

OCTOBER 29 & 30, 2024 - BARCELONA

SYMPOSIUM

EXPLORING THE INTERSECTIONS
OF ARTS, SCIENCE, TECHNOLOGY
AND SOCIETY AS CATALYSTS
FOR CHANGE

REPORT

S+T+ARTS



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INTRODUCTION

Over the past seven decades, the discourse on the dialogues and intersections between the arts and sciences has undergone a profound transformation since the inception of the “two cultures” debate. Today, numerous publications, institutions, organisations, academic associations, and funding programmes, such as S+T+ARTS in the European context, testify to the burgeoning emphasis on transdisciplinarity.

However, amidst this progress, persistent questions and concerns remain, particularly with regard to the dissemination and impact assessment of projects within these transdisciplinary fields. A key challenge is to develop effective methods for observing, monitoring, evaluating, and identifying key variables illuminating project findings and respecting their inherent complexity.

This symposium addressed these needs by convening an international dialogue that spanned academic discourse and practical applications. By fostering collaboration and knowledge exchange, it explored new strategies for accurately addressing, monitoring, and measuring the multiple impacts of projects situated at the

intersection of the arts, technologies, and sciences, within the global challenges of contemporary society.

Co-organised by HacTe, Barcelona’s Hub of Arts, Science and Technology, and Universitat Oberta de Catalunya (UOC) in the framework of the S+T+ARTS in the City project, on October 29th & 30th, 2024, the event brought together in Barcelona contributions from more than 50 international academics, researchers, artists, policymakers and practitioners working on the crossroads between the arts, science and technology, proposing a journey through the genealogies of interdisciplinary practices, to reflections on potential values social and ethical changes, epistemologies and ontologies, legacies, practices from past and ongoing projects and material and ethical questions, as well as looking to the future of S+T+ARTS initiative throughout panel discussions, roundtables, conferences, workshop and project presentations in the poster and audiovisual area.

Overall, the event aimed to explore transdisciplinarity to address societal challenges through research and innovative practices.

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1ST DAY - TUESDAY, 29 OCTOBER 2024

Comments in pink are personal from the person writing this report

After arrival and accreditation at the front desk...

A little bit of desorientation, a little sandwich and coffee to help me feel better...

..we are greeted with a few **welcome words** by Manel Jiménez (Vice-rector for Culture at Universitat Oberta de Catalunya, UOC), Alberto Rabbachin (Deputy Head of Unit at the European Commission), Christophe de Jaeger (Director of GLUON and S+T+ARTS in the City project), Tere Badia (Co-Chair and Director of Barcelona's Hub of Art, Science and Technology, HacTe), Andrés Burbano (Co-Chair and Professor at the Arts and Humanities Department of UOC) and Pau Alsina (Co-Chair and Associate Professor at the Arts and Humanities Department of UOC).

Drawing from his 30 years of experience **Manel Jiménez** discusses UOC, the world's first online university, emphasising the political interest in creating this public service. He highlights the first seven studies at UOC aimed at fostering the intersection of technology, science, and the arts, noting how the arts contribute to knowledge creation within scientific paradigms. Over time, a mutual understanding has emerged where methodologies in science and the arts can intertwine, allowing knowledge transfer between the two fields. This led to the formation of a collaborative group of academics and educators, culminating in the HacTe consortium, which hosts the Symposium with leaders in the ASTS field as Pau Alsina and Tere Badia.

Alberto Rabbachin highlights, through a video-message, the importance of curiosity and experimentation in bridging communication gaps and generating unique solutions to current challenges through the integration of science, technology, and the arts. He insists on disrupting linear thought also for the creation of policies for the current challenges we face as society.

Christophe de Jaeger presents GLUON, an arts, research and education platform based in

Brussels, and the S+T+ARTS in the City project, emphasizing the need for democratic education and awareness in a rapidly digitised space. He also proposes the need to discuss the future of the S+T+ARTS initiative during these days.

Tere Badia outlines the HacTe initiative, an independent association gathering 11 institutions that acts as a mediation organization for interdisciplinary collaboration, existing communities with interstitial powers. HacTe promotes the ACTS network in Spain, which facilitates collaboration across disciplines and highlights the necessity for fostering intersectional practices. She underscores the importance of this symposium as a common playground to gather agents and interdisciplinary projects.

Andrés Burbano recognises the large number of high-quality submissions received in the open call of the Symposium, reflecting the poor limitations of disciplinary boundaries. His speech addresses the background coincidences (the COVID pandemic and the concept of pollution) of the books written by the keynote speakers: "Sensing Machines" by Chris Salter and "Aeropolis" by Nerea Calvillo. This background also makes a difference in the ways we approach the intersectionality that concerns us.

This reference to Calvillo's book acts (subjectively) as a kind of filmic montage-at-a-distance with the very end of these days, or as a kind of "choose your own adventure", you can go to page 23.

As an auditory misunderstanding of Calvillo-Calvino, I'm remembering that Calvino (Italo Calvino) and his Invisible cities will appear repeatedly during this symposium). Wait.

Pau Alsina stresses the need to critically reimagine how art and science can provide solutions to contemporary challenges, encouraging us to use this actual collaborative learning environment across and through fields, expanding and rethinking them.

OPENING TALK

THE ART-SCIENCE COMPLEX: OBSERVATIONS FROM THE FIELD

Keynote: **Chris Salter**
Zurich University of the Arts

Respondant: **Veronika Liebl**
Ars



OPENING TALK

The Art-Science Complex: Observations from the Field

Keynote speaker: Chris Salter, Zurich University of the Arts

Respondent: Veronika Liebl, Ars Electronica

Moderator: Pau Alsina, UOC

After Alsina's introduction, **Chris Salter** began with a black and white image. Four white males working in a "concert" in Stanford in 1967.

The photo was taken the same day he was born, or so I seem to understand... Too fast for my spanglish.. So, I decided to record the Symposium in audio, too.

The photo heralds a genealogy that runs through Stanford, which until the 1990s was making money from computer-based music. "Just a strange idea," says Salter wryly. His genealogy begins with John Chowning, best known for having discovered the FM synthesis algorithm in 1967. In 1973, Stanford University sold the license for his discovery to Yamaha (from Japan), with whom Chowning, who apparently had no idea about computation, worked to develop a family of electronic synthesizers and organs.

*The slide reads:
"THE PERFORMANCE IS ABOUT TO BEGIN"*

One page publicity introduces the DX FM digital synthesizers and features some drawn portraits of the composer Jerry Goldsmith (who composed the soundtrack for Rambo), Elton John, Chick Corea and Quincy Jones speaking wonders of Yamaha...

What do the histories of techno-science-based-art offer us, given their long entanglement with questions of infrastructure, innovation, invention and experimental practice?

Salter examines the Art-Science Complex, a network of historical and theoretical assumptions surrounding collaborations between artists and scientists from the 1950s to 1970s, especially during the rise of electronics and computing in the 1960s. His lecture explores three main themes: **Innovation**, **Interdisciplinarity**, and **Unity**.

Innovation: This section traces art and technology collaborations, referencing

movements like Bauhaus, Dadaism, and Futurism. It highlights how emerging technologies in the early 20th century, especially electronics and computing, influenced artists and designers, particularly during the Cold War. Cybernetics emerged as a key interdisciplinary field, connecting artists like Nam June Paik, Allan Kaprow and John Cage, who explored **feedback control** and **interaction**. The narrative shifts to the 1960s counterculture, which protested the Vietnam War and embraced technological and perceptive experimentation for personal and political expression, leading to the creation of institutions dedicated to art and technology, such as Experiments in Art and Technology (EAT), the Art and Technology Programme at the Los Angeles County Museum of Art and the Architecture Machine Group at MIT, among others. However, he notes critiques from the 1970s, such as Jack Burnham's view that art struggled to use technology for social relevance. The resurgence from the 1980s to 2001 saw hybrid institutions, but Salter critiques linear and individualistic views of "invention" emphasizing that instead true innovation is collective and historically rooted.

What about women and... and... and...?

The text also critiques teleological and deterministic narratives in "innovation", dispelling **myths** such as the **linearity of innovation cycles**, and emphasizes the importance of collective effort in driving innovation. Salter differentiates between **innovation and invention**, arguing that true innovation is dynamic and involves a network of historical trends, contexts and collective endeavour rather than isolated contributions from individuals. This narrative is no longer useful today as other narratives emerge such as AI, big data, COVID, *Black lives Matter*...



Interdisciplinarity: Drawing on Born and Barry's work, Salter discusses and amplifies various interdisciplinary "logics"—such as accountability and defamiliarization—which reconfigure socio-technical relations rather than just creating new objects. He argues that interdisciplinarity is not simply collaboration among fields, but a rethinking of relationships and suggesting that interdisciplinarity does **not solely imply collaboration among distinct disciplines**.

Unity: The last section explores the concept of epistemic cultures and critiques narrow scientific models used to understand the arts. The strength of science lies in an "heterogeneous assemblage of subcultures" (Galison and Stump, 1996). He, along with Haraway and Suchman, advocates for "**situated knowledge**" and "**situated action**", while **critiquing traditional male-dominated narratives in science and notions of objectivity**. Paul Feyerabend's notion of **epistemological anarchy** calls for blurring disciplinary boundaries, suggesting that there is no single method or ultimate structure in knowledge.



As conclusion, Salter's reading of an alternative history of the art-science complex is thus meant to provide a corrective to the ongoing neoliberalisation of creativity made possible by keeping such art-science connections black-boxed - as somehow driving the 'natural processes' of linear, market-driven innovation as the work of individual geniuses outside of their socio-technical contexts, and seeing interdisciplinarity itself as a frictionless social configuration where everyone speaks the same languages and has the same set of values and...what replaces knowledge...?

Veronika Liebl gives us insight into her personal learnings on interdisciplinary collaborations and complexities and brought 3 concrete proposals for the S+T+ARTS initiative:

Involve Artists Early: Advocate for **more inclusive and diverse models** in the S+T+ARTS initiative by involving artists at the earliest stages of project development to help redefine the core problems and assumptions, encouraging innovative thinking. The current model, which brings artists in later as "experts," limits their influence.

Focus on Systemic Change: Shift focus from simply measuring project outputs to evaluating the transformative and societal impacts of interdisciplinary collaborations. This includes assessing the quality of partnerships and the role of "**innovation catalysts**" in overcoming communication challenges. There is also a call for developing **interdisciplinary educational and vocational programmes** that go beyond domain expertise, supporting research-driven, long-term projects that involve **citizen science** and **community-driven activities** for broader knowledge creation.

Establish Regional Centers: As sustainable regional hubs across Europe to facilitate interdisciplinary training and collaboration, enhancing networks and exchanging best practices, much like existing models (the UNESCO City of Media Arts and Fab City are mentioned). She concludes with a call to action for continued collaboration and innovation in S+T+ARTS during the next ten years "**and we probably also need to challenge ourselves a bit in advancing the models we use**".

Overall, the conversation between Salter and Liebl with the public highlights the difficulties faced in fostering interdisciplinary work due to **institutional limitations** and the necessity of finding flexible approaches to overcome these challenges. Liebl talked about the differentiated temporality of production between disciplines, noting that scientific projects typically span 3 to 4 years, while artists often produce within 3 to 4 months, and emphasizing the need for deadlines in research to bring clarity and focus to projects.

*AAAAAH...
What kind of art are we talking about??
Object-based art? Many of us no longer
work within those frameworks...*

Both speakers offer a critique of institutional hurdles, pointing out that while artists and researchers are interested in interdisciplinary work, **institutional frameworks often create barriers that hinder collaboration**. They discuss an essential difference between countries: "it's different than Austria, different than Germany, similar in Belgium, similar in France where these schools have not been granted the right to give research degrees".

*I feel a kind of Spanish/Portuguese GAP.
I assume that Spaniards, Portuguese,
and others like me, may not understand
anything they are talking about.*

*I'm feeling this strong cultural
and class gap since the beginning.
Let's take into account inclusions
and exclusions that matter,
not only in references but also in
the potential for certain types of
not institutionalized artists.*

*"Artists move in and out of
institutions all the time",
I hear someone say.*

The speakers discuss the need for creative workarounds to navigate the restrictive rules and regulations imposed by institutional frameworks in both art and science, acknowledging that these structures can be unforgiving and limit innovation.

*"only one, its late" / coupling sound /
nothing new in public questions*



I PANEL DISCUSSION

TOWARDS HYBRID RESEARCH SCENARIOS

Lúa Coderch, BAU - Centre Universitari d'Arts i Disseny de Barcelona and

Marta Royo Llonch, SHOOK Studio / ICM-CSIC

Derek Curry and Jennifer Gradecki, Northeastern University

Joel Ong, York University

Lucía Sommerer, Halle University (Germany) & Yale ISP

Moderated by: Andrés Buitrago, Universitat Politècnica de Catalunya



PANEL DISCUSSION I

Towards Hybrid Research Scenarios

Participants: Derek Curry, Jennifer Gradecki, Lúa Coderch, Marta Royo Llonch, Joel Ong

Moderator: Andrés Burbano

The panel discussion, moderated by Andrés Burbano (UOC), covered topics on the intersection between art and science, highlighting how these disciplines can collaborate on innovative research. Here are the main points:

+ Joel Ong, York University. *Untitled Interspecies Umwelten*

Ong presents the project *Untitled Interspecies Umwelten*, which explores interactions with microorganisms, specifically focusing on the microbe *Euglena gracilis*. *Euglena gracilis* is a well-studied organism commonly used as a bioindicator in polluted ponds, bioengineered for powdered supplements, biofuels, and genetically modified in various ways, reflecting biocapitalism and new forms of care. It also performs photosynthesis, making it hard to classify strictly as plant or animal, and can be observed in performative expressions. Rarely a microbe is seen as an individual; it's usually perceived as part of a group. Ong asks, what would it be like to live as a microbe? Ong frames his work within "Biotic Games hackaction".

While sharing images, "hybrid notes," and handwritten sketches, he comments that, "The *Euglena* should not follow the game; the game should follow the *Euglena*". The microbe thus becomes the PROTAGONIST of a video game. Ong combines digital technology and bioengineering in his project, inviting viewers to reimagine the relationship between humans and other species. His work challenges traditional representations by suggesting that the game should adapt to the behavior of microorganisms rather than imposing objectives on them. The work also critiques the tendency to prioritize quantitative data over non-human narratives and perspectives. The project raises new questions about the concept of life, moving beyond traditional artistic perspectives to reveal microscopic worlds.

Ong clarifies that his work is not just a passive observation of nature, as in 19th century art, but an active exploration of microscopic life and its interactions, from passive witness to active companion... His experiments aim to connect the Umwelt (worldview) between humans and microorganisms. He uses various strategies, including visualization and sonification technologies, proposing speculative intermingling of natural and cultural worlds through biosemiotics and extra-verbal language, while raising critical questions about the concept of life and its artistic representations.

The project aims to develop **an interspecies future through collaborative practices**, including plants, animals, fungi, and microbes. Ong emphasizes the importance of **welfare regulations that include non-human considerations**. He also explores what kinds of environmental histories can be articulated.

Ong prioritizes, not so much the human voice as an imposed narrative, but rather **SENSORY MEDIATIONS**. In his earlier experiment, a visualization interacts with a localization chatbot. An algorithm observes and tracks its contortions... What examples of **LOMs** (Learning Object Metadata) for creating compositions, sense, and emotional expressions... When *Euglena* stretched out it would be "happier." In his tracking of movements, he draws on concepts from dance to explore improvisation and systems.

"We can't impose our will on a system. We can listen to what the system tells us and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone. We can't control systems or figure them out. But we can dance with them!" quotes Donella Meadows in "Dancing with Systems."

But we can dance with them!

Ong also references Donna Haraway and her "tiny companions" that help him grapple with life cycles, death, and care for living organisms. Collaborating as both an artist and a caregiver of these organisms made him reflect on dealing with life cycles and the confrontational nature of working closely with these beings, sometimes akin to a "graveyard".

In response to an ***AUDIENCE QUESTION***. He explains that he's focusing on simplicity and that it's not a data visualisation piece, although it's being contextualised within that sphere, it is more about trying to adopt a different perspective. **How to make environmental monitoring today**, the more senses we have, the more we will know about an environment. He emphasizes the importance of changing the paradigm from just data centric practices, to alternative modes of seeking information, more conversational narrative approaches to understanding and histories that are embedded within environments.

Andrés Burbano adds that **sentience** at the microscopic level is also intelligence, and how this concept raises questions about how these organisms feel and express themselves, posing fascinating questions for consideration.

+ **Lúa Coderch**, Centre Universitari d'Arts i Disseny de Barcelona & **Marta Royo Llonch**, SHOOK Studio / ICM-CSIC. **Gleaning the art and science collaboration filed: a data ecology prototype**

Lúa Coderch and Marta Royo discuss the experimental collaboration between scientists and artists from the Institute of Marine Sciences (ICM) and the University Centre of Arts and Design in Barcelona (BAU), who are jointly exploring interdisciplinary methodologies based on hospitality and care. Inspired by Agnès Varda's documentary *The Gleaners and I (Les glaneurs et la glaneuse)*, they explore the concept of "Gleaning" as a metaphor to establish collaboration between artists and scientists. The project emphasizes the recovery of discarded materials from scientific research. The "discarded" is taken as a basis for new meanings and artistic reinterpretation.

The project is process-based rather than focusing solely on artistic production. These findings have emerged from collective encounters such as exploratory sessions with speakers in different cultural contexts to determine which dynamics work and which do not, documentary screenings (Varda), interactions, and prospections with scientific samples.

As an update on the ongoing project, they highlight the importance of reporting, and explain

that they are currently seeking funding while prioritizing adequate compensation, long-term commitment, and valuing the artistic sensitivity of scientists who genuinely wish to participate. This project requires sensitivity and openness from both sides: scientific and artistic. The aim is to create a "bidirectional nourishment" approach that fosters better mutual understanding between disciplines. The research began the **construction of a common glossary**.



Two key words have been added to this glossary:

Rigour, as intrinsic to both fields, exploring objectivity versus subjectivity, biases, and prejudice, and hospitality appears as essential; and **metaphor**, as a strategy to create a new common language. After viewing Agnes Varda's documentary together, the idea of GLEANING appeared, and they began to develop it as a methodological strategy. This metaphor raises important issues such as value, residue, perspective, the forgotten, kindness, and community.

Throughout various phases, they have identified at ICM all the samples that scientists use for knowledge production but ultimately discard. Then some sessions between artists and scientists have included open discussions and "gleaning" of interests – Can artists glean the scientific field? They have created cartographies with three gleaning fields (data, material samples, AV registry) to collect possible interests.

In response to a subsequent ***QUESTION FROM THE AUDIENCE***, they make an important remark: gleaning is not a concept that comes from the arts to be applied on sciences. **Gleaning involves metaphors that move things from one place to another**, and this is what works for them. Moreover, while initially focused on objects, it also works to unite communities to collaborate. They also point out the tendency of a specific scientific profile that believes these projects are merely to “communicate their research.” They insist on the importance of having the right artist and mediator, among other factors.

Burbano later commented on the fruitful nature of the idea of *gleaning*, comparing it to the *circular economy*.

+ Derek Curry and Jennifer Gradecki, Northeastern University. *From Algorithms to Allegories: Leveraging Scientific and Artistic Epistemologies to Combat Digital Disinformation*

Derek Curry and Jennifer Gradecki presented *Epic Sock Puppet Theater* (MediaFutures 2023), an artistic research project and interactive installation combining analytical methods, social science research, and artistic practices. The project aims to help viewers critically reflect on the tactics used by imposter social media accounts to promote polarization and disinformation, employing artistic methodologies to combat this issue. They have created an interactive traveling theater with animatronic puppets.

The project defines disinformation as “an adversarial campaign that weaponizes multiple rhetorical strategies and forms of knowing – including not only falsehoods but also truths, half-truths, and value-laden judgments – to exploit and amplify identity-driven controversies” (Díaz Ruiz & Nilson 2022, 29). Disinformation campaigns target multiple countries (Russia's 2016 elections, Syria, and China) and topics, such as climate change and political issues. The audience is encouraged to share any disinformation campaigns they know about for its potential inclusion in the project. The project uses data from various sources, including researchers, government agencies, and journalists, and is grounded in inoculation theory from social

psychology, aiming to build resistance to persuasion attempts.

The work on these *animatronic sock puppets* can be described as **TACTICAL ETHNOGRAPHY**, and uses aesthetic and theatrical strategies. They apply techniques from Epic Theater (Bertolt Brecht), such as **critical distancing**, and others as **breaking the fourth wall**, and even **humor** as a distancing technique, allowing participants to critically reflect on the content.

The puppets speak content derived from various disinformation campaign datasets, with accompanying visuals displayed on a screen. The aesthetic design of the puppets, with their exposed wire, reinforces conceptual aspects of the project and emphasizes the role of technology in online disinformation campaigns that enable the spread of disinformation, including fragmented media landscapes and content recommendation algorithms that promote engaging but potentially sensational content.

Insights from user testing were shared to gather valuable feedback for improving the installation's interface and accessibility. Which voices to use, what content to include, and whether the content was sensitive for the target group. More natural and human voices were found to be less effective; it was suggested to slow down AI-generated voices slightly to improve accessibility for non-native English speakers. This led to improvements in the installation's interface including adjustments to AI-generated voices and content descriptions. The meeting concluded with a demonstration of the animatronic puppets performing disinformation posts, showcasing the project's practical application.

The moderator provided **concluding remarks**, highlighting key points from each presentation. They emphasized the potential of exploring SENTIENCE at microscopic levels, the concept of bringing CIRCULAR ECONOMY to scientific processes, and the power of using HUMOR and DISTANCE to communicate complex ideas in art-science collaborations.

I'm repeating again:
**GLEANING, CIRCULAR ECONOMY,
SENTIENCE, HUMOR.**



PANEL DISCUSSION II

Confronting values and measures in projects and policies

Participants: Sofia Greaves, Michele Coletti, Teresa Sanchis, Mona Hedayati, Adrien Lucca

Moderator: Simona De Rosa

The second panel, moderated by Simona De Rosa (T6 Ecosystems), discussed the complexities of measuring the impact of art, science, and technology initiatives. It involved two rounds: one focused on learning their perspectives and how they are addressing the issue of measurement and value in their daily work, and a second round, more specifically related to their position on how to measure the impact of initiatives involving the arts, science, and technology.



I have decided to present each proposal separately to facilitate your reading.

+ Michele Coletti, Grenoble Ecole de Management. ***Towards a management map of Arts+Science projects***

Arts+Science initiatives have existed for a long time, with their initial goal being to trigger creativity and innovation within the host organization, and then to address broader societal challenges. However, there is little research on the managerial side of these initiatives. By leveraging expert inputs and interviews, applying collaborative research, and coding the 9 documents derived from the Reference Framework IPMA Project Excellence model, this study aims to identify the key components of Arts+Science projects and their success factors, a kind of **map of Arts+Science project management elements**.

A critique of The Dragui Report (2024) and its omissions are posed, noting how it mentions technology 137 times and innovation 147 times, but creativity or arts appear 0 times. Coletti explains that this framework IPMA outlines three dimensions: **people in purpose, processes and resources, and project results**.

He also reviews the goals and owners/sponsors, such as government/associations for citizen awareness, cultural centers, innovation in

performative arts, research labs to inspire scientists, and businesses with innovative product ideas. To measure the impact of such projects, Coletti introduces the concept of **ADDITIONALITY**, affirming that projects with well-defined additionalities tend to be more successful, as they have clear objectives that resonate across sectors. These additionalities are **supplementary benefits** or impacts that these projects create **beyond their primary goals**, including not only input (funding, expertise, collaborations), output (results such as publications, artworks), or economic income (which is very important for empowering professionals), but also **social** additionalities that focus on societal impacts, raising citizen awareness, and fostering community engagement; **educational** and **cultural** additionalities related to the preservation or innovation of heritage and new cultural narratives pushing creative boundaries; and **policy-making** advocating for greater support and integration of the arts in scientific and educational agendas.

This **holistic view** helps ensure that European-funded projects achieve meaningful impacts across multiple dimensions. It also investigates ways to better integrate artists into research groups and foster transdisciplinary collaboration, such as through the use of **mediators**.

He emphasizes the need for understanding **Art+Science Project success factors**: Preparation and planning, clear definition of goals and objectives, effective communication and collaboration, flexibility and openness to exploration, supportive organizational culture, institutional support, engagement of stakeholders, alignments of expectations, differences...

QUESTION The mediator asks about the challenges and Coletti points out that project funding tends to lead to an excessive broadening of objectives, creating ambiguity about what is being attempted. It would be better to be a little more precise in terms of focus, because this allows projects to be more convergent. He criticises the **lack of discussion about the projects failures**.

+ Teresa Sanchis, Institute for Bioengineering of Catalonia. ***Art and bioengineering to explore human condition and knowledge generation***

From her experience with the Institute for Bioengineering of Catalonia (IBEC), she discusses the integration of humanities, social sciences, and art to create connections between disciplines and address ethical and philosophical **dilemmas** in bioengineering.

Transdisciplinary research there focuses on the Engineering of Molecular Systems Based on Biological Self-Assembly, Synthetic Biology, and Nanomedicine for Advanced Therapeutic Systems; Preserving, Regenerating, and Fabricating Human Organs and Tissues: Biomodels and Tissue Engineering; Ubiquitous Sensors, Engineered Living Sensors, and Smart Data Analysis: Bioelectronic and Biomedical Signal Processing; Molecular Mechanobiology; and Advanced Microscopy, Imaging, and Biological Mapping...

Some open questions arise in the IBEC: What is life? When does consciousness begin? Is there a limit to human life? Can we achieve immortality through digital twins? Should we alter our DNA to prevent disease or even death? How far can we modify a human before they become something else? These questions reflect profound ethical issues related to biotechnology, artificial intelligence, and the limits of science in modifying human life. And these lead recursively to other questions: How do we, as animals, interact with other animals in the lab, and how does this affect our research? How are our research practices influenced by our backgrounds, gender...?

IBEC has several objectives that emphasize reaching wider audiences, exploring novel ways of engaging society and creating impact, improving communication of complex ideas, fostering transdisciplinary collaboration, encouraging creative thinking and innovation, opening new avenues of research, and fostering reflection on the human condition and how knowledge is created.

It is nice to hear how, as self-reflection, she acknowledges that at first, she viewed art as a way of communicating science to other audiences, but later came to see it as part of true transdisciplinarity.

Teresa exemplifies and presents two projects from the IBEC framework: "Tasmanian Tiger; Case Study of the Museum of Extinction" by Antonio Muntadas and Benedetta Bolognesi

presearcher), presented at ARTS Electronica 2022; and the exhibition "A=A, B=B" at the Antoni Tàpies Foundation, where cameras were installed to show in real-time what was happening in the IBEC lab. It also highlights their recent Artists-in-Residence programme, which started in 2022, with two experiences: one by Roser Cussó, with Laboratory of Human Landscapes. After a year of attempts to connect the artist with researchers through workshops and symposia, the experience improved the following year with Tess Marschner (2023/2024). As an anecdote, they mention that she presented her video at an event, and many researchers began to reflect on how gender affected their research.



Despite these emerging collaborations with artists at IBEC, some new challenges are raised: funding constraints, lack of connections with the art world, misalignment of expectations, difficulties in integrating artists into research groups, and barriers to achieving true transdisciplinary collaborations. Sometimes scientists view artists as "butterfly hunters." With young researchers, it's easier, she said, as they are offered training but underlines the difficulty to place an artist in a research group. She also reflected the role of mediation as crucial to connect the two worlds.

+ Sofia Greaves, Postgrowth Innovation Lab. *SciArt Collaborations at the Joint Research Centre: Knowledge Valorization beyond Economic Value*

In this presentation, Greaves discusses the **EU Knowledge Valorisation Framework (KVF)** adopted by the Commission's R&I strategy and its assumptions regarding the value of art and science collaborations. She conducted an ethnography at the **Joint Research Centre (JRC)**, a major EU research institution, to understand the impact of these collaborations from the perspectives of artists, scientists, and policy makers. Since 2016, the JRC has been focusing on innovation in science and policy-making, and citizen engagement through sci-art projects, with a focus on transdisciplinary collaboration. Their curatorial statement invites artists, artist-scientist-policy makers to participate in summer schools, exhibitions, and more.

Greaves emphasizes the need to rethink the EU KVF to better capture the **immaterial and relational changes** generated by art and science collaborations. Within the current framework, impact is understood and measured as "sustainable production services, solutions, and knowledge-based policies that benefit society."

However, she argues for a **broader evaluation that includes non-economic impacts**.

Much of the findings emerged from a four-month ethnography with 32 interviews and 14 transdisciplinary projects, supported by participant observation and bottom-up coding. One key impact of these transdisciplinary collaborations was making accessible knowledge forms that are both complex, engaging citizens in new ways. Greaves argues that theories of arts-based research must be integrated into the KVF to better understand how transdisciplinary research structures generate outputs.

She presents a case study of the *Specter(al)s of Nature* project, which addresses surface water change with a global surface dynamics atlas. The project was achieved by researchers who applied architectural techniques like 3D sculpture combined with satellite imagery to create objects that represented the changing nature of surface water. Several testimonies from scientists and policy makers highlight the importance of rethinking science and not taking it for granted. It has an impact in policy making, in thinking of water as a body, "not just knowing it in your brain, but really feeling it", understanding water as a dynamic, as a moving body over time, rather than a static entity.

+ **Mona Hedayati**, Concordia University, University of Antwerp. **ASTS as Method: Towards Critical Interdisciplinarity**

Mona Hedayati introduces the concept of Art, Science, and Technology Studies (ASTS) and its methods of exposing and subverting techno-scientific knowledge. She discusses the importance of public-facing practices and the need to critically engage with that knowledge, emphasizing how intelligent machines as socio-technical systems reshape human interactions with the world. Reflecting on STS as Method, John Law claims that methods ingrained in object-processes of study and methods of STS practices are intertwined, underlining the fluidity and incoherence of methods and their relationship with the messy world 'out there.'



Hedayati proposes instead ASTS as an interdisciplinary field that neither adheres to the so-called 'scientific method' nor mere artistic representation/exploration, but enables a



reciprocity between artistic and STS methods. ASTS is contingent, performative, and situated, highlighting art's unique stance in critiquing and engaging with technological infrastructure, providing a public-facing platform to raise ethical and critical questions, and making complex human-machine dynamics accessible and tangible through artistic inquiry.

Her contribution goes beyond the state of the art, encouraging the development of meaning. She presents two particular methods: *Exposing* and *Subverting*. **Exposing** critiques techno-scientific objectivity and its capabilities, exemplified by Trevor Paglen's *ImageNet Roulette*. **Subverting** involves adopting technical pipelines and altering their functionalities, as demonstrated by Winnie Soon's *Unreasonable Character Series*.

She emphasizes the need for artists to engage with urgent concerns and develop practices that serve a broader purpose beyond formal aesthetics, exposing and critiquing the often-unquestioned objectivity of techno-scientific knowledge. By integrating methods from both art and science, ASTS enables a public-facing critique that questions the societal implications and ethical concerns tied to technologies such as artificial intelligence and surveillance systems.

AUDIENCE QUESTION. When asked about the role of the researcher or artist in developing projects at the intersection of art and technology, she points out that there's a constant obsession with mastering the craft of art-science technology, often focusing on understanding technical pipelines or software mastery, which is sometimes seen as the end goal. She critiques this formalism, noting how it often leads to brute-force aesthetics. She encourages her students, and herself as a practitioner, to think about what can serve urgent concerns and raise awareness, instead of simply focusing on formal practice or attracting large institutions and funding.

+ Adrien Lucca, Studio Adrien Lucca. Rethinking Artificial Lighting: Balancing Human and Animal Visual Needs in Urban Environments

As an artist working with light and color, Adrien Lucca developed a methodology for designing lighting schemes that harmonize the needs of human residents with those of our ecological

co-inhabitants. Could we, in some way, balance the needs of humans in the city—the need for light, the pleasure it brings—and the potential threat that light poses? Light pollution represents a critical challenge for urban ecosystems.

LED light, used to illuminate cities for the last 20 years, degrades visual experiences for other species, such as hawkmoths. He will present alternative findings, a critical review of existing literature, and discuss potential solutions. He critiques how these technologies are promoted in terms of energy efficiency (the amount of visible light the device creates, but for humans).

This human-centric nature of LED lights and the potential for induced color blindness in animals raises the challenge of **defining light pollution from non-human perspectives**. We tend to forget that color is extremely human-centered; we live surrounded by **colors that we cannot see** because we are not equipped with the proper spectral sensitivity. Flowers have colors and pigments that have been selected because they are the product of co-evolution between insects and plants. In moonlight, we see perhaps in white, but insects might see a form of neutral light for different reasons because the moon has ultraviolet light that we don't see but still stimulates the eyes of nocturnal insects. Intuitively, when you don't stimulate a cell in the retina, you essentially create a color darkness. There's a famous work by Olafur Eliasson, for example, where only one type of photon is present in a room, and everything seems black and white.

From a *Nature Communication* article, he finds that the color rendering of light that contains no UV light was equivalent to or better than sunlight, which was quite strange. He then re-implemented the mathematics and analysis behind the article and found that something was completely wrong. At some point, the math went haywire and created false colors in the data that didn't exist. The article uses human categories, like black colors, such as black flowers, which don't make sense in the context of an animal that doesn't see blacks because their cells don't have the same spectral sensitivities as ours. The most interesting part was that there are many ways to define light pollution, but one new way would be to say that it's possible to induce a darkness of

colors. So, if the light spectrum doesn't match your visual system, some colors might change or disappear.

So Lucca explored the impact of LED light pollution on nocturnal animals, emphasizing **the need for public awareness and policy change.**

QUESTIONS The moderator initiates a debate on the next big challenge beyond climate change and biodiversity loss. Lucca highlights the value of contributing to programmes or initiatives that can be meaningfully used by policy makers and experts. Sofia changes the perspective of growth, from a purely economic concept to one driven by collaborative change in research practices, such as requesting permission before collecting water samples or incorporating moments of reflection.

Teresa addresses the issue of institutional unding and impact measurement by explaining a service being developed to help scientists and artists evaluate the effects and biases of their

collaborations. The conversation on impact includes examples like Utrecht's Creative Coding Center raising awareness about citizens' digital rights, attracting political attention.

The audience points out the common **asymmetry in collaborations between well-funded institutions and artists bringing projects to them.** A suggestion emerges to integrate scientists and professionals into artists' environments to foster deeper, more liberated engagement. Though some call this idea utopian, noting the lack of "safe spaces" in the world, there is a strong call for structural change, redefining rules, and reshaping funding and assessment processes. Trust-building, metrics for evaluating it, and time-intensive storytelling and testimonials are highlighted as essential elements in this transformation, and all these processes require time.





PANEL DISCUSSION III

Embracing social and ethical changes

Participants: Anni Garza, Gro Sarauw, May Abdalla, Clarice Hilton, Alessia Gervasone, Antonio Irre Catalano

Moderator: Raoul Frese

The discussion featured presentations by various artists and researchers addressing social and ethical challenges. The discussion underscored the importance of ethical considerations and transdisciplinary collaboration in artistic practices, moderated by **Raoul Frese** (Vrije Universiteit Amsterdam).

+ **Anni Garza Lau and Gro Sarauw**, Ghost Agency.
Ghost Agency: Women's rights in the digital age

Anni Garza Lau and Gro Sarauw present their project "Ghost Agency" focused on women's rights in the digital era, combining art, cybersecurity, and activism. The project investigates and addresses online safety for women, especially in contexts of structural violence, such as Mexico, where women and transgender people face heightened risks due to surveillance technologies and a digital infrastructure that perpetuates inequalities and dangers. For example, public transportation becomes a space for harassment.

"Ghost Agency" uses artistic and collaborative practices to empower women and vulnerable communities. They hold sessions with Mexican women to explore their challenges and **co-design** software and strategies that empower communities to evade surveillance. Participants include women from diverse backgrounds and ages, mothers seeking justice for missing children, rural and Indigenous women, activists, and LGBTQ+ activists... They design technologies that enable them to reclaim their safety and privacy in digital spaces. Their work is an advocacy for human rights in the digital age, talking about Fostering Digital Sanctuaries for women's rights... There is an emphasis on the co-authorship of their own agency.

The project also explores grammars of invisibility (following Denise Ferreira da Silva) and

representation in art, creating installations such as "Desde la Ceguera" at the Centro de Cultura Digital in 2023, which address systemic violence and the lack of protection for women in Mexico. They emphasize an important point: "We don't make art 'about' our collaborators", their identities are never included, as there is an ethical protocol for this.

The research extends theoretically, questioning information asymmetries and ethical practices in digitalization. Through collaborations with activists and communities, they create **concrete security tools** and manuals that strengthen local networks, fostering technological autonomy and shared knowledge. When asked by the audience about the project's beginning and ending, they commented that although receiving funds for structure results, they aim for the model not to rely solely on their team, but for communities to be able to replicate it autonomously.

REPLICABILITY, AGENCY and CO-DESIGN



+ **May Abdalla** and **Clarice Hilton**, Anagram. *This is not a simulation: measuring impact of a virtual reality documentary created to inspire empathy towards people diagnosed with schizophrenia with a view to improving medical outcomes.*

May Abdalla and Clarice Hilton, along with Lucy Watkins, present a **virtual reality (VR) documentary** project designed to foster empathy towards people with schizophrenia.



This VR experience, called "Goliath", is an immersive documentary based on the life of a man named John, diagnosed with schizophrenia. The story allows users to sensorially experience what it's like to live with this condition, highlighting the reality of isolation and social stigma faced by patients. The project, which won the Grand Prix at the Cannes International Film Festival, has had a major impact, with over a million downloads—a rare achievement in the VR field. It raises questions about embodied storytelling and how technology can be used to achieve this.

They have brought together groups of people and invited them to use VR to recreate instances of psychotic episodes. This approach helped them gain a broader context about potential uses of the project (e.g. that doctors could see what it really feels like to experience psychosis, suggesting that it could strengthen the patient-provider relationship).

The goal of "Goliath" is to use VR not just as entertainment, but as a **training tool** for mental health professionals, helping them better understand their patients' experiences. One doctor who has used the VR experience in their practice highlighted how it enabled them to see schizophrenia from a new and empathetic perspective, improving their relationship with patients. This project also includes training sessions that create a **safe environment** for participants in order to share personal experiences, raising ethical challenges in creating a respectful and secure space.

Some of the ethical considerations raised included the possibility of negative reactions to the experience or triggering traumatic memories. Thus, in these training sessions, the team has been working to create a boundary space where participants feel comfortable sharing their experiences. For them, it's important how perceived empathy reduces anxiety, builds trust, and makes patients more likely to seek medical intervention.

The Anagram team continues developing similar projects; their next experience is a mixed-reality piece focused on ADHD, also aimed at opening new forms of empathy and understanding toward those with the condition.

”
SAFE TRAINING SPACES...

+ **Alessia Gervasone**, Department of Art History at the University of Barcelona. **Post-extractive and decolonial imaginaries in transdisciplinary researches.**

During her presentation, Gervasone addresses the concept of **EXTRACTIVISM**, a capitalist paradigm that involves the massive extraction of natural resources, affecting both the land and its inhabitants. She also reflects on other types of extractivism: agro-extractivism, immaterial cultural extraction, data mining, and extraction related to the politics of bodies. She proposes **exploring how artistic practices can contribute to a post-extractive way of life, the revaluation and preservation of cultures threatened by extractivism, and how artistic discourse in political ecology and transdisciplinary collaboration can help envision a more sustainable future.** She offers a field of problematization that challenges traditional

narratives around extractivism and opens up spaces to explore sustainable and equitable alternatives through art and interdisciplinary collaboration.

Gervasone presents two case studies from which she unpacks several challenges:

Solomon López: His project, presented in the context of the United National Conference COP16 in Bogotá, focuses on biodiversity preservation. López works with an Indigenous community that has been displaced by agricultural extractivism and uses a participatory approach to collect DNA from local trees, which he analyzes, encapsulates, and replants. The project aims not only to preserve the natural environment but also to protect the community's cultural heritage, creating a participatory museum with community-led management that aligns with Indigenous values.

Tabitha Rezaire & Yussef Agbo Ola: Omi Yemoka Tengku merges scientific research with spiritual rituals, exploring relationships between aquatic microorganisms and human life. This installation invites interaction with alternative knowledge systems and is an effort to reflect on new ways of structuring life and society in the future, emphasizing the importance of interdisciplinary collaboration and respect for cultural and biological diversity.

Gervasone emphasizes the need to rethink development in ways that prioritize Indigenous culture and ways of life. Alternative models of economy and governance might emerge by integrating Indigenous knowledge into biodiversity conservation. She also advocates for using alternative and decolonial epistemologies, where Indigenous and alternative knowledge systems can offer solutions to contemporary challenges and be valued and legitimized in academic and artistic contexts.

How can artistic and scientific practices work together to decolonize knowledge and promote a more inclusive and diverse understanding of the world? She suggests building *shared imaginaries*, redefining the ethics of care to include not only humans but also ecosystems and non-human beings, shifting community participation models to redefine cultural and economic management in contexts of exploitation, and rethinking collaborative strategies to ensure that all voices are heard and respected.

She raises a critical question: should artistic and cultural initiatives truly lead to significant changes in governance and economic practices, or are they merely symbolic? How can we measure the impact of these practices on the reality of affected communities?

“Care for the land, care for the earth, care for the ecosystem...Care as art”, she states.



+ **Antonio Irre Catalano**, Independent artist and researcher. **PLart: research practices on wilderness between art and science**

What would you ask if you could talk to a plant?
The project "PLart" about Plant Communication stems from this question, and from the observation that the biology underlying all living beings has a lot in common. Catalano addresses the intersection of art and science with this multidisciplinary work, which includes public art, theater, and a focus on contemporary social issues. His interest lies in fostering empathy towards the environment, arguing that this connection is fundamental to change our relationship with nature. Catalano invites reflection on the act of interacting with trees, suggesting that we should ask permission before hugging them, highlighting the need for a deeper connection with the natural world. In his research, Irre emphasizes the biological similarity between humans and plants, raising questions about the nature of communication, wondering about why we speak, and how different cells share a common foundation, opening a field of reflection on the interconnection of all forms of life.

He also addresses ethics in research, suggesting that the well-being of plants should be as important as that of animals. This ethical approach is reflected in his first installation *If you could talk to a tree* (2015), which he placed in various locations in the city, inviting people to ask questions to the trees. The installation fosters introspection on the connection between humans and nature. However, it became very personal between the person and the trees, to the point that he stopped reading the questions. He started with this idea and later incorporated all those thoughts into his first theater show. "If you start to think you can communicate with these trees, or with all the trees around, first of all, you start to see things. And then you change your perspective". He also mentions works such as *The Infinite Meadow* (2016), referencing Italo Calvino, and *Plant Stillness* (2022).

Finally, Catalano expresses the loneliness he feels as an independent researcher and the need to build communities that support the exchange of ideas. He believes that the only way to **change our relationship with the environment is through empathy.**

AUDIENCE QUESTION The discussions that arose during the session reveal a series of issues about the limitations of ethics in artistic practice, and the nature of interdisciplinary collaboration. Someone states that as artists we address a multiplicity of personalities, so one of the central topics is the ambiguity surrounding the definition of what it means to be an artist in the current context, specially when working in transdisciplinary areas that combine art, science, and other fields. The freedom associated with being an artist contrasts with the reality that this role also involves rigorous discipline and the need to define and structure work autonomously, which can be a challenge in an environment where the expectations of the art industry are strict.

The panelists agree that art must also involve deep ethical considerations, especially when working with vulnerable communities. The need to create a trust space and a responsible approach towards the narratives and realities of the people involved is key to the success of any collaborative project. Artists must recognize their role in this context, not only as creators, but also as dialogue facilitators and agents for social change.



A NOTE ABOUT THE SYMPOSIUM FORMATS

I'm missing more knowledge sharing that is not exclusively discursive, talking-head style, or descriptive exhibitions. If we want to change the forms, we can change the classic modes of presentation such as panels and conferences.

More practice, some collective experience, a walk... Attention fluctuates when the temporal intensity of the talks is so high. The quality of listening gets lost, bodies cannot endure sitting for so long, and I can see how half of the audience is looking at their phones.

ROUND TABLE

A S+T+ARTS DIALOGUE

Tere Badia, HacTe

Christophe De Jaeger, GLUON

Rosanna di Nuzzo, MEET Digital Culture Centre

Jurij Krpan, Kapelica Gallery for Contemporary Investigative Art

Veronika Lilek, Ars Electronica

Moderator: Maja Alenčič, Institut Oberta de Catalunya



2ND DAY - WEDNESDAY, 30 OCTOBER 2024

ROUND TABLE: S+T+ARTS Dialogue

Participants: Tere Badia, Christophe De Jaeger, Rosanna di Nuzzo, Jurij Krpan, Veronika Liebl
Moderator: Pau Alsina

The discussion, moderated by Pau Alsina from the Universitat Oberta de Catalunya, focuses on the experiences and challenges of the S+T+ARTS initiative, with particular emphasis on its impact and the potential role of Regional S+T+ARTS Centers (RSC) in leading rooted transdisciplinary innovation and promoting cross-cutting collaboration between European regions. Pau introduces each participant and asks them two questions each, generating two rounds of conversation.

*In this presentation
an image triggers the text.*

Christophe De Jaeger, GLUON

*We see a picture with a kind
of wooden market-boat in a river at sunset.*

Food is an important topic within the innovation agenda in the Brussels region. “If you look at the history of art, there has always been a connection to food”, like in Baroque and Flemish paintings. The future of our food systems is a key focus. People believe that technology can change and improve food systems. They think that food “grown in labs” will be the future – a view aligned with ecomodernist ideas. The future of farming is seen as crucial, not just in connection with technology. In San Francisco, a project involves a boat that navigates the city, distributing bio-food, led by activist artists working alongside activist farmers. This project is aimed at creating a more sustainable way of doing things. The question is raised: how is food distributed between farmers and citizens? It organizes early markets, and there are screenings and radio programs on the boat.

Veronika Liebl, Ars Electronica

*We see a photo with lots of
people laughing and looking at camera.*

She starts exposing their collaborative university projects, highlighting the role of Regional Arts Centers in Linz over the past few years, emphasizing on the importance of integrating arts and sciences in higher education and advocating for this interdisciplinary approach to also be applied in primary and secondary education, and summer schools. Liebl stresses that fostering curiosity, experimentation, moments to fail, and openness—skills necessary for 21st-century collaboration—is key. This approach, while not a universal model, aims to promote the structural role of Regional Arts Centers in creating meaningful collaborations and educational programs in secondary education.



Rosanna di Nuzzo, MEET Digital Culture Centre

*We see a picture of people working
with colourful post its in the wall
and a text: “Charrete x Policy Making”*

Since 2019, she has led regional projects exploring the intersection of art, science, and technology to promote sustainable innovation. She has worked with artists and industries, engaging in partnerships with institutions like Politecnico di Milano. Her work focuses on using data and AI to

inspire new city policies and sustainable practices, such as urban mining and circular processes to promote sustainability. She emphasizes the importance of collaboration of S+T+ARTS in the City with local institutions and artists to bring cultural approaches into regional programming and funding structures, contributing to a transformative ecosystem. They take the topic of invisible cities (taking as a reference the novel by Italo Calvino) as urban minds.

Jurij Krpan, Kapelica Gallery for Contemporary Investigative Art

We see a picture of four men looking to a woman who is explaining something in a kind of futuristic lab.



Krpan talks about their work done within the S+T+ARTS initiative over the years, which fosters innovation through artistic imagination, advocating for more than just critical observations but for ideas that inspire reflection on our position in the world. His approach emphasizes the importance of bringing artistic thinking into innovation processes, which is central to the projects developed at the gallery. They start by building their own laboratories so that artists can work alongside scientists and engineers. They have someone who speaks different languages... "We are pushing these

innovations as positive utopias...". They come up with ideas that have the potential to allow people to see their position from imaginary worlds. They are developing a methodology to bring artists outside of the art world and he states that they perform reverse engineering...

Right then I'm feeling a terrible punch in my stomach. It's a somatic perception of class gap again.

We clearly don't have the same problems or challenges.

Tere Badia, HacTe

She doesn't show a picture. So, I'm imagining a brilliant black rectangle with plenty of possible images instead of the main slide of the session they are projecting to fill that gap (of the image not the one on my stomach).

HacTe was founded by the Universitat Oberta de Catalunya and became an independent organisation in 2023. It is composed of 11 organizations, including universities, research centers, cultural institutions and entities representing business and economic sectors in Barcelona. It is conceived as an "EXTITUTION" rather than an "INSTITUTION" (inside). An EXTITUTION signifies an outside form, proposed as a SURFACE or INTERFACE, allowing for temporary and fluid assembly or disassembly. Temporality is seen as unusual, with a focus on strong action, moving beyond sectors and disciplines to explore new possibilities. Its goal is to activate connections between diverse communities, operating with a MATRIX logic, shifting positions and crossing boundaries of education, production, artistic research, and industrial prototyping, rather than following a linear path. HacTe doesn't adhere strictly to predefined lines of innovation. It aims to identify itself as a radically interdisciplinary organization, emphasizing strategic action to step beyond traditional spaces. It works strategically with interlocutors at various political levels, grounded in extensive experience within a mature ecosystem, with a political vision to break away from traditional spaces and act together to create new collaborative spaces.

In the **second round**, Pau proposes revisiting the specific role of Regional S+T+ARTS Centers by

asking about the complexities involved and how they can contribute to create ecosystems.

The metaphor of the ecosystem comes up all the time. In other contexts too. The mere movement of ideas is pertinent, or we will wear it out like “love from using it so much” (“...amor de tanto usarlo”, quoting the super popular Spanish singer Rocío Jurado).

Christophe de Jaeger says that S+T+ARTS plays a critical role for GLUON, especially in fostering intersectoral collaboration. Engaging with politicians proves challenging, highlighting the need to persuade them about the importance of their work through more structured methods. European funding is vital, as it aligns with GLUONs forward-thinking approach, which is not always reflected in Brussels or Belgium. While promoting cross-sectoral work seems evident, convincing political figures remains a significant challenge. They have engaged with institutions like Innoviris, creating international networks for dialogue among innovators, agencies, and entrepreneurs to learn from one another. This collaborative systemic approach is essential for state and regional innovation efforts.

Veronika Liebl thinks in hubs connecting the center to make it accessible to other sectors. There are hundreds of requests, as well as failures. There is a strong focus on the doing, with opportunities to connect the centers to academia across Europe, but it's still unclear how to build networks for exchanging goals. It requires **infrastructural funding** to create such systems.

Rosanna di Nuzzo states that the idea of an ecosystem allows for the pursuit of collaborations with industrial partners, research institutions, and other entities. First, it focuses on promoting a **culture of interdisciplinary collaboration** by identifying exemplary cases to demonstrate its potential to enhance both economic and social innovation. This culture is built on **trust** and should extend to educational settings within academia. Additionally, mapping out possible resources within a given territory can strengthen these relationships, as evidenced by initiatives like the AI and Robotics Lab in Milan, which could help shape future policies and funding strategies.

The S+T+ARTS initiative plays a crucial role by fostering innovative connections between arts, science, and technology through mechanisms like the Dutch approach, offering a unique framework that doesn't yet exist elsewhere, says **Jurij Krpan**. He gives us an illustrative example that highlights the challenges and potential of building strong networks: they presented ideas to the Ministry of Culture that were not heard; afterwards, turning to the Ministry of Technology, they showcased their work... By persistently engaging, sending informational letters, and inviting key figures to experience Ars Electronica they managed to convince them. They loved the experience and this resulted in subsequent meetings and broader recognition of the potential of this scheme. Though it shifted from substantial funding to none over four years, the groundwork laid by S+T+ARTS demonstrates the potential to create a resilient political infrastructure for interdisciplinary collaboration.

Tere Badia talks about the importance of two basic things: the different material conditions among institutions and agents from different fields involved in ARTS processes, and the precarious systems of artists, on one hand, of scientists having a big pressure, or entrepreneurs meeting tight demands or developing new ventures. The major challenge is time— the time is the fucking... problem.

*Yeah!
Laughter erupts from the audience for the first time.*

TIME TIME TIME TIME TIME

Pau asks what allows that and also which methods can be implemented to evaluate and capitalize on the impact of collaboration in research and the industrial field... The challenge of measuring industrial impact and the importance of involving stakeholders throughout the collaborative processes. Some of the more relevant and no repetitive things are written below:

(The atmosphere has eased after the laughter)

Jurij Krpan wonders how to translate this practice and philosophy to a broader audience and tell us that they have invested heavily in

education, from an ideologically interested perspective, exploring the “black boxes”. Sustainability in funding has been a struggle for years, and investing is crucial.

Rosanna di Nuzzo states that both from the researcher’s and the artist’s perspective it’s not easy to work together. She emphasizes the need to create contexts for “serendipity”, where ideas and collaborations can flourish organically.

Tere Badia tells us that years ago, at Hangar, to avoid the sense of knowledge hierarchy, they explored how to bring artists and scientists together. Initially, scientists questioned why they were there, critiquing the lack of rigor of the artists’ methods. The knowledge hierarchy was evident. Artists were brought to scientific centers and viceversa leaving a feeling of being “extracted” or taken advantage of. To overcome this, they raised the idea of “**expedition**”: bringing roles and skills without judging or evaluating others beforehand. In terms of creating trust, this was a pivotal part of the methodology.

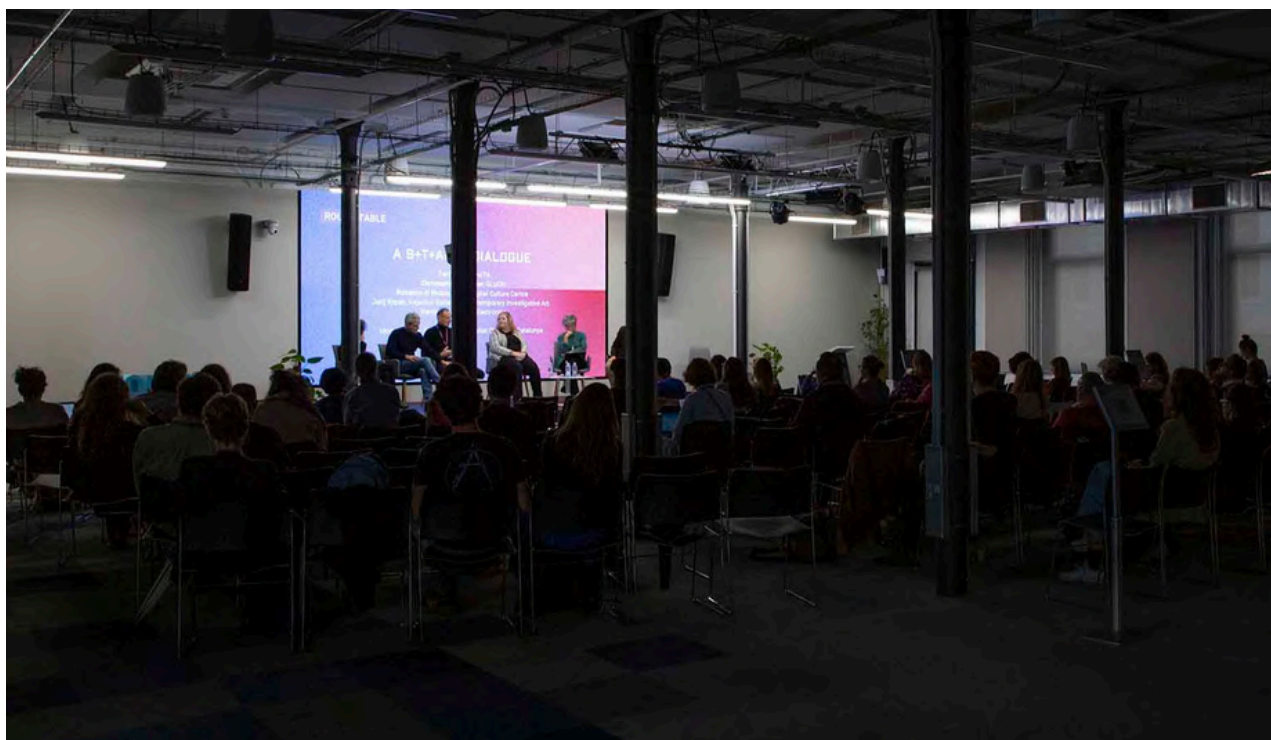
The metaphor changed perceptions about who was doing what, without pre-determining others’ skills—you simply solved the problem at hand,

“when climbing a mountain, it doesn’t matter who is with you; the focus is on the task”.

Some ***AUDIENCE QUESTIONS*** focus on recognition and brands. A man in the audience thinks that a strong brand helps with positioning... How can we improve the recognition of institutions and branding in the context of living laboratories and artistic-scientific collaboration? It is criticised that the effectiveness of branding is perceived differently from different distances; it is stronger up close, but less evident from afar. Tere Badia says that branding requires distilling complex situations into messages that are too short.

Pau says we talk about **INTERSECTORIALITY** and that we’re talking about something existing between departments, ministries, and between different spaces like research centers, cultural centers, universities, and industries—this “in-between” is everywhere and nowhere. Different objectives, different approaches, different cultures must be addressed, with a lot of language-building needed in between to enable collaboration.

“We could create a European network called ‘In Between’, jokes a panelist...”



Computing Tragedies with Hector



PANEL DISCUSSION IV

Epistemologies and Methodologies

Participants: Carolyn Kirschner, Guillemette Legrand, Maxim Velli, Lola Kengen, Jessica Coldrey, Carla Molins-Pitarch

Moderator: Tomás Criado

The panel, focusing on epistemologies and methodologies, with a strong emphasis on the HOWS to create conflicts or facilitate encounters, exploring different approaches, processes, dynamics, frictions, and problems of interdisciplinary collaboration. The structure of the panel includes five presentations followed by three blocks of questions to explore challenges and solutions. It was moderated by Tomás Criado (Universitat Oberta de Catalunya).

+ **Jessica Coldrey**, Independent engineer.
Epistemologies of Healing: Hybrid Visual Research in Flood-Affected Communities

In the Northern Rivers of Australia, specifically in Nimbin, shortly after catastrophic floods had devastated the area, Jessica Coldrey was hired by a tech startup to design and manage the first humanitarian application of drone tree planting. Meanwhile, her colleague Emily Ragus was working on flood relief in South Africa. In that coincidence, both recognized the importance of understanding the sensory experiences of flood survivors through similar methods.

At the precise moment she is talking about floods, the terrible DANA storm is striking Valencia. A terrible reminder that knowledge exchange occurs too within specific, material and historical contexts.

Inspired by Creative-led Research and Sarah Pink's Sensory Ethnography, where "ethnography is produced in the contexts of embodied and emplaced experiences", they worked through **participatory mapping and clay modelling** to document changes in space in affected informal settlements while considering the community's role in healing. The clay modeling served as "boundary objects" to facilitate interviews and surveys, allowing participants to represent themselves and their altered self-images, such as

enlarged representations of their mouths or hearts, resulting from their experiences surviving the floods.

Their work raised questions about the community's timeline for restoration and biodiversity, using drawings to explore ways to support flood recovery. Ethnographic knowledge was generated not only through observation of "others" but by understanding collectively these embodied experiences. Given the local drug culture and community apprehension towards outsiders, they focused on testing and tracking iterative methods to build trust and relationships through mixed methods, with emphasis in iteration, to build relations assessing how different engagement approaches impacted participants' feelings of empowerment and whether their insights were valued by the engineering team.

The presentation included the animation "**Tracing Precarity**", which connects scientific data with lived experiences, exploring the sensory impact of anthropogenic natural disasters. The animation depicted shapes and sounds from the floods, illustrating how hybrid methodologies can advance post-disaster humanitarian practices and advocacy. They experimented with rectangles and shapes to convey the chaotic aftermath, with white symbolizing healing and renewal.

+ **Carolyn Kirschner**, Goldsmiths, University of London. ***A Case for the Intentional Mis-Use of Scientific Tools and Processes as a Productive Approach to Art/Science Research***

Kirschner examines **ERROR** as a crucial element in knowledge production, transcending the boundaries of established disciplinary methodologies. For her, "error generates knowledge, and knowledge, in turn, leads to error". During her presentation, she discusses a range of experimental art/science case study projects that explore how the intentional misuse of scientific tools and technologies can create unconstrained spaces for interdisciplinary exchange, new perspectives on familiar topics, and innovative collaborative approaches.

She lists several types of errors with examples, including: processing error (citing a NASA failure

to detect a large ozone hole in the 1980s), **instrument** error, accidental or human error (which can lead to discoveries, such as X-rays), **modelling** error (highlighting limitations in weather forecasting), and **historical** error, represented visually on the screen by the “periodic table of collective delusions and misconceptions”. Finally, she discusses **quantum error**, using Schrödinger’s cat to illustrate the ironic notion that error and non-error can coexist simultaneously.

Kirschner asserts that error is pervasive in various forms, many of which occupy a fluid position. This creates crises in knowledge production, specially as science traditionally confronts error, a challenge intensified by the climate crisis and shifting paradigms. Agnieszka Kurant’s assertion that the very idea of eliminating error is absurd emphasizes that doing so would annihilate the possibility of surpassing the status quo. She suggests that while scientific methodologies are designed to minimize error, seeking out error voluntarily in the context of art-science collaboration may prove to be a worthwhile endeavor. In this context, she advocates for the **intentional misuse** of scientific tools and technologies as a productive methodological approach, especially in areas where methodologies have not yet been established or formalized.



She illustrates this point with her project **Landscape of False Information**, which uses magnetometers to produce a sculpture that materializes the history of errors accumulated in relation to the Earth’s magnetic field, created using Blender modeling software. Drawing from various data sources, including one of the earliest maps of the Arctic Ocean, the project reflects on the current rapid movement of the magnetic pole towards Siberia, a phenomenon that remains unexplained.

Kirschner emphasizes the importance of seeking spaces of error in art-science collaborations to foster new knowledge and methodologies. She concludes by discussing the implications of searching for areas where existing knowledge and methodological approaches falter, suggesting that these **“error spaces” could serve as rich sites for interdisciplinary collaboration**, though their impact may vary significantly depending on the context.

+ Guillemette Legrand, Ecole des Arts Décoratifs (PSL) / Basel Academy of Art and Design (FHNW). **Computing Tragedies with Hector**


Legrand explores the climate model named **Hector** by examining the interrelations of its technical, institutional, political, and socio-economic realities. Hector is an open-source *Simple Climate Model* available on GitHub, designed for rapid assessments of various socio-economic climate scenarios and calculating the impact of temperature changes. Legrand argues that these interrelations co-constitute how Hector predicts climate futures, raising questions about the model’s onto-epistemological imaginary.

She explores how artistic-led research through computational ‘bugs’ (*The Underground Division*, 2021) can help document the model’s logic and socio-political implications and produce transdisciplinary knowledge. She contrasts two contexts: Hector as a **model** and Hector as a **myth**. In the first context, Hector functions as a political and economic infrastructure developed at the Pacific Northwest National Laboratory (PNNL) with funding from the U.S. Department of Energy. This highlights the political materiality of its infrastructure and the specific future it models regarding fossil fuel economies and national security. This shows the condition in which Hector modeled the future and what future

Hector is modeling.

Through various graphs and provocations, Legrand questions whether Hector can adequately address climate change or if it is limited by a specific imagination. She employs bugging and debugging processes and engages with users to explore the thoughts and practices behind the model, provoking the climate model to act abnormally or irrationally. This debugging shifts the conversation to rethinking the model, describing the gaps, making it difficult to deconstruct its amateurism... reflecting on its technical limitations based on carbon imagination and future climate scenarios.

In the second context, **Hector as myth** (High Emulations Calculator of Temperature), Legrand incorporates imagery from mythology, including Zeus (god of the sky and thunder) and Cassandra, to provoke discussions about the model's logic and what she calls its "imaginary model." Hector is designed for socio-economic scenarios, challenging conventional dialogues around climate models. She highlights the need to rethink the model and address its limitations while playing with various images, including pictures of Zeus, ironically showing the figure of Hector with a circle on his face, and the painting "Cassandra's Prophecy."



*I hear a kind of explosion,
and I connect it with an invocation
of that Zeus. But no. The thunder
has started with an intense rain
outside that seems to try to drown
out the voice of Guillemette Legrand*

This suggests that the architecture of Hector reflects a mythological framework that regulates the environment. The prophecy of Cassandra was fulfilled when Hector sealed the fate of God before him; Hector is a dead figure whose destiny is sealed, capturing in his last words, "I can see my destiny before me." The forecasting model was realized when climate policies were enacted according to sociopolitical conditions proportional to Hector's capabilities. Can the model named Hector also foresee its own limitations while informing us about the constraints of its imaginary? This insight raises questions about the model's ability to recognize its limitations and the reliance on a simple climate model that privileges the sociopolitical conditions of its creators. Legrand concludes by

advocating for diversifying climate modeling practices to foster a more pluralistic and imaginative climate future.

+ **Carla Molins-Pitarch**, CITM -UPC.
Transdisciplinary Design Toolkit: Lab to Street. Tangible Science Framework to collaboratively create art, tech & science experiences

Molins-Pitarch presents the transdisciplinary design project "The Toolkit: Lab to Street," which is an open-access resource that uses design methodologies to effectively communicate complex multidisciplinary research to various audiences. Initiated in 2020, the project collaborates with molecular biologists and other stakeholders to tackle the challenge of communicating molecular biology and translating laboratory work to public understanding through design. The toolkit aims to establish a shared lexicon, a common framework, and a comprehensive methodology for collaborative projects.

The project consists of workshops and prototypes to test and refine the toolkit. In the first phase, they developed a beta version and created a booklet, which was uploaded to the open repository Zenodo, addressing the "unknowns" for both designers and molecular biologists. This phase identified needs for a shared lexicon, common framework, comprehensible methodologies, clear checkpoints, and a "shared recipe/protocol".

In the second phase, they produced a color-coded booklet to clarify the process, followed by a third phase where the toolkit is evaluated by involving collaboration with people from other disciplines. The final phase included sharing the project through an exhibition titled "Life's Journey" which featured an interactive centerpiece: an interactive genome experience that allowed visitors to engage with their own genomes.

The toolkit fostered collaboration and trust among participants from diverse disciplinary backgrounds. In conclusion, Molins-Pitarch emphasizes the evolving role of designers in science communication, highlighting the toolkit as a key resource. The open repository has effectively engaged various community members, and attendees can access it via the QR code or a material version.

+ Maxim Velli and Lola Kengen, Learning Planet Institute, Paris. **Solarpunk Science: Transforming Epistemologies for a Regenerative Scientific Praxis**

Breaking the fourth wall, Maxim playfully asks the audience who among us are scientists and how many of us really feel we can confidently speak about doing creative work in our daily lives?

(a mysterious pause)

They emphasize that society struggles with reconciling technical rigor and creativity, a struggle that often begins early in education. The speaker addresses the discomfort around recognizing creativity within technical fields, particularly engineering.

Then, Maxim Velli introduces Solarpunk, as a kind of manifesto to explore its potential for transforming epistemologies toward a regenerative scientific practice. Using slides featuring short sentences and illustrations by various artists, they build a text around several "what ifs" shortly explain as example:

*What if schools were about building together?
What if universities taught connections, not niches?
What if research was driven by purpose, not pressure?*

A phrase displayed on the screen lingers before transitioning to the female voice of Lola Kengen:

Practicing this speculative thinking and reclaiming radical hope, the belief that things can be different.

They delve into the idea of creating spaces of conviviality, hope, justice, and desirable futures. The presentation challenges the notion that technical rigour and creativity are incompatible. They advocate for schools and universities that foster horizontal and vertical learning and collaboration, proposing a shift in educational paradigms, envisioning schools as community spaces that encourage horizontal and vertical learning, allowing students to contribute meaningfully to society from day one. In universities, they advocate for collaborative exploration of real-world problems across



disciplines rather than traditional lecture-based education.

The speakers challenge the rules of academic research, suggesting that researcher's prestige should be defined by their impact on communities, rather than publication metrics. They draw upon concepts from the "education of our desire," which encourages questioning seemingly immutable limitations and practicing speculative thinking and radical hope for a better future.

EDUCATE YOUR DESIRE

The discussion introduces "solarpunk" through the Solarpunk movement, which envisions a harmonious relationship between humanity and nature. Solarpunk acts as a memetic engine that spreads possible futures, preferred futures, probable futures, and plausible futures. It serves as a counterpoint to dystopian narratives like cyberpunk, which recognized the historical link between science fiction and reality and reversed it, inviting us to speculate about desperate futures and the various ways they could exist, a narrative that has dominated popular culture.

The speakers argue that scientists need to reflect on their values and aspirations and consider how these align with their work. They suggest that

engaging with different epistemologies and methodologies—referencing books like *Refuture Your Minds*, *Regenerative Scientific Praxis*, *Reverse Engineers*, and *Epistemic Justice*—can help scientists assess whether their technologies contribute to a desirable future. **By envisioning a better world, scientists may feel more motivated to work toward it and act responsibly to accomplish that "vision."**

Tomás Criado opens discussion stating that the interdisciplinary encounter is much more complicated than it might seem and invites the speakers to delve into how their different proposals shape or suggest ways to facilitate this interdisciplinarity through methods like error, connecting mythology, using ethnography to generate design outputs, or even through manifestos. He later mentions a "thread", viewing it as an attempt to shape and foster an encounter, but acknowledges that such encounters are often filled with hierarchies and misunderstandings.

Shaping encounters and cross-disciplinary collaboration: Maxim Velli, with a background in bioengineering, explains that in his work with biomaterials often has to explain to both scientists and designers why certain ecological and social considerations are important in experimental design. For example, if in labs scientists only care about the technical aspects of biomaterials but without explaining why ecological concerns matter, the materials may have no real-world application. He also shares that creating frameworks for cross-disciplinary collaboration helped both groups to see the value of each other's work, giving the example of a design framework used to encourage both engineers and designers to understand each other's language and practices. The ultimate goal was to show that collaborate without needing formal degrees in the other field can lead to deeper and more meaningful outcomes.

Type of roles, errors and constant adaptation in collaboration: This question about different roles emerged from the audience. Coldrey shares her experience in getting into a multidisciplinary team as an outsider. She initially tried to project professionalism by wearing a suit and offering a formal handshake, but the team greeted her with a casual "g'day" and a knuckle bump. This initial "error" made her realize the importance of

adapting to the informal team culture. Coldrey learned to change her approach, wearing a fun bucket hat with mushrooms and greeting with a knuckle bump, which helped to build trust and friendship.

Challenging hierarchies and knowledge systems: Some conclusions are that by incorporating local knowledge into the restoration design, projects may have a better chance of long-term success. The idea of the artist as a "translator" or mediator in interdisciplinary work emerges: when scientists and artists collaborate on a project, artists may introduce creative methods that are unfamiliar to scientists, while scientists can explain the technical side to creatives in multidisciplinary spaces. When entering as an outsider, you often play the role of mediator, adapting to communicate in different languages. There's an inherent error in this—experimenting with the roles meant to assume. These errors help to challenge our assumptions. By adapting and building friendships, errors in such spaces can be valuable. Holding space for those errors and using them as an opportunity to iterate, it can lead to deeper connections and meaningful impact.

Fallibility in Science and Art collaboration: There is an interest in the spaces of uncertainty and how creativity can be applied to explore it. These "unresolved" spaces, panelists argue, are places where cross-disciplinary collaboration can lead to new insights. Guillemette Legrand says "not so much blaming the tool, but more about conversation?". She places climate modeling in a difficult-to-define space, and that's where it becomes interesting and where perhaps a space of mutual comfort is found. She shares the work of a group called the **Indigenous Mapping Collective**, which explores ways of intentionally misusing scientific instruments in unconventional ways. They collaborate with scientists using satellites and other remote sensing technologies to produce alternative maps of landscapes in counter-mapping and anti-colonial practices.

Overall, the conversation highlighted how cross-disciplinary collaboration, embracing errors, and integrating different kinds of knowledge, such as local expertise and artistic approaches, can lead to more innovative and successful projects.

S+T+ARTS

+ General
frame



Alfred Eisenstaedt, Kids Rejoice at Street puppet show Paris 1963



PRESENTATION

Legacies of Transformative Collaborations: Insights from S+T+ARTS in the City

Participants: Elisenda Ardèvol, Laia Blasco, Alba Colombo, Anna Pinotti

Moderator: Aurélie Delater

This session critically examines the **methodologies developed by S+T+ARTS in the City project** to assess the impact of collaborative projects between artists, scientists, and technologists across five European regions. Key findings were presented, highlighting the importance of both quantitative and qualitative data. The speakers are Elisenda Ardèvol, Laia Blasco and Alba Colombo, from Universitat Oberta de Catalunya and Anna Pinotti, HacTe, in a presentation moderated by Aurélie Delater.

The moderator introduces her personal journey in S+T+ARTS that began over a decade ago gaining momentum in 2017 with the residencies, which facilitated collaboration on a larger scale than ever before. Their goal then was to **enhance cross-disciplinary collaborations**, to ensure a smooth communication between all parties involved, **and produce tangible results, though impact measurement was not a primary focus. They collected feedback and monitored progress.** Over time, S+T+ARTS initiative expanded to address broader fields, establishing a strong network and support system. A significant development was the 2019 S+T+ARTS Ecosystem, which gathered stakeholders under a common branding, reinforcing the S+T+ARTS community (she talks about a “big family”), at both regional and local level. While the concept of impact has always been central to S+T+ARTS’ innovation goals, she recognized that there is a **lack of structured impact assessments** or strong reports. With the S+T+ARTS in the City project, they seized the opportunity to rigorously evaluate impact, aiming to provide solid data for policymakers and stakeholders to support future funding and expansion.

Alba Colombo begins her speech showing a black and white picture taken in 1963 by Alfred Eisenstaedt, who captured a group of kids and their strong and different emotional reactions to a

street puppet show in Paris. Colombo outlines their no indifference, stressing the **impact** (an emotional one) the show had on them and shares with us her desire to see this impact in the ASTS field, wondering how to evaluate projects as S+T+ARTS in the City. She poses another metaphor, imagining a drop of water falling down to a surface and generating different waves (or dimensions) so, like a drop, a project can impact in various dimensions of people's life.

She advocates for the use of a *Complex Holistic Assessment*, a multimethod approach, for assessing and evaluating projects like S+T+ARTS in the City, emphasizing a comprehensive **iterative approach** that considers both quantitative and qualitative dimensions (more in depth).



She insists that the qualitative gives us the possibility to add other kinds of information capable of giving a more holistic approach. Here’s a summary of the primary methods suggested:

Integration of iterative and ongoing Assessment from the beginning: The evaluation process

should be built into the project's design phase rather than added at the end. Evaluations should be conducted at multiple stages of the project, not just at the end. This ongoing assessment allows for adjustments in response to observed challenges or new insights and teams can make real-time improvements and adapt to evolving conditions.

Circular Process of Evaluation: The speaker suggests a continuous cycle for assessment: define objectives, collect data, analyze, report, share, and refine the approach as necessary. This method allows for ongoing adjustments.

Multi-Methodological Approach: For a holistic evaluation, the speaker emphasizes combining quantitative (e.g., surveys, economic impact, mobility) and qualitative methods. Qualitative data adds depth by capturing subjective insights on how the project impacted participants.

Iterative and Ongoing Assessment: By revisiting the evaluation process at different project phases, teams can make real-time improvements and adapt to evolving conditions.

Stakeholder Engagement: Effective assessment requires engaging stakeholders (e.g., artists, participants) throughout the project. Gathering feedback at multiple stages—before, during, and after participation—yields a fuller picture of impacts and recognizes the dynamic needs and experiences of stakeholders over time.

Clear Objectives and Data Management: It's essential to have clear goals for each assessment, including specifying the audience (e.g., which impacts matter to whom). Proper data management and analysis models are necessary for ensuring that collected data accurately reflects the project's success and impact, aligning with initial goals.

Legacy and Lasting Impact: She underscores the importance of understanding the project's lasting legacy. This involves capturing how experiences and outcomes influence participants' lives and future projects.

She gives some common mistakes to avoid: underestimating evaluation time and resources; lack of clear objectives; inadequate stakeholder engagement and neglecting data collection.

Elisenda Ardèvol helped develop the methodological framework to measure the impact of the S+T+ARTS in the City project artist residency program, integrating both quantitative and qualitative KPIs to assess the outcomes. The project aimed to evaluate the programme's effectiveness by not only counting quantitative data but also analyzing participants' experiences and engagement quality. As Alba Colombo, she insists on the need of collecting both quantitative and qualitative data, gathered from reports, interviews, and focus groups with mediators, artists and scientists participating in the programme.



The framework identified five main dimensions of analysis: interdisciplinary collaboration, innovation and creativity, residency dynamics, public engagement, and long-term sustainability. Each dimension was examined across three entangled aspects: perceptions (participants' expectations and feelings), actions and conditions (specific steps taken and challenges faced), and legacy (lasting changes and mutual influence on participants' mindsets). The framework, planned as a knowledge ecosystem, provides insights that can be used to refine future iterations of this kind of residency programmes, ensuring a better meets its goals and supports meaningful interdisciplinary collaboration.

Anna Pinotti explains that the analysis done reveals some key findings about the

interdisciplinary residency programme. It fosters deep collaboration, where both artists and scientists benefit, but data reveal that they experience it differently. Artists value trust, support, and advice from scientists, while scientists see collaboration with artists as a source of inspiration, new ideas, and broader dissemination of their work. However, scientists often feel a lack of strong mutual influence, perceiving limitations in how deeply they can integrate their perspectives with those of the artists. This dynamic highlights the challenges of blending different mindsets and methodologies in a meaningful way.

The residency program is perceived as a collaborative space for innovation. This objective is very much dependent on the role of the facilitator that they call Innovation catalyst. The residency process itself emerged as a significant focus of analysis. One key problem is its short duration (nine months), which artists and scientists agree is not enough time to foster deep, meaningful collaboration. Additionally, "setting and integration" (work conditions, facilities, and access to research environments) plays a crucial role in enabling artists to work effectively with scientists. An important tension is the idea of Process versus Outcome: the need to deliver a tangible result by the end of the programme (artwork or prototype) conditions joint research processes and the desire to engage in an open-ended collaborative process. Artists and scientists valued the importance of conversations and sharing time/space.

Finally, the roles of "innovation catalysts" (facilitators) and local expert groups are crucial in enabling collaboration, but their involvement could be strengthened. The local expert groups, often mentors, provide guidance and expertise that significantly impact the development of the artists' projects, but their role could be expanded to also benefit the scientists. However, involving a larger audience or communities in these residencies has been challenging due to tight

schedules and the specialized nature of the projects.

There are only a few instances where a strategy for citizen involvement has been established. In cases where public engagement has been possible, it has fostered a sense of shared ownership and contributed to more human-centered, effective solutions. The programme must work to create a more diverse knowledge ecosystem.

These findings suggest that while the residency has successfully fostered innovation and creative collaboration, structural adjustments, especially in **time allocation and integration of broader audiences**, could improve future programmes.

Laia Blasco briefly introduces an ongoing HacTe and UOC report about another S+T+ARTS pillar called **Academies**, focused on educational activities. As a case study about how to assess these activities, analysis findings show a **lack of clear definition and systematic documentation**, with little available public information about activities, particularly in science and technology education. Preliminary recommendations suggest enhancing data collection to better track and evaluate these programmes, proposing improvements linked to multi method approaches that allow the gathering of more quantitative data (such as institution involvement, participant demographics, and methodologies) and highly relevant qualitative data (like open-ended responses and focus groups). There is a concern that excessive structure might limit the Academies' adaptability and creative openness.

Anna Pinotti finishes proposing a paradigm shift toward the design of complementary indicators to evaluate interdisciplinary collaborations: the transition from Key Performance Indicators (KPIs) to **Key Transformative Indicators (KTIs)** reflects a need for a transformative approach that allows better understanding of long term effects, impacts and sustainability of these initiatives.



Madrid In The Air 24h (Ecovisionaries, Royal Academy, London 2017)



CLOSING TALK

Arts, Science, Technology and Society intersections: how to navigate them in practice?

Keynote speaker: Nerea Calvillo, Centre for Interdisciplinary Methodologies, University of Warwick

Respondent: Laura Benítez, Universitat Autònoma de Barcelona

Moderator: Tere Badia, HacTe

The intersections of Arts, Science, Technology and Society look good on paper, but they are inevitably messy, exciting, challenging and fragile – the ingredients required for innovation and change to emerge. However, how to navigate these intersections in practice? What is at stake at personal, professional, collective and institutional levels? Who -with whom, where, when- has the capacity, desire, courage – and privilege- to do so? What are the conditions that can facilitate, support, enhance, trigger or encourage these processes?"

Nerea Calvillo, problematizes the structural conditions that hinder the development and sustainability of interdisciplinary projects and calls for a **critical rethinking of the evaluation frameworks** and funding models to support them more effectively. She begins by questioning the notion of intersection, assuming that there is "always" something in common, but **sometimes, there is nothing in common**. The disciplines that go beyond the methods used have different temporalities, challenges, interlocutors, and each of these has its own problems, methods, practices, expectations, evaluation processes, timings, and world-making capacities. Calvillo proposes another way of understanding this as **different galaxies with their own systems**. She suggests thinking of them as encounters, battlefields or contact zones. She brings back into the debate an idea that has been previously brought up: "What is this space for us when we are in it?". Is it a field, a practice, a product, a transit zone, or telepathy, as suggested yesterday?". Referring to Badia's proposal of expedition, Calvillo says that she loved the concept and questions *who is transiting, where, and from where to where? How does orientation work if it's a spatial collision?*

To explore these issues, she proposes a project journey, or a linear biography, through the experience with "In the Air," an ongoing collaborative project that visualizes air pollution, initiated at MediaLab Prado in 2008, and its various iterations with different teams, including apps, installations, and even a book called *Aeropolis*. In this project, she highlighted the importance of understanding the materiality of air, the role of **science and technology studies, feminist technoscience and transfeminist, intersectional and queer approaches in her methods**, and the ethical considerations in knowledge production. The keynote also reflects on the personal and professional toll of such work, balancing art, science, and technology, dealing with different institutional demands, and managing **free labor**. It allowed us to grasp the material, institutional, affective, spatial, economic, elements that, looking back, were needed.

Calvillo reflects on the high expectations that vary depending on the context, whether in an academic, artistic or architecture career, where there's always something lacking, always something missing. Although this project is often considered a successful one, the question remains:

What made it possible?



...definitely not the conditions in the university because "things don't happen in the air": they need materials, institutions and support. Why is it always so homogeneous? "It is quite scary", she says and she refers to the previous keynote talk by Salter, when every single human that appeared at the intersection between science and art was a white male. However, **feminist and queer methods, theories, and activism** have been really important to open up non-institutionalized forms of knowledge. There is a need to focus on the politics of knowledge production, on how things are done, because all these processes matter from an ethical perspective into looking at what is missing in the picture: **power relations, challenging categories, or putting inequality and oppression at the center.**

She critically unpacks some questions:

Who funds the projects? Calvillo talks about political parties dismantling institutions of support (Medialab Prado in Madrid as an example).

What **free labour and emotional labour** are operating here? She reflects on unfunded experimentation, including invested time, when the product is not known in advance, and how curators focus on results and performance in a way that lacks empathy. She asks questions about how she made co-design with participants, reflected in who can offer time with or without fees, and how artists bring the body to exhaustion: "Living in the not enough". **What do we do with this contradiction, and how do we care for ourselves?** As solutions, it's crucial to go beyond encounters and create **new funding opportunities** that require specific conditions, including experimentation.

Funded practitioners: Compensated participation as some grants don't allow paying all participants... because it's externalizing labour... "but *time is time*", she says.

New evaluation criteria: Sometimes only the artists are evaluated, but not the frameworks where work happens, leading to impossible standards.

Integrated Maintenance: How to maintain and keep the project running within institutional websites and others...

Stable contexts and diversified contributions: We depend too much on political cycles; institutions are not capable of maintaining long-term, and something is always lost when an institution closes.

New forms of authorship and redistributed benefits: In science, there are sometimes three paragraphs on authorship; in art, there is none. What happens if authorship is just a description of the project bio?

What do we do it for? Are we doing it to test possible futures? Are we engaged in science communication?

What is the aim of each of these projects, and does each of these aims require different evaluation criteria? What does success look like? And for whom are we doing it? Who benefits? Can we redistribute the benefits?

Calvillo thinks we also need new narratives on why this matters, these intersections, what impact is, or these encounters, or these battle points, because they take a lot of effort and time.



For me this has been a very emotive presentation in which my gap feeling has been closed.

Laura Benitez brings to the table her obsession with **language**, stemming from her background in philosophy. "We've been discussing issues such as ethical responsibility, epistemologies, and care in depth": intersectionality is key here, linking deeply with ethics, but she highlights that the use of language can be very complex and can even be reversed in ways that prevent crucial questions from being reduced to mere hypes, trends, or cultural artifacts.

She also critiques the opening keynote focused on masculine genealogies, stating that "when we are facing this kind of presentations, we are nourishing epistemic violence." Benitez aims to connect questions related to the material conditions of research, knowledge creation, and the presences and absences within those spaces. Regarding air and toxicity, Benitez reflects again on the use of language and how it reveals who collaborates with whom and what resources are involved.

She mentions the notion of “**epistemic toxicity**,” and how politicians often use toxic subjectivity to obscure their responsibilities. She believes that **the approach to toxicity can open critical cracks that allow different possibilities to be articulated from a transfeminist and intersectional perspective**. Toxicity, as a concept, remains open for articulation and transformation.

She also notes that many artists from Barcelona are unable to attend the event due to material conditions, such as lacking time or multiple working jobs. Epistemic justice is thus deeply linked to these unequal material conditions—a key issue for her. She references a report noting that in 2023, 72% of artists in Spain were below the poverty line, emphasizing that labour conditions are crucial. Transforming these material conditions into terms of labour is necessary for a meaningful change.

I wanna cry...



Benitez warns against using language to transform critical questions into mere cultural types or artifacts produced by cultural industries, as this can lead to the erasure of bodies and conditions. We carry ethical responsibilities toward these matters, and she emphasizes the importance of embodied commitment. Acknowledging the contradictions inherent in working with public funds from the European Commission, while also being aware of agencies like Frontex with their biopolitical and necropolitical practices, is necessary. She reminds us that nobody uses the term tanatopolitics: Why? She emphasizes “not trying

to hide the elephant in the room” or displacing responsibilities. We must confront them.

Embracing intersectionality alongside interdisciplinarity requires genuine care, rather than capitalizing on care as a trendy topic for projects. Benitez highlights the differences between working for private or public universities and the challenges posed by insufficient research resources. Thinking about epistemic justice amid constant material difficulties is incredibly complex. She calls for **decolonizing knowledge**, noting that academia, like some artistic institutions, embodies both feudalism and neoliberalism? Awareness of privilege and understanding one’s place of enunciation is essential. Decolonization is not a metaphor but a complex process involving historical responsibility, reparations, and more. Benitez invites us to transform material conditions and open small cracks of possibility.

Tere Badia sits with them to reflect on material conditions. What’s happening in public universities in terms of infrastructure? What about the new cognitariat? What about infrastructure-related issues or power relations?

Laura acknowledges being in a privileged position but she has faced extreme power relations struggles at the university over political and gender-related issues. The exhaustion of being a “killjoy” remains a burden, but Benitez finds valuable staying engaged. She agrees with Bell Hooks with the perverse use of academia as “a pretty affective way of domination”, but she has confidence that classrooms can still work as spaces of possibility and potential.

AUDIENCE QUESTIONS begin. Someone asks: “How can we make a six-month residency more inclusive?” Nerea answers that one of the challenges is extreme competition and the need for intersectional inclusivity, which depends on the artist’s choice in each situation. Some have fewer opportunities because they always have to work... How do you come back to your work after a residency? How can we shift the hierarchy of what matters? There is maternity leave, paternity leave, and no other leaves...? There is a need to change the hierarchy of what matters, building work-based positions that preserve jobs and rights. Could it be an artistic hierarchy? “We need

to get creative about it”.

Audience questions open debate about the need for adequate working structures. Laura responds that perhaps, even today, unions need to be rearticulated in the 21st century, but like any workers, artists need proper platforms to gain knowledge, legal awareness, and tools to understand their rights. If not, you are always relegated to a position of pity. For example, the critical work done by platforms like the Visual Artists' Union and the PAAC (Assembly Platform for Artists in Catalonia) is key for her. These platforms are vital for claiming proper working conditions for artists and ensuring artistic work is valued.

Tere Badia asks about the relationship between weak infrastructures and academia or research centers. Do we really have enough centers for doing transdisciplinary research? Which role do the STAR+T+S regional centers play? Nerea answers that public funding for these spaces is crucial to participation. Laura agrees that old structures just reproduce themselves: **“I would say we don't need more centers; we need to transform the existing ones”**, referring as example to spaces like Hangar, that embodies

more than academia.

A man from the audience poses a last question about a prejudice that scares him. His final dissertation ends like this: “what I see working with artists is that if we give them a budget of 30,000 euros for the project, they can't do it. They interrupt this very deep production, they can't make certain mistakes (...) They interrupt their misery, and they function perfectly in their little gardens, without responsibility, just interrupting things. So this is what scares me”.

As a beautiful end Tere responds with a little story of the last century:

[...] “So they looked at a group of ants and noticed that some of the ants were doing nothing at all. Then they thought “maybe if we take those ants out, we can increase the productivity and it would be a colony of 100% productive ants”. OK, so they did it. They took the unproductive ants away. Suddenly, in both groups -the unproductive and the productive- things started to change. So in the 100% productive group, some ants decided to do nothing. And out of that 100% unproductive group, one group decided to do something”.

It's a very nice story.



AV & POSTER AREA

The symposium included a space for the display of posters and audiovisual essays. There was also an opportunity to see the installation of *Invisible Voice*, by Mark Farid, artist in residence at the Universitat Oberta de Catalunya (UOC) as part of the S+T+ARTS in the City residency programme.



The projects exhibited in this space were:

Wide Time - Space Psychology for improving quality of life after cancer

Gioia Arieti (Wide Time)

As space exploration progresses, the focus has increasingly shifted towards addressing the psychological well-being of astronauts. Recognizing the complexities of time perception distortion during long-duration missions, interdisciplinary research has developed a novel calendar structure to measure meaningful time units in space. This innovation, rooted in design and psychological science, is currently being tested with cancer survivors to assess its applicability in post-treatment adaptation. The study underscores the potential of integrating design, science, and technology for future advancements.

Metabolism of Techno-Financial Worlding

Andreu Belsunces Gonçalves (Engineering Fiction & UOC)

“Metabolism of Techno-Financial Worlding” is a speculative video essay that explores the process of financialization through the relationship between finance, imagination, and the computational production of uncertainty and futures. It focuses on how Venture Capital exploits the mythological aura of technology to advance with its libertarian and technocratic agency. This video essay, still under production, tells the story of the Venture Capital Capacitor, a device that exploits the energy of an invisible territory called Reality³ to summon techno-financial entities from the imaginary realm to material reality.

Invisible Voice

Mark Farid (University of the Arts London)

Invisible Voice is a digital arts and research project featuring a browser extension, mobile app, and interactive installation. Developed over three years with EU support, it challenges societal narratives on key issues like human rights and corporate ethics. The plugin seamlessly integrates into browsing, using data from 37 open-access sources to reveal company practices. The app offers product scanning for deeper insights. An interactive installation adds a dynamic layer, spotlighting brands’ impacts. Invisible Voice empowers users to align their actions with their values, driving change in politics and media.



ASTER+S>ART^SEALIFE: SciArt works concreated in transdisciplinary teams in collaboration with marine biologists of the Institut de Ciències del Mar (ICM-CSIC)

Rocio Garcia-Robles (University of Seville)

ASTER+S > ART^SEALIFE (@asterproyecto) arises from the SciArt collaboration between the Institut de Ciències del Mar (@icm.csic) and the ASTER+S research group from the University of Seville with invited participants (Netherlands, Barcelona). We focus on how marine life is developing beneath the surface under the influence of climate change, with the dimension of citizen science supported by the EMBIMOS research group (<https://minka-sdg.org/>), and using our eco-SciArt methodology for transdisciplinary co-creation.

LEONARDO/ISAST LASER Talks: Interdisciplinary Creativity for Innovation

Christiana Kazakou (LEONARDO/ISAST LASER Talks)

Leonardo/ISAST LASER Talks is an international program that “democratizes” knowledge by bringing together artists, scientists, humanists, and technologists for informal presentations, performances, and conversations with the wider public. The mission of the LASERs is to encourage contribution to the cultural environment of a region by fostering interdisciplinary dialogue and community building in over 57 cities across five continents. LASER’s local & global nodes build a creative infrastructure to address the world’s most challenging problems and help us engineer a better future.

THE SOLAR SHARE An Edible Solar Currency
DISNOVATION.ORG

THE SOLAR SHARE stages a form of planetary economics based on photosynthesis. THE SOLAR SHARE project challenges prevailing economic models with insights from sunlight-harvesting organisms, crucial to life’s metabolism. Featuring a one-square-meter microalgae bioreactor, it highlights human dependence on photosynthesis and proposes edible microalgae as a new economic unit, representing daily biomass yield.

It offers a transformative economic system that reintegrates human metabolism and energy needs with photosynthesis, redefining sustainability within planetary limits.



Somoure

Mónica Rikić, Universitat Oberta de Catalunya

Somoure is an artistic research project developed during an EU S+T+ARTS residency, focusing on improving the social acceptance of assistive robotics. The project explored various ways of integrating robots into healthcare systems to enhance the independence of patients requiring assistance. Conducted in collaboration with the Institute of Industrial Robotics (IRI) at CSIC-UPC in Barcelona, the research investigated how robots could be effectively integrated into assistive roles while ensuring patient comfort and trust.

Fostering Interdisciplinary Alliances: Gluon’s Six-Stage Methodology

Ramona Van Gansbeke, GLUON

The six-staged methodology developed by Gluon puts its emphasis on local ecosystems and global challenges, representing a novel approach that pushes the boundaries of innovative practices. It is based on the belief that the contribution of the arts is key in facilitating new social imaginaries and transformational narratives for the twin green and digital transitions. This methodology enables organisations to bundle and expand expertise and existing networks and raise the skills and innovation levels within the challenges put forward.

PARTICIPANTS



May Abdalla

Anagram

May Abdalla is a highly acclaimed director and artist known for using physical experience, technology and storytelling in ground-breaking ways. Her work brings poetic insight and meaningful interactivity to important contemporary issues with the aim of deepening our understanding of ourselves and the world around us.



Pau Alsina

Universitat Oberta de Catalunya

Pau Alsina is an Associate Professor at the Arts and Humanities Department of the Open University of Catalonia (UOC) and at the Official Master's Degree in Digital Art Curatorship (ESDI). Since 2001 he has been editing the scientific journal ARTNODES. He has chaired conferences (BCN ISEA, Art Matters, Interface Politics), curated exhibitions (BCN Science Biennial, ISEA Possibles, Ars Electronica Garden, NEO Cosmocaixa, Cultures of Change), advised public (FECYT, Barcelona City Council) and private institutions (Fundación Carasso, BBVA, NAF) on cultural policies and the relationship between arts and sciences. He is a member of the Executive Committee of the Barcelona Culture Council.



Elisenda Ardèvol

Universitat Oberta de Catalunya

Professor at the Faculty of Arts and Humanities of the Universitat Oberta de Catalunya (UOC) in the field of Social and Cultural Anthropology, and visiting professor at the Department of Anthropology, History and Humanities of Flacso (Ecuador). His research career stands out for its interdisciplinary nature and the breadth of his fields of study, with his transversal focus on ethnography and qualitative methodologies related to the media. His current lines of research in the Mediaccions group are related to the development of digital ethnography, anthropology of design, creative practices, environmental activism and narratives.



Gioia Arieti

Wide Time

Gioia Arieti, by day, works on large-scale digital transformation projects. By night, she is the founder of Wide Time, a human-centered calendar designed for long-term Space missions. This calendar was tested in an analog Space mission and has received international media coverage, including TEDx, the Melissa Space Conference, and an art prize from a European Space community.



Tere Badia

HacTe

Tere Badia holds a Bachelor's degree in Art History from the University of Barcelona and a Master's degree in Information and Knowledge Society from the IN3 (Internet Interdisciplinary Institute-UOC). From 2010 until 2017, Tere Badia was Director of Hangar, a centre for artistic production and research in Barcelona. From 2018 until 2022, she served as Secretary General at Culture Action Europe in Brussels. Since December 2024, she is the Director of HacTe, the hub for Arts, Sciences and Technologies in Barcelona.



Andreu Belsunces Gonçalves

Engineering Fiction

Andreu Belsunces is a sociologist of design, technology, and imagination. His research practices engage traditional, speculative, and artistic methods to explore how material futures emerge through the interplay of technology, industry, policy, and finance, particularly in relation to uncertainty, hype and fiction. He is a lecturer in Science and Technology Studies, as well as critical and speculative design, across several BA and MA programmes. He is currently a PhD candidate at the Tecnopolitica research unit, at the Universitat Oberta de Catalunya.



Laura Benitez

Universitat Autònoma de Barcelona (UAB)

Laura Benitez has a Ph.D. in Philosophy and is a researcher and university lecturer. Her research connects philosophy, art(s), and technoscience. She is an associate professor at the Department of Philosophy at the Autonomous University of Barcelona. She also teaches at Elisava. She has served as the coordinator of the Theory area in the Arts and Design Degree at Massana, where she taught Critical and Cultural Studies. She has been a visiting researcher at the Ars Electronica Center and the Center for Studies and Documentation of MACBA.



Marie-Carmen Bex

Deputy Director General of Innoviris (Brussels, Belgium)

An economist by training, specialising in Development, Population and Environmental Studies, Marie-Carmen Bex is currently Deputy Director General of INNOVIRIS, the public funding organisation for research and innovation of the Brussels-Capital Region. Marie-Carmen Bex specialises in R&D&I funding policy and has been active in this field since the 1990s. After various experiences (BELSPO, EU PermRep, etc.), she has mastered the institutional intricacies of the field, from the regional level to Europe.



Laia Blasco

Universitat Oberta de Catalunya

Laia Blaso is director of the Bachelor's Degree in Arts and lecturer on the Bachelor's Degrees in Multimedia and Design and Digital Creation at the Universitat Oberta de Catalunya (UOC). She holds a PhD in Network and Information Technologies from the UOC, a Bachelor's Degree in Fine Arts, a Diploma in Graphic Design, with a Postgraduate Degree in Visual Culture and a Master's Degree in Multimedia Applications. Her artistic and academic research focuses on the creation, study and critique of interactive visual tools for experimentation and learning.



Andrés Burbano

Universitat Oberta de Catalunya

Andrés Burbano is Professor at the Open University of Catalunya, UOC (Barcelona, Spain) and Visiting Lecturer at Donau-Universität (Krems, Austria). He holds a Ph.D. in Media Arts and Technology from the University of California at Santa Barbara (California, EEUU). Burbano is a scholar and transdisciplinary artist; his research projects focus on media history and media archaeology in Latin America and the Global South, computational technologies' historical and cultural impact, and 3D modeling of archaeological sites. Burbano was ACM SIGGRAPH 2024 Chair and is the author of the book "Different Engines: Media Technologies from Latin America" (Routledge, 2023).



Nerea Calvillo

Centre for Interdisciplinary Methodologies, University of Warwick

Nerea Calvillo (she/they) is an architect-scholar, based at the research Centre for Interdisciplinary Methodologies (University of Warwick, UK), director of spatial design office C+ arquitectas and funder of In the Air, an ongoing collaborative project to sense air(pollution). She works at the intersection between spatial design, feminist technoscience, queer and environmental studies, and her current research is on toxic politics, AI natures, atmospheres and queer urban political ecologies. Her work

has been exhibited at the Venice Architecture Biennale, Royal Academy of Arts, Canadian Centre for Architecture or the Shanghai Biennale; and published in interdisciplinary journals like Social Studies of Science, Journal of Extreme Events or Public Culture. She is author of *Aeropolis: Queering air in Toxicpolluted worlds*.



Evy Ceuleers

Manager of the Science Promotion department at Innoviris (Brussels, Belgium)

Evy Ceuleers is a trained linguist specialized in multilingualism research. Since 2020, she has been the manager of the Science Promotion department at Innoviris, the public funding organization for research and innovation of the Brussels-Capital Region. In this role, she is committed to promoting science and technology to young people and the general public. She co-organizes the annual I Love Science festival and is passionate about the intersection of arts and science, aiming to build a resilient city ready for current and future challenges.



Lúa Coderch

BAU – Centre Universitari d'Arts i Disseny de Barcelona

Lúa Coderch is an artist, researcher, and professor at BAU, College of Arts and Design of Barcelona. She holds a BA in Fine Arts, an M.A. in Productions and Research, and a PhD in Advanced Studies in Artistic Productions from the University of Barcelona. She combines narrative practices and sculptural and objectual practices in videos, performances, and installations that she configures as research devices.



Jessica Coldrey

Independent Engineer

Jess Coldrey is a human geographer and humanitarian engineer who blends technical and creative approaches to environmental challenges. She has presented work at COP26, the World Conference on Ecological Restoration, and the British Ecology Society's People and Nature journal. Recognised as one of the Top 50 Women in Engineering and a guest lecturer at King's College London, her research connects science, creativity, and public engagement to drive community outcomes.



Michele Coletti

Grenoble Ecole de Management

Michele Coletti is an Associate Professor in the Department of Management, Technology and Strategy at the Grenoble Ecole de Management, France. His research focuses on collaborative research and innovation and has been published in academic outlets such as *Economics of Innovation and New Technology*, *International Journal of Entrepreneurship and Innovation Management*, *European Journal of Innovation Management*, *Journal of Environmental Management*, and *Science and Public Policy*.



Alba Colombo

Universitat Oberta de Catalunya

Alba is an associate professor and researcher at the Universitat Oberta de Catalunya. Her research centers on the critical analysis of the contemporary significance of cultural events and festivals as social and cultural expressions, as well as spaces for resistance, disruption, and platforms for equity, diversity, inclusion, well-being, and human rights. A specialist in evaluation models for cultural projects, she emphasizes mixed methodologies that integrate both quantitative and qualitative processes. She has advised various research and administrative institutions and currently serves as the director of the Master's degree in Cultural Management at UOC.



Tomás Criado
Universitat Oberta de Catalunya

Tomás Criado is an anthropologist, currently working as Ramón y Cajal Senior Research Fellow at the Open University of Catalonia's CareNet-IN3 group. His ethnographic and public engagement work focuses on different instances of knowledge and material politics in settings where care is invoked as a mode of urban intervention: be it as a particular mode of technoscientific activism (democratising knowledges, design practice and infrastructures); or as a practice of articulating ecologies of support (accessible urbanism; urban heat care plans).



Derek Curry and Jennifer Gradecki
Northeastern University

Derek Curry and Jennifer Gradecki are media artists who critique technological solutionism by reverse-engineering technologies to reveal underlying assumptions and problems that arise through implementation. They use methods from media theory and science and technology studies as a means for critical engagement. They often replicate technologies used for social control or that have a significant social impact, including open-source surveillance systems, financial technologies, and neural networks.



Christophe De Jaeger
GLUON

Christophe De Jaeger (b. 1979) is an art historian and curator with a specialization in contemporary art and collaborative practices bridging art and research. In 2009, he founded Gluon, an elementary force uniting artists and researchers to cultivate artistic endeavors exploring science and technology. Gluon facilitates artist residencies within corporations and research institutions. The nexus between Brussels, a cosmopolitan hub, and Europe is integral to his work, as is his emphasis on engaging the youthful and diverse young generations of this vibrant city.



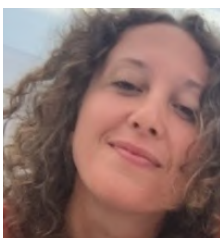
Aurélie Delater
Independent Advisor

Aurélie is a supporter of art-tech collaborations at European level. She works with cultural and artistic organisations across Europe that want to push the boundaries and question the use of technologies, through art-driven projects. She is currently involved in the S+T+ARTS initiative, the largest European programme in the field, and coordinating the S+T+ARTS in City project.



Simona De Rosa
T6 Ecosystems

Simona De Rosa (PhD) is partner and senior researcher of T6 Ecosystems srl. Since 2015, she has participated in responsible positions in more than 10 European projects funded by the European Commission under the research frameworks FP7, H2020 and Horizon Europe. Within the company, she is coordinating the Policy dialogue and advocacy activities. She is currently deeply involved in the research community on creative and cultural industries and part of the S+T+ARTS family since 2020.



Rosanna di Nuzzo
MEET Digital Culture Centre

Rosanna di Nuzzo is an independent project designer and manager, currently collaborating with MEET Digital Culture Centre in Milan, overseeing research and innovation projects. She specializes in social and cultural innovation, education, inclusion, and digital transformation. Since 2019, she has led three Regional STARTS Center projects as an innovation catalyst, fostering collaborations between art, science, and technology to drive sustainable innovation. Her work is dedicated to empowering individuals and societies through interdisciplinary strategies.



Mark Farid
University of the Arts London

Mark Farid is an Artist, Researcher, and Lecturer in Fine Art at Central Saint Martins, University of the Arts London. He specialises in the intersection of the virtual and physical world, and the effect new technologies have on the individual and their sense of self. Farid's work embodies hacker ethics, such as a focus on privacy policies, use of surveillance technologies, and campaigning for data privacy and protection. His work forms a critique of social, legal, and political models.



Luís Fernandes
Artistic Director GNRation (Braga, Portugal)

Luís Fernandes (1981) is a musician and curator whose work focuses on exploratory music, sound, art and technology. He was lecturer at institutions such as Berklee College of Music, Elektra Montréal, Serralves, Off the page – The Wire, MAAT, and teaches at Universidade do Minho. He was artistic director of Semibreve Festival (2011-2023) and is currently the artistic director of Teatro Circo, GNRation, Index – art and technology biennial, besides supervising the program of Braga25 – Portuguese Capital of Culture.



Raoul Frese
Vrije Universiteit Amsterdam

Dr. Raoul Frese is a physicist at the Vrije Universiteit Amsterdam, and head of the hybrid forms laboratory. He explores a wide range of photosynthesis-based technology, from biological solar cells to algae powered robot and plant-human interactions. His research leads to novel technology that cooperates with nature and the development of the trans-disciplinary method of artsience. Frese is the recipient of several prestigious science grants in physics and humanities, and has been a long-term resident of Malinese filmmaker Manthia Diawara which served as a model for the EU-network of Studiotopia.



Rocio García-Robles
University of Seville

Dr. Rocío Garcia-Robles holds degrees in Arts and Computer Science Engineering from the University of Seville. Her award-winning doctoral thesis on Art Holography is housed in the MIT Museum. A professor at the University of Seville, she supervises doctoral students in SciArt and STEAM fields. She leads the ASTERISM research group, focusing on Art, Science, Technology, and Society synergy, and directs the ASTER+S project, promoting sustainable, democratic, transdisciplinary co-creation.



Anni Garza Lau & Gro Sarauw
Ghost Agency

Ghost Agency is a techno-social art and research practice founded in 2021 by Danish artist Gro Sarauw and Mexican media artist Anni Garza Lau. It focuses on using non-visibility and anonymity as tools to advocate for human rights amid Surveillance Capitalism. The project is currently sustained as a 'micro institute' at Art Hub Copenhagen, the Nordic Culture Fund and the Danish Arts Foundation.



Alessia Gervasone
University of Barcelona

Alessia Gervasone is a PhD researcher in Art History at the University of Barcelona and an independent curator focused on art and political ecology. As part of the Art, Globalization, Interculturality (AGI) research group, her work explores how art and curatorial practices foster post-extractivist and decolonial imaginaries, integrating non-human governance. She currently collaborates with the Espronceda Institute of Art & Culture as a project manager, overseeing European projects.



Sofia Greaves
Postgrowth Innovation Lab

Sofia Greaves is a Postdoctoral Researcher working for the Postgrowth Innovation Lab (ERC) at the University of Vigo. Sofia holds a PhD in Classics from the University of Cambridge, which explored cultures of science, technology, and urban planning in the nineteenth to twentieth centuries. Her postdoctoral research explored cultures of innovation in contemporary urban planning and European policymaking institutions, focusing on the importance of introducing arts-based approaches to address environmental issues.



Mona Hedayati
Concordia University, University of Antwerp

Mona Hedayati is an artist-researcher and a joint PhD candidate in the interdisciplinary humanities at Concordia University, Canada and the digital arts doctorate program at Antwerp Research Institute for the Arts, University of Antwerp, Belgium and a research fellow at St Lucas school of Arts in Antwerp. Her work draws on computation arts and sound design. She has an MFA in digital media and an advanced master's in social-political art and design. Hedayati has been trained in media art and design and her research-practice aims to bring social thickness back into the science and technology practices that conventionally claim their fields as "immune" to social concerns.



Clarice Hilton
Anagram

Clarice Hilton is a designer and researcher at Anagram. She is a creative technologist and researcher specializing in disability centered design, and is completing a PhD at Goldsmiths in embodied technology and disability centered design.



Marko Hren
Head of Unit Slovene Sustainable Smart Specialisation Strategy (Ljubljana, Slovenia)

Marko Hren is the head of unit for the Slovene Sustainable Smart Specialisation Strategy (S5), focusing on digital and circular economy, deep tech innovation, and the creative sector. With extensive experience in ICT development, humanities research, and social activism, he has engaged in various stages of tech and social innovation within the quintuple helix. In the past 25 years, he has continuously served as an evaluator and monitoring expert for both national and centralized EU initiatives.



Antonio Irre Catalano
Independent artist and researcher

Antonio Irre Catalano (1980) Artist, independent researcher and cultural designer. He specializes in site-specific and audience-specific art practices. He is a performer and an author of performances, visual works, poems, short stories, and theater. As a cultural designer, he works on Public Art and Relational Art projects. As a researcher, his current focus is a project between Art and Science on plants and human-plant communication.



Christiana Kazakou
LEONARDO/ISAST LASER Talks

Christiana Kazakou is the Program Engagement Specialist at Leonardo/ISAST, where she manages LASER Talks; a program of international gatherings that foster interdisciplinary dialogue and opportunities for community building in over 57 cities and five continents worldwide.



Lola Kengen & Maxim Velli

Learning Planet Institute Paris

Maxim Velli and Lola Kengen combine their backgrounds in biodesign, politics, and climate education to tackle the reflexive impotence of their generation. Their “Solarpunk Manifesto” podcast explores how solarpunk ideals can inspire shifts in thinking and practice, particularly at the intersection of innovation and sustainability. In response to the crises of political representation and societal exhaustion, they advocate for radical hope as the driving force for more just and desirable futures.



Carolyn Kirschner

Goldsmiths, University of London

Carolyn is a designer and researcher whose work explores complex relationships between humans, ecologies, and machines. Her work has been shown at the Centre Pompidou (2023), ZKM Center for Art and Media Karlsruhe (2022), Milan Design Week (2024), and A/D/O in Brooklyn (2020). Publications include *Perspecta* (2021), *The Polar Silk Road* (2021), and *Visual Ecologies of Placemaking* (2024). She is a Lecturer in Design at Goldsmiths, University of London.



Jurij Krpan

Kapelica Gallery for Contemporary Investigative Art

Jurij Krpan founded Kapelica Gallery for Contemporary Investigative Art in 1995 and has been its senior curator since. He has curated national and international exhibitions, including the Slovenian pavilion at the 50th Venice Biennale. Since 2012, he’s been the artistic director of the Kersnikova Institute, supporting art research labs BioTehna and Rampa. Krpan integrates art with innovation for sustainable development and is Slovenia’s Smart Specialisation Ambassador. He joined Slovenia’s National Council of Culture in 2019 and became its president in 2024, lecturing globally on the Kapelica Gallery.



Guillemette Legrand

Ecole des Arts Décoratifs (PSL) / Basel Academy of Art and Design (FHNW)

Guillemette Legrand is an artist, designer, and researcher who documents and mobilises computational infrastructures that produce knowledge about people and the earth to question the cosmological imaginaries it naturalises. Guillemette’s work can be described as an artistic and participatory intervention of algorithmic knowledge to re-imagine its frictions and possibilities through interdisciplinary cooperations and multimedia installations. Guillemette is affiliated with the EnsadLab (ENSAD-PSL) and the Critical Media Lab (FHNW-HGK).



Veronika Liebl

Ars Electronica

Veronika Liebl is the Ars Electronica’s Director of European Cooperation and the Managing Director of its Festival/Prix/Exhibitions department. For over ten years she has been involved in programming and the production of collaborative programs with partners from the arts, sciences and industry and evolved, launched and completed numerous EU projects such as the STARTS Prize and the European ARTificial Intelligence Lab. Furthermore, she serves as a member of the City of Linz Culture Council, the executive board of the Linz UNESCO City of Media Arts and the Content Innovation Council of the Frankfurt Book Fair’s ARTS+ program.



Adrien Lucca

Studio Adrien Lucca

Since 2009, Adrien Lucca develops a multidisciplinary body of work around color and light that questions our perception of the physical world. In search of practical means of action to set up aesthetic experiences, he has set up a research and production laboratory where he conceives his works in an autonomous way at the intersection of art and science. To the antipodes of a sad passion for the

normalization and the technicization of our relations to the physical world, Lucca believes that one can highlight the strangeness of the link between the physical world and our perception of it by appropriating scientific and technological resources. His most recent work aims at redefining the very concept of “color”.



Nicolas Maigret
DISNOVATION.ORG

DISNOVATION.ORG merges contemporary art, research & hacking to critically translate complex eco-social debates into operative and provocative exhibits. They create radical artworks staged as large laboratory experiments focused on energy, ecology and economics that work as catalysts for crafting futures that diverge from prevailing narratives. Their exhibits, books and videos permeated global cultural landscapes fostering a critical dialogue at the nexus of artistic, political and scientific inquiry. They co-edited *A Bestiary of the Anthropocene* with Nicolas Nova, an atlas of anthropic hybrid creatures, and *The Pirate Book*, an anthology on media piracy.



Carla Molins-Pitarch
Image Processing and Multimedia Technology Center, UPC

Carla Molins-Pitarch, PhD, MFA, is an experienced designer, creative technologist, and researcher working at the intersection of design, technology, and science to bring a tangible instance to complex concepts. Currently, researcher at the Image Processing and Multimedia Technology Center, UPC (DiCode: digital culture and creative technologies research group). Marie Curie Fellow, PhD in communication UPF (Spain) 2019-2023; La Caixa Fellow, Design & Technology MFA '19 Parsons, The New School (NY, USA).



Joel Ong
York University

Joel Ong (PhD) is a media artist whose works connect scientific and artistic approaches to the environment. His recent works explore the visibility and audibility of ambient phenomena with a particular focus on the wind and the atmospheric microbiome. Joel holds a PhD from DXARTS at the University of Washington (2017), and an MSc. in Biological Arts from SymbioticA at the University of Western Australia. He was a recipient of the Petro-Canada Young Innovators Award in 2020 and is Associate Professor in Computational Arts, at York University and the Helen Carswell Chair for Community Engaged Research in the Arts.



Anna Pinotti Blanch
HacTe

Anna Pinotti holds a degree in Audiovisual Communication from the UB and a Master's degree in Cultural Management from UOC-UdG. She worked as a freelance cultural manager and consultant accompanying public institutions and private organisations, mainly in the Basque Country. From 2020 to 2023 she worked in Conexiones improbables, an organisation that promotes open innovation processes through methodologies of hybridisation between the arts with other sectors. Since January 2024, she is project manager of HacTe, the Hub for Art, Science and Technology in Barcelona.



Ricardo Rego
Councillor in Viana do Castelo City Council (Portugal)

Ricardo has a degree in Organisational Psychology, specialising in Organisational Management. He is currently a councillor in the Viana do Castelo City Council with responsibility for health promotion, human resources, sport, innovation and digital transition and heritage management, having also been the mayor's chief of staff between 2017 and 2020. He has developed several municipal projects, including 'Viana European City of Sport 2023' and the Viana STARTS Project of the New European Initiatives.



Monica Rikić
Universitat Oberta de Catalunya

Mónica Rikić (Barcelona, 1986) is an electronic artist and recipient of the 2021 National Culture Award of Catalonia. She combines creative coding and electronics with non-digital objects to create interactive projects and robotic installations. Her work explores the social impact of technology, focusing on critical thinking around alternative technologies and open hardware. Her projects have been exhibited at national and international institutions and festivals for over ten years.



Gabriele Rosana
Freelance journalist and policy analyst

Gabriele Rosana is a freelance journalist and moderator, and a policy analyst based in Brussels. Specialised in EU Affairs at the College of Europe in Bruges, he has extensive experience in cultural policymaking, having worked as a policy advisor both in the European Parliament and with Culture Action Europe, the major European cultural network of networks, organisations, and activists. He contributes to various publications with stories and analyses on Europe and the European Union.



Marta Royo Llonch
SHOOK Studio / ICM-CSIC

Marta Royo (1990, Terrassa) is a scientific researcher (PhD in Environmental Microbiology), designer and visual artist. She is an expert in the analysis of big data, conducting research at the Institut de Ciències del Mar since 2012. In 2018, Marta co-funded SHOOK Studio to improve the accessibility to scientific knowledge through art and design. They are specialists in mediating science/art collaborations and their works have been presented at international festivals.



Georg Russegger
Head of Open Innovation Center at Ludwig Boltzmann Institut (Vienna, Austria)

As a trained media artist and researcher with a PhD in media anthropology, Georg Russegger works and operates at the crossroads of open innovation and human-computer interaction. Research and development, responsible innovation and knowledge valorization for academia, society and the economy are key. My endeavor is to open artistic and creative methods of design for outreach, engagement and education with agile impact. Skills transfer, capacity and community building to empower and open up people's desires to deal with global challenges and work together for a better future fuel my inspiration.



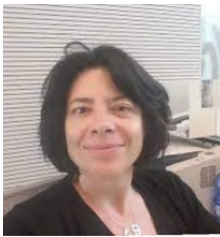
Chris Salter
Zurich University of the Arts

Chris Salter is Professor for Immersive Arts and Director of the Immersive Arts Space at the Zurich University of the Arts (ZHdK), Professor Emeritus, Design and Computation Arts at Concordia University in Montreal, former Co-Director of the Hexagram network for research-creation in arts, cultures and technology and Co-Founder of the Milieux Institute at Concordia. His artistic work has been seen all over the world at such venues as the Venice Architecture Biennale, Barbican Centre, Berliner Festspiele, Wiener Festwochen, ZKM, Kunstfest Weimar, Musée d'art Contemporain, Muffathalle, EXIT Festival and Grand Palais Immersif-Paris, among many others. He is the author of *Entangled: Technology and the Transformation of Performance* (2010), *Alien Agency* (2015) and *Sensing Machines* (2022), all from the MIT Press.



Teresa Sanchis
Institute for Bioengineering of Catalonia

PhD in Physics with a MSc in Leadership and Management of Science. 17+ years of experience in project management and strategy development of R&D organisations. Currently, Head of Strategy of the Institute for Bioengineering of Catalonia (IBEC). Responsible for the Art & Science programme of IBEC and Open Science Strategy of IBEC. Executive coordinator of the Spanish Platform for Nanomedicine. Passionate about science, technology, art, and what we can create together.



Stefania Tamborini

Head of Communication and Cultural Enterprises at DG Culture (Regione Lombardia)

Stefania Tamborini is head of the office that deals with cultural activities, communication, cultural and creative industries, european projects and funding at Directorate-General for Culture in Lombardy Regional Government since 2021. She has studied and worked mostly in the area of public communication. Graduated in mass communication at University of Bologna, she achieved a master degree in digital communication at Politecnico of Milan in 2019. In Lombardy Regional Government she, previously, oversaw institutional communication plans and strategies and managed projects to promote high-quality agricultural goods and tourism. Finally, she has extensive experience teaching public and social communication in both universities and adult education programs.



S + T + ARTS

SCIENCE + TECHNOLOGY + ARTS