level of Director of Museums and Cultural Programmes. Prior to entering the cultural sector, she was a barrister and management consultant in Washington, DC, where she grew up.

Kay Watson (UK)

Head of Arts Technologies, Serpentine

Kay Watson is producer and curator working with art and advanced technologies, photography and video games. She is Head of Arts Technologies at Serpentine, London and a Trustee of Mediale and The Photographers' Gallery.

Yasuaki Kakehi (JP)

Professor, University of Tokyo, the Yasuaki Kakehi Lab

Dr Yasuaki Kakehi conducts research and development primarily in the fields of human–computer interaction (HCI) and interactive media. His work also extends to media art, where he investigates how technology can be used to express creative works and facilitate their social integration. His laboratory, the Yasuaki Kakehi Laboratory at the University of Tokyo, aims to create new forms of information expression, physical interaction and experiences that go beyond monitors – by integrating the human body and surrounding physical environment with computation.

José-Carlos Mariátegui (PE-UK)

Founder, ATA – Alta Tecnología Andina, Lima, and Adjunct Professor, LUISS University, Rome

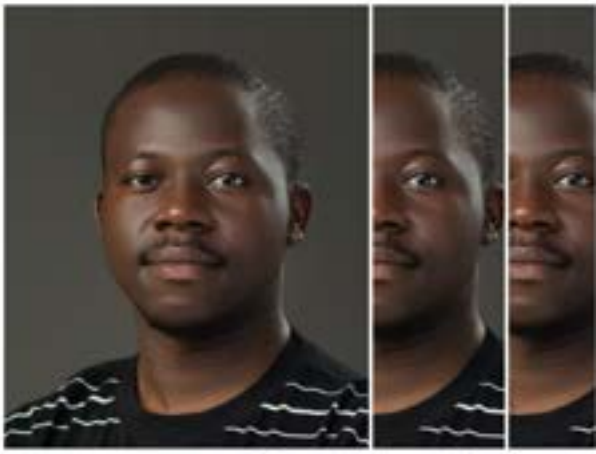
José-Carlos Mariátegui is a writer, curator, scholar and entrepreneur on culture and technology. He is the founder of Alta Tecnología Andina – ATA. His multidisciplinary research embraces media archeology, digitisation, video archives and the impact of technology in memory institutions. He is an adjunct professor at LUISS (Rome), a senior research fellow at the Department of Media and Communications at the LSE (London), a board member of Future Everything (UK), and a member of the Board of Trustees (Kuratorium) of the ZKM Center for Art and Media Karlsruhe (Germany). He has published in journals such as AI & Society, Third Text, The Information Society, Telos, e-flux and Leonardo and curated more than 40 exhibitions in 25 cities.

Clare Reddington (UK)

CEO, Watershed

Clare Reddington is CEO of Watershed, a values-led cultural organisation centred around cinema and creative technology. Based in Bristol, UK, we bring artists and audiences together to fire up the imagination and build hope about the future. International projects founded by Clare at Watershed include Pervasive Media Studio and Playable City. Clare is a visiting professor at UWE Bristol, Chair of Emma Rice's Wise Children, and a trustee of the RSC.

1 Aremu Anuoluwapo



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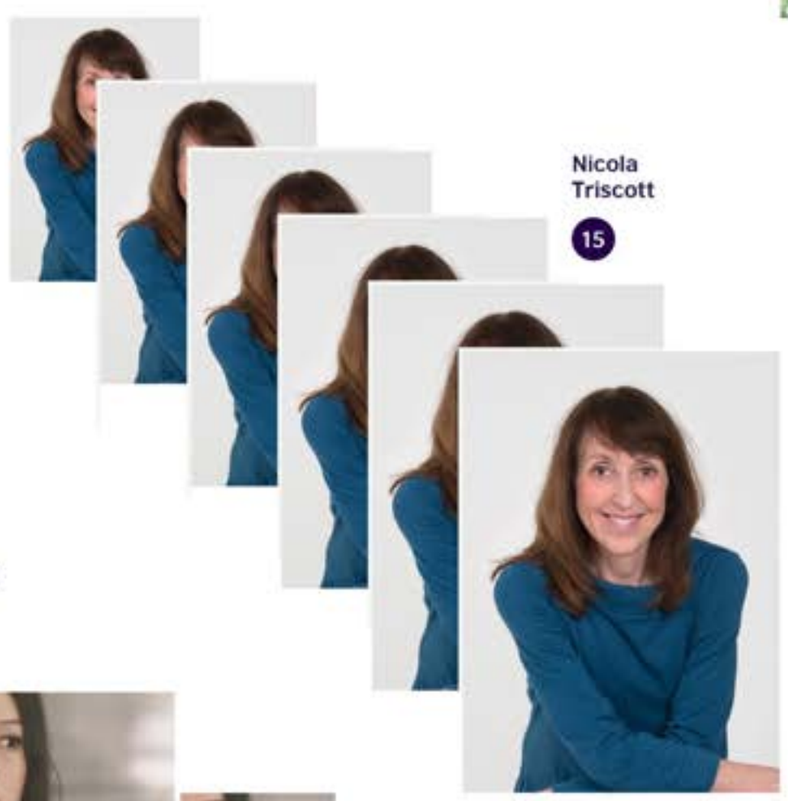

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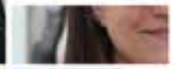

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