Starting a University

IT:U
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FOUNDING LAB

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Preface

The Interdisciplinary Transformation University (IT:U) aims to promote Austria's excellence in digitalization and digital transformation. It strives to open new interdisciplinary research areas and equip students with the 21st century skills needed to tackle global challenges.

Founding a new university that conducts innovative teaching and research for the future is a complex process that can only succeed with the involvement of the greatest possible diversity of interdisciplinary expertise and perspectives as well as a great deal of courage to try something new.

The FOUNDING LAB is an important step in this direction. The topics covered by the FOUNDING LAB range from (digital) materials of the future to biotechnology in conjunction with artificial intelligence and provide an insight into the diversity of areas and issues that the new university will address. The focus was on project-based and practice-oriented teaching that opens new areas of knowledge with the help of the Art Thinking approach. Particularly against the backdrop of climate change and rapid technological progress, approaches are needed that produce unconventional solutions on the one hand and enable them to be implemented in practice on the other.

Based on the insights gained from the diverse workshops and projects of the FOUNDING LAB, which can be found in this book, I am convinced that the IT:U is making a significant contribution to this!

Assoc. Prof. Dr. Martin Polaschek
Federal Minister of
Education, Science & Research

BKA Andy Wenzel

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The Beginning

of a New University

IT:U

Interdisciplinary Transformation University Austria

Stefanie Lindstaedt

It is said that every journey begins with the first step. But when a journey is as adventurous in its nature and as ambitious in its design as the creation of a new university, the first steps already shape the travel experience, and should be well considered.

As founding president, I have been charged with establishing Austria's first new public university in many years: the Institute of Digital Sciences Austria (IDSA)—or as we refer to it since November 2023—IT:U Interdisciplinary Transformation University Austria. Some fundamental aspects of my journey with IT:U were predetermined by our public stakeholders. IT:U is a technical university that investigates digital transformation from a broad, interdisciplinary perspective. Other aspects were less well defined. Which educational model should IT:U apply? How should research be structured? Which kind of challenges should IT:U address to attract students and scientists?

Together with Ars Electronica, we have answered these questions in an unprecedented experiment:

The **IT:U x Ars Electronica** FOUNDING LAB 2023.

In a series of events starting with a summer school and culminating in an exciting winter semester, we collected the opinions and experiences of 75 international students and 25 fellows on how a modern university should look, work, and feel like. In addition, we also engaged in a dialog with many other stakeholders from industry, education, and the general public. The results of this experiment enabled us to define the fundamental principles which shape IT:U—our institutional and cultural DNA.

Let me now tell the story of the beginning of a great journey. How is Artificial Intelligence transforming research? Why is interdisciplinarity the key to successful transformation? What is the DNA of our new university, and how did we find it? Join me on this journey.

The Nature of Technological Transformation

Transformative processes often escape immediate notice, remaining inconspicuous as their profound implications unfold slowly and gather momentum over time. Only in hindsight do we come to recognize and appreciate the true extent of their revolutionary power.

If you lived in Amsterdam around 1699 and wanted to visit a fellow researcher or artist in Paris, you would have to undertake a twelve-day journey that involved coach, river boat, and horseback riding, which would likely have left you exhausted and ill-inclined for a spirited exchange of ideas. A hundred years later, in 1799, the same journey would have taken you just four days by river barge. You would have arrived refreshed and presented your colleague with a folder full of ideas, which you wrote down while in your comfortable cabin. Of course, your journey would have only taken a single day in 1899, thanks to the advent of railroads and steam engines. But at its core, the mobility transformation was already well underway a century earlier. The expansion of the European canal network laid the foundation for the epochal shifts in transportation and connectivity which formed a large part of the industrial revolution.

Contemplating recent advances in Artificial Intelligence (AI), I wonder whether these developments echo the silent, creeping influence of canals or the thunderous, transformative debut of steam locomotives. Are we witnessing AI's peak of power right now, unfolding before our

eyes in chatbots and deep fakes, or does its ultimate potential await us further ahead in a much more encompassing transformation process?

We certainly live in a golden age for computational methods. Thanks to the emergence of the World Wide Web, data repositories have grown increasingly accessible and interlinked on a global scale. Big data technology has made this wealth of information readily available for analytical and modelling purposes. Advances in computing power now provide the raw number-crunching power required to scale statistical methods like neuronal networks to the amount of data available. Results are nothing short of astounding: computers compose literature, produce artwork, craft films, and perform a plethora of other artistic feats that were, until quite recently, believed to belong exclusively to human capacities. We find ourselves at a moment in history where we must reevaluate the fundamental contracts of our economies and societies to account for unprecedented transformation drivers.

Scientific research is an area of human endeavor where AI is generating particularly strong impact. AI instigates monumental shifts across manifold scientific disciplines, acting as a catalyst expediting research and forging connections among separate disciplines. For instance, machine learning algorithms process colossal datasets and identify salient patterns and correlations which would otherwise have remained hidden from researchers. Virtual environments generated by AI provide scientists with limitless possibilities to test hypotheses swiftly and economically. Computer simulations circumvent resource constraints, material scarcity, or physical hazards, allowing for iterative experimentation at unparalleled speeds. And AI-enhanced language processing facilitates automatic translation, sentiment analysis, and content extraction, opening doors for unprecedented collaboration among international teams.

Given the profound influence of AI on research across numerous disciplines, the Organization for Economic Co-operation and Development (OECD) has consistently cautioned that those failing to promptly incorporate AI assistance for research and development risk lagging behind in the global scientific landscape. I suspect, however, that AI will have a still more disruptive impact on science that the impressive scaling effects outlined above: AI will finally break down the disciplinary boundaries which have kept us from harnessing the benefits of true interdisciplinary research for a long time.

The Need for Interdisciplinarity

Increasingly, complex challenges and ill-defined problems can only be effectively addressed when we integrate more than one perspective, utilize the problem-solving methods of more than one discipline. Indeed, we find collaboration across disciplines and diverging viewpoints at the core of many historical achievements.

In the summer of 1858, cholera outbreaks ravaged many London neighborhoods, claiming countless lives. The accomplished physician John Snow suspected contaminated water as the source but struggled to defend his views against the popular miasma theory, which attributed illness to foul air. At the same time, engineer Joseph Bazalgette found London's crumbling sewer system incapable of handling increasing waste disposal needs but failed to gain the support of city officials. Snow and Bazalgette joined forces in pursuit of improving public health. But only when they enlisted cartographer Charles Cheffins to draw his famous Broad Street cholera map, which visualized geospatial correlations between cholera incidence and water sources, were they able to sway the opinion of a skeptical society by linking cholera cases to specific water pumps polluted by raw sewage leaks.

An interdisciplinary collaboration of medicine, engineering, statistics, and cartography that correctly identifies the problem, devises a solution, fosters public understanding, and generates the political support required for implementation, saving thousands of lives: It seems that interdisciplinarity is just what we need to face climate change, pandemics, and other global challenges of today.

Interdisciplinarity has a long and successful history. Historically, the deciphering of ancient languages required the collaboration of linguists, historians, archaeologists, and cryptographers. The success of industrialization was founded in the collaboration of mathematicians, physicists, chemists, engineers, economists, and, later, social scientists. Public health is another interdisciplinary success story, as outlined above. Recently, the Human Genome Project has enabled personalized medicine, gene therapy, and advances in evolutionary biology by mapping the entirety of the human genetic code in 2003. Sequencing over three billion base pairs was only possible through the collaboration of researchers from genomics, bioinformatics, computer science, molecular biology, medicine, and ethics. Today, Artificial Intelligence research and development flourishes at the intersection between computer science, statistics, cognitive psychology, neuroscience, interface design, ethics, and law.

There has also been prominent research into interdisciplinarity for a long time. For instance, the famous Santa Fe Institute for the study of complex systems has brought together researchers from physics, biology, mathematics, computer science, economics, social sciences, and humanities since 1984, to collaborate on understanding the fundamental principles underlying complexity

in nature, society, and technology. In recent years, leading research organizations like MIT have proposed a convergence of disciplines: Building bridges and collaborating across traditional disciplinary boundaries will enable researchers to address critical global challenges. Understanding climate change, for instance, requires integration of insights from atmospheric science, oceanography, geology, economics, and many other disciplines. And in cancer research, interdisciplinary teams from genetics, biochemistry, bioengineering, immunology, computer science, and patient care work together to develop novel treatments.

European policy makers have recently adopted an interdisciplinary policy approach by calling for a twin green and digital transformation in Europe. This strategic initiative simultaneously pursues sustainability goals and digitalization efforts to achieve a greener, more digitally connected, and socially inclusive Europe by leveraging synergies between these two areas. Expected advances include, for instance, smart grids, precision farming, circular economy models and teleworking ecosystems.

Educating the Transformers of Tomorrow

The inquisitive reader may wonder, can one currently pursue studies in computational interdisciplinarity in Europe? Unfortunately, the answer is largely negative. Despite the escalating complexity and multifaceted nature of global issues, universities predominantly focus on educating students in siloed disciplines and individual subjects. This is especially evident in technical education, where fields such as data science and AI research have become specialized to a degree that hampers practical application. While some study programs attempt to integrate two disciplines, they often result in a juxtaposition of existing specialized courses rather than a genuine integration of approaches. Some European universities are now endeavoring to develop interdisciplinary curricula. Several emerging universities are also exploring new avenues. However, it is unfortunately evident that we are still in the nascent stages of developing truly interdisciplinary models for technical higher education.

Another essential element is lacking in the education landscape, a vital component that would empower students to utilize computational methods and interdisciplinary approaches in addressing global challenges. I refer to this elusive factor as “21st century skills.” Abilities such as project management, self- and time management, intercultural communication, motivation, team leadership, and numerous others often wrongly categorized as “soft” skills are indispensable for collaborating with colleagues on an international scale and developing real-world applications and solutions that stand up to a global context. Interdisciplinarity is, above all, about building bridges and understanding different mindsets. And I believe these are core competencies for tomorrow’s transformers.

The founding of IT:U provides us with an unique opportunity to create a new educational model for an interdisciplinary yet technical higher education program. Such a program would integrate the transformative power of computational sciences with in-depth disciplinary knowledge and the 21st century skills required to make things work in practice. But our path remained largely unchartered. We therefore had to come up with a strategy to identify promising approaches, or at least landmarks enabling orientation in the vast landscape of educational possibilities.

Our solution was the
IT:U x Ars Electronica FOUNDING LAB.

University DNA

It is time for a first summary of our findings. We have condensed the results of the IT:U x Ars Electronica FOUNDING LAB into a number of principles which form the DNA of IT:U and will determine our institutional and cultural identity for the next years. To make very sure we remember these principles, we took the liberty of condensing them into hashtag format:

#thingsthatmatter—IT:U will conduct cutting edge interdisciplinary research addressing digital transformation challenges on the road to a sustainable future. The research goals defined by society and economy increasingly require scientific cooperation across disciplinary boundaries. Scientific advances, for example in hybrid modeling or computational social sciences, demonstrate that the use of computational methods opens up new research horizons for many disciplines. Researchers and students want to contribute to solutions for global challenges like climate change. **At IT:U, we will work on things that matter.**

#allofus—IT:U establishes a research and education environment fostering an international, interdisciplinary, and inclusive community from the very beginning. From an Austrian perspective, it is imperative to attract international talent and encourage students and researchers to stay in the country, contributing to research and industry. On the scientific side, we will create an open work climate where many disciplines can meet without prejudice. On the education side, we will design an environment which counters language barriers and accounts for cultural considerations and all other forms of diversity. We will go to particular lengths to attract and integrate women to work on digital topics. **At IT:U, all of us will work together.**

#nextlearning—IT:U will conduct education within challenge-based projects, promoting project-based learning and using groundbreaking educational technology to scale up. The best way to learn new skills is to practically acquire them within projects which address challenges that engage and motivate us. While this type of project-based learning is widely considered optimal in educational sciences, it also places very high demands on the number and quality of educators and infrastructure. We will develop and apply advanced education technologies to overcome the implicit scaling challenge. **IT:U explores the next level of learning.**

#transformeverything— IT:U recognizes the demand for 21st century skills beyond technical ability implicit in the interdisciplinary nature of the transformations driven by digitalization and computational methods. Future transformers in science and industry must be adept in change management, cross-cultural communication, project organization, and many other non-technical skills to roll out, scale up, integrate and, ultimately, realize the value of solutions based on digital methods. Such skills are best acquired in a project-based learning experience. **IT:U offers tomorrow's transformers a well-rounded education.**

#technologyrocks—At its core, IT:U is a technical university where students and researchers employ a rich toolbox of digital and computational methods ranging from data science and artificial intelligence to robotics and augmented reality. We will offer a broad technical education to students from a variety of backgrounds, enabling them to transform their respective fields with technology. Our researchers will employ computation methods to explore new scientific frontiers. **IT:U explores how technologies can change the world—for real.**

#newmodeluniversity—IT:U will apply a new model of university organization, including flat organization structures, agile management methods, and key performance indicators covering all aspects of research and education.

Underway

We are back to considering the adventurous voyage which leads to a successful new university founded in computational sciences, interdisciplinarity, and next generation education models. This publication will give a detailed account of the great experiment we conducted to chart the path of our journey. I am grateful to our students, our fellows, and the Ars Electronica team for their efforts. All of this would not have been possible without the energy and vision of the members of our Founding Convention, specifically Katja Schechtner and Christopher Lindinger. Paraphrasing Robert Frost on the topic of travel choices, we can certainly claim to have taken the road less traveled. But I am confident that our example will soon turn it into a well-trod path towards a technologically empowered interdisciplinary education.

Finally, I would also like to thank our key development partners, the Austrian Federal Ministry of Education, Science and Research, the Government of Upper Austria, the City of Linz, and our strong partners in international science, research, education, business and industry. Interdisciplinarity is the way, digital transformation is the goal. Let's embark on all follow this mission together.

Enjoy the following report on our journey so far.

Antje Wolm

Univ.-Prof. DI Dr. Stefanie Lindstaedt (DE/AT) is the elected founding president of Austria's first public university exclusively dedicated to the digital transformation of science, business and society—IT:U Interdisciplinary Transformation University Austria. Within the last ten years Stefanie Lindstaedt has developed two institutions in Austria that today bring together over 250 computer and data scientists, AI and ML specialists: Institute for Interactive Systems & Data Science (ISDS) at TU Graz and Know-Center, one of Europe's leading research centers for Trusted AI and Data. Stefanie Lindstaedt is an international, interdisciplinary scientist with research focus on AI, HCI and EduTech. She was awarded MS and PhD degrees in computer science by the University of Colorado Boulder (USA) and her habilitation by TU Graz.

Why FOUNDING LAB?

Katja Schechtner

The Institute of Digital Sciences Austria (IDSA), as IT:U was previously called, was founded by the Austrian Government in July 2022. The spirit of the corresponding law that we took as our brief was clear: The new university's research and teaching are dedicated to all dimensions of digitalization and its transformative effects on science, art, society, and the economy. The university is built on interdisciplinarity and inter-university cooperation and located in Linz, Upper Austria. It aims to attract faculty and students who are interested in the interaction of technical studies, natural sciences, economics, law, social sciences, humanities, cultural studies, and artistic disciplines.

Within a year, the Founding Convention, consisting of nine members appointed by the Austrian Federal Minister of Education, Science and Research, launched the IT:U x Ars Electronica FOUNDING LAB, a collaborative project of the new university and Ars Electronica. 75 students, more than 30 fellows, experts, and mentors from more than 50 countries with profiles as scientists and artists, engineers and designers, scholars and practitioners, entrepreneurs and visionaries—and everything in between and beyond—worked together from summer 2023 onwards at the POSTCITY (the Ars Electronica Festival location), the Ars Electronica Center, and IT:U offices in Linz to explore and forge new pathways towards building the university of the future.

The goal of this FOUNDING LAB was to identify, develop, and present new areas, approaches, and formats that address the challenges of digital transformation. It was inspired by and built upon previous initiatives by Ars Electronica, such as the Future Innovators Summit (2014, 2015) , the Festival University (2021, 2022), the Transformation Lounge (2022), and the Ars Electronica Futurelab Academy (2017 – ongoing), and incorporated Art Thinking from the very beginning. By transcending traditional disciplinary boundaries, the FOUNDING LAB confronted the complex and contradictory realities of our time, nurturing the skills required to navigate an increasingly digitized world. Experts, leading thinkers, scientists, and innovators from all disciplines convened to explore and define new pathways toward transformative digital change.

The Ars Electronica Festival 2023 served as a public platform to showcase initial ideas and outcomes of the FOUNDING LAB Summer School and Forum. True to the spirit of the FOUNDING LAB the students and fellows took center stage at the Forum, presenting their work, their expectations and their questions, and discussing them with government representatives, technology experts, artists, many Linz citizens, and the Founding Convention as well as the Founding President of IT:U.

The different positions were then further explored in depth within a 6-chapter seminar series during the FOUNDING LAB Fall Term, which focused on the facts, figures, and futures related to infrastructure, code, machines, the virtual worlds, and media and governance systems that respect nature, tech, and people.

Reflecting on "Who owns the Truth?", the 2023 title of the Ars Electronica Festival, a question arises again and again: "Who owns a university?" Or rather: "To whom does a university belong?"

When building a new university—"our" new university—divergent concepts of belonging, ownership, power, and responsibility, but also of knowledge, authorship, facts, and truth(s), revealed a captivating and messy reality, one that defied simplistic notions. We realized that far from being the mere possession of a single entity, a university is a living embodiment of collective—and often contradicting—visions and aspirations that emerges out of collaborative endeavors of and openly discussed controversies between countless individuals. While founding conventions, advisory boards, and presidents may try to steer the course based on their visions, and diverse funding sources may sustain the university, the true essence of it is found in a dynamic mosaic of stakeholders—with student voices as a center piece. Students, faculty, alumni, staff, benefactors, and the broader community engaged in an ever-evolving process of discourse to push forward their respective narratives, contributing distinctive threads, knots and holes to the multi-patterned fabric of the IT:U's identity.

The expertise of the students will continue to shape IT:U as some of them will continue to explore their perspectives and projects in the coming months together with IT:U staff and faculty. They will also prepare crucial input for the upcoming teaching and learning elements that IT:U will launch 2024. This intricate web of interconnectedness will therefore continue to build the institution, transcending conventional notions of possession—and truth. As we delve into the multifaceted dimensions of building a new university—"our new university"—, we were compelled to recognize the shared responsibility and globally intertwined destinies that drove its first class of students, fellows and experts and shaped its progress.

These challenges require a new approach—one rooted in creativity and co-creation. The FOUNDING LAB, therefore, serves as an initial impulse for creating the university that IT:U set out to be. It test-ran new knowledge creation strategies based on far-reaching transdisciplinary collaborations, reflected by the diverse fields and backgrounds of the inaugural students and fellows.

Ultimately, the IT:U x Ars Electronica FOUNDING LAB aspires to question, discuss, and shape a university that will profoundly impact the future of nature, tech, and people on a global scale. And thus, it itself became part of IT:U's founding ~~truth~~ myth.

Katja Schechtner ↗ page 18

IT:U—Interdisciplinary Transformation University Austria

Members of the Founding Convention

On July 1, 2022 the Federal Act on the establishment of the Interdisciplinary Transformation University Austria (IT:U), the legal basis for the foundation of the Institute, entered into force.

The first step was the appointment of the nine members of the Founding Convention, the strategic body of the University during the founding phase by the Austrian Federal Minister of Education, Science, and Research, Dr. Martin Polaschek.

One of the first tasks of the Founding Convention was the election of the founding president: Dr. Stefanie Lindstaedt was elected as IT:U's first president on March 5, 2023.

On June 15, 2023 the Constituent Convention signed into force the strategic principles of the Institute of Digital Sciences Austria (IDSA)—as it was formerly known—to further guide the development of the university.

As part of its strategic work the Founding Convention established the IDSA x Ars Electronica FOUNDING LAB (now known as IT:U x Ars Electronica FOUNDING LAB) as a collaborative prototype with which the IT:U and Ars Electronica want to identify and develop new approaches and formats that best promote the analysis and co-creation of the digital transformation. Boundaries between disciplines and between art and science are to be overcome and all dimensions of digitization are to be considered.

Role: Founding President of IT:U

Univ.-Prof. DI Dr. **Stefanie Lindstaedt** (DE/AT)

Stefanie Lindstaedt is the elected founding president of Austria's first public university exclusively dedicated to the digital transformation of science, business and society—IT:U Interdisciplinary Transformation University Austria. Within the last ten years Stefanie Lindstaedt has developed two institutions in Austria that today bring together over 250 computer and data scientists, AI and ML specialists: Institute for Interactive Systems & Data Science (ISDS) at TU Graz and Know-Center, one of Europe's leading research centers for Trusted AI and Data. Stefanie Lindstaedt is an international, interdisciplinary scientist with research focus on AI, HCI and EduTech. She was awarded MS and PhD degrees in computer science by the University of Colorado Boulder (USA) and her habilitation by TU Graz.

Role: Chairwoman of the IT:U Founding Convention

DI **Claudia von der Linden** MBA (IMD) (DE)

Claudia von der Linden is Vice Rector for Digitalization and Change Management at TU Graz (Graz University of Technology) and chair of the UNIKO (Österreichische Universitätenkonferenz) Policy Committee on Digitalization. She is a member of several supervisory boards and boards of trustees. Claudia von der Linden has more than 30 years professional experience in global industry and as Managing Director and Partner in several international strategy consulting firms. Main areas of experience are Strategy Development and Change Management of large transformation processes. She holds a degree in industrial engineering and has a MBA from the renowned Swiss Business School IMD.

Role: Board of the IT:U Founding Convention

Univ.-Prof. DI Dr. **Martin Hitz** (AT)

Martin Hitz holds a PhD in computer science from TU Wien (1989). Since 2000, he has been a professor at the University of Klagenfurt, heading the Interactive Systems group, which deals with HCI, non-classical user interfaces, and usability. From 2001 to 2006 and from 2012 to 2020, he was vice rector; in 2006, he prepared the founding of the Faculty of Technical Sciences, which he headed from 2007 to 2012. Since 2022, Hitz serves as chairman of the Senate. He is also a board member of the Austrian Computer Society and Informatics Austria.

Role: Board of the IT:U Founding Convention

Dr. **Christina Rami-Mark** (AT)

Christina Rami-Mark holds a PhD in Chemistry from the University of Vienna (2015). After working as a post-doc at Medical University Vienna as a Deputy Head of Radiochemistry and Biomarker Development and a two-year internship in the automotive industry, she took over the management of her family company. Since 2019 she is CEO of MARK Metallwarenfabrik in three countries. She is part of the board of the Young Industry Upper Austria and part of the IT:U Founding Convention, as well as a member of Pier 4 and STEM Initiative Austria.

Role: Member of the IT:U Founding Convention

Prof. DI Dr. techn. Dr.hc. **Wilfried Eichlseder** (AT)

Wilfried Eichlseder, born in 1956 in Steyr, Upper Austria, studied mechanical engineering at TU Graz. He started his career as an engineer specializing in finite element and fatigue analysis, in 1981 at Steyr-Daimler-Puch AG. In 1995 he became director of the Engineering and Technology Center Steyr and in 1999 he was appointed as a professor and Chair of Mechanical Engineering at Montanuniversität Leoben. In 2011, he was elected and served as Rector at Montanuniversität Leoben three times— from 2011 to 2023.

Role: Member of the IT:U Founding Convention

Prof. Dr. **Dieter Kranzlmüller** (AT)

Dieter Kranzlmüller received his PhD and habilitation in computer science from Johannes Kepler University Linz, Austria. After several years in the IT industry, he switched back to academia and worked at universities in Linz, Reading, Dresden, and Lyon, as well as at CERN in Geneva. In 2008, he was appointed Chair of Communication Systems and Systems Programming at LMU Munich and member of the Board of Directors of the Leibniz Supercomputing Centre (LRZ) in Munich. There, Kranzlmüller took over as Chair of the Board of Directors in 2017.

Role: Member of the IT:U Founding Convention

DI **Christopher Lindinger**, MAS (AT)

Christopher Lindinger is an innovation researcher and computer scientist renowned for his projects bridging art, technology, and society. In 1997, he joined the Ars Electronica Futurelab, holding the positions of Co-Director and Director for Research and Innovations. By 2019, he took on the role as Vice Rector for Innovation at Johannes Kepler University Linz. He is member of the founding convention of IT:U and was recently appointed Professor for Digital Humanities in the Arts in Salzburg.

Role: Member of the IT:U Founding Convention

Dr. **Johanna Pirker** (AT)

Johanna Pirker is a professor at Ludwig-Maximilians-Universität in Munich and an assistant professor at TU Graz. She leads the Game Lab Graz research group and studies digital environments and games with a focus on AI, HCI, data analysis, and VR technologies. Johanna was included in the Forbes 30 Under 30 list in the field of science and has been honored with the Futurezone Women in Tech Award (2019), the Käthe-Leichter Prize (2020), and the Hedy Lamarr Prize (2021).

Role: Member of the IT:U Founding Convention

DI **Katja Schechtner**, MSc. (AT)

Katja Schechtner is an urban scientist who advises global governments and businesses on how they can build the cities of the future. Previously, she developed technology and innovation policy at the OECD in Paris, led infrastructure programs at the Asian Development Bank (ADB) in Manila and a research lab at Austrian Institute of Technology (AIT) in Vienna. As part of the MIT Senseable City Lab in Boston, she regularly publishes her work, which has also been featured at the Architecture Biennale in Venice, Ars Electronica in Linz, and the Seoul Biennale for Urbanism, among others.

Role: Member of the IT:U Founding Convention

Mag. Dr. iur, Hon.-Prof. **Wolfgang Steiner** (AT)

Wolfgang Steiner studied law at Johannes Kepler University of Linz, where he holds the position of Honorary Professor of Public Law. Since 2010, he has been Director of the Upper Austrian Parliament and Head of the Directorate of Constitutional Services in the Office of the Upper Austrian Government. He is a member of the Founding Convention of the newly established Interdisciplinary Transformation University Austria (IT:U) in Linz, a technical university, and since July 2023 associate member of the Advisory Committee on the Ethics of Artificial Intelligence of the Austrian Commission for UNESCO.

Founding President of IT:U

Stefanie Lindstaedt

Chairwoman of IT:U Founding Convention

Claudia von der Linden

Board of the IT:U Founding Convention

Martin Hitz

Christina Rami-Mark

Members of the IT:U Founding Convention

Wilfried Eichlseder

Dieter Kranzlmüller

Christopher Lindinger

Johanna Pirker

Katja Schechtner

Wolfgang Steiner

Starting a University

IT:U x Ars Electronica FOUNDING LAB as a Prototypical Laboratory

Gerfried Stocker

Like all good things, especially viable ideas and concepts, the extraordinary cooperation between the new university IT:U—which is in the process of being founded, and Ars Electronica—which has existed for 45 years, is not just a flash in the pan, and there are many reasons why both the concept and the results are remarkable.

The starting point in 2020 was the rather surprising announcement that a new university for digital transformation was to be founded in Linz. This came at a time when Ars Electronica and Johannes Kepler University (JKU) had already begun an intensive program and venue collaboration, and the Ars Electronica Festival 2020 was successfully held on the JKU campus, despite the most adverse circumstances due to the corona pandemic.

That was, of course, the task and challenge of working on central questions for a university of the 21st century: What does it have to offer, who should it attract and educate and, above all, how can the university and its endeavors establish local and global networks and exchange? Can a festival, which by its very nature is dedicated to this purpose, contribute to this and, despite its temporary nature, become an annual window that new winds and new perspectives flow in and out of? The brainstorming began with Meinhard Lukas, the then rector of JKU, and interested supporters were quickly found in the then Federal Minister for Education, Science and Research, Heinz Faßmann, and in head of department (Sektionschef) Elmar Pichl.

From the very beginning, an important basis for this was the Ars Electronica Festival's intensive annual collaboration with universities from all over the world. From 2001 onwards, this became a regular part of the annual programs

Martin Hieslmair

as the festival's “campus” together with the University of Arts Linz, and by 2019 this platform had grown to over 50 participating universities. The network created was a decisive factor in not only attracting interested students from over 50 countries to the Festival University (2021/2022), a joint initiative by Ars Electronica and Johannes Kepler University Linz (JKU), within a very short time, but also mentors and experts from art, science, and society, who worked with the students.

For one important principle of the Festival University we were able to build on our experiences with the Future Innovation Summit (FIS): to see interdisciplinarity not as a by-product, but as a basic requirement. The Ars Electronica Futurelab, together with the International Telecommunication Union and the large Japanese media agency Hakuhodo, realized the FIS as a festival format from 2014–2019 and further developed it annually. Young experts from art/creativity, technology/science, entrepreneurship and social activism were set up in working groups to address critical questions and problems of our time, accompanied by renowned experts and with the vibrant atmosphere of the festival in which they presented their ideas and could put concepts to the test.

The start of IT:U in September 2023 then became the decisive catalyst that would bring the festival's prototypical programs and willingness to experiment with the ambitious, forward-looking concepts of a new 21st century university to a productive reaction.

This book perfectly documents what 75 students, 15 fellows, the members of the founding convention, and the Ars Electronica team were able to achieve.

Gerfried Stocker (AT) is a media artist and an engineer for communication technology and has been artistic director and co-CEO of Ars Electronica since 1995. In 1995/96 he developed the groundbreaking exhibition strategies of the Ars Electronica Center with a small team of artists and technicians and was responsible for the setup and establishment of Ars Electronica’s own R & D facility, the Ars Electronica Futurelab. He has overseen the development of the program for international Ars Electronica exhibitions since 2004, the planning and the revamping of the contents for the Ars Electronica Center, which was enlarged in 2009, since 2005; the expansion of the Ars Electronica Festival since 2015; and the extensive overhaul of Ars Electronica Center’s contents and interior design in 2019. Stocker is a consultant for numerous companies and institutions in the field of creativity and innovation management and is active as a guest lecturer at international conferences and universities. In 2019 he was awarded an honorary doctorate from Aalto University, Finland.

Ars Electronica

A Creative Ecosystem for Art, Technology, and Society

Since 1979, Ars Electronica has been exploring the shaping of the future and the impact of new technologies on our lives, with the focus always on the role of people, the cultural and social challenges, and the resulting creative opportunities. Over more than four decades Ars Electronica has developed an internationally successful platform from the innovative exchange and interplay between art, technology, and society.

- **ARS ELECTRONICA FESTIVAL**
  (since 1979)

Since 1979 we celebrate the Ars Electronica Festival once a year. More than 1,000 artists, scientists, developers, designers, entrepreneurs, and activists come to Linz, Austria, to address central questions of our future. For five days, everything revolves around groundbreaking ideas and grand visions, unusual prototypes and innovative collaborations, inspiring art and groundbreaking research, extraordinary performances and irritating interventions, touching sounds and rousing concerts.

- **PRIX ARS ELECTRONICA**
  (since 1987)

Prix Ars Electronica is the world's most highly regarded award for artists working in science and technology. Up to 4,000 submissions from more than 100 countries each year impressively document the dynamics of international media art. The presentations of the awarded projects and artists are special highlights of each Ars Electronica Festival.

- **ARS ELECTRONICA CENTER**
  Museum of the Future
  (since 1996)

The Ars Electronica Center with its exhibitions and programs focuses all year long on educating people about how new technologies and sciences are changing their lives as well as engaging them in the process through interactive displays and experiences. Special education programs and workshops have earned the Center its reputation as a "School of the Future."

- **ARS ELECTRONICA FUTURELAB**
  (since 1996)

The powerful pillar for research and development is Ars Electronica Futurelab. As laboratory and atelier for future systems it is a place of inspiration and creative ideas, where artists, engineers, and developers team up to work together from the outset on art projects as well as commissioned research projects. In its research Ars Electronica's think and do tank always centers on the human being and considers the social aspects of technological developments and their impact on our society.

- **u19-CREATE YOUR WORLD**
  (since 1998)

Ars Electronica create your world is the name of Ars Electronica's exciting programs and initiatives for and with young creators. Since 1998 we celebrate and support the creative and innovative ideas of young people and their visions for the world of tomorrow. Prix Ars Electronica u19–create your world is a special category for young creators up to age 19.

- **ARS ELECTRONICA EXPORT**
  (since 2004)

  Based on its big international network of artists and creators and the rich experience of curating and producing festivals and exhibitions, Ars Electronica has become an attractive collaborator for many museums, festivals, and exhibition venues worldwide. Since 2004 Ars Electronica Export realizes bespoke exhibitions, conferences, performances and workshop programs for our international partners.

- **ARS ELECTRONICA SOLUTIONS**
  (since 2012)

  As a spin–off of the Futurelab, Ars Electronica Solutions brings the creations and prototypes that emerge from the Ars Electronica ecosystem to the market. They not only support local industry and business in the development of new products and services, but also develop creative solutions on an international level for exhibitions, brand lands, trade fairs, events, and for the urban development sector.

- **ARS ELECTRONICA JAPAN**
  (since 2016)

  With a permanent presence and activities in Tokyo and Osaka, Ars Electronica Japan is engaged in artistic projects, collaborations with universities and museums as well as research, development, and consulting projects with many Japanese leading companies.

- **ARS ELECTRONICA ARCHIVE**
  (since 1979)

  The Ars Electronica Archive is a unique collection of descriptions and audio–visual documentations of over 150,000 projects linked with Ars Electronica since 1979, a unique opportunity to research the cultural impact of the digital revolution.

- **ARS ELECTRONICA EDUCATION**
  (since 1996)

  The development and practical evaluation of new innovative methods and technologies for education and knowledge transfer with special consideration of new digital media is the goal of Ars Electronica Education. The applications range from kindergarten and schools to special programs for universities and professional training and qualification services for business and industry. The latest programs are the Ars Electronica Future Thinking School and Ars Electronica Home Delivery, a service that was created in response to the global pandemic and its lockdowns in 2019.

ARS ELECTRONICA
Art, Technology & Society

Ars Electronica Festival

Prix Ars Electronica

Ars Electronica Center

Ars Electronica Futurelab

u19–create your world

Ars Electronica Export

Ars Electronica Solutions

Ars Electronica Japan

Ars Electronica Archive

Ars Electronica Education

Ars Electronica Education

Veronika Liebl

Practice-driven, Transdisciplinary, and Collaborative

As digital transformation is rapidly changing the world and increasing complexity, creativity and innovation have become an inseparable pair for societal and economic development, not only has this interconnectedness brought us new forms of technologies, it also calls for a shift in the role of its users to become more active agents. Today, artists, scientists, researchers, and engineers are guided by a common question: How can we, in the face of this complexity and interconnectedness, adjust our role from being mere consumers to active producers and influencers of digital change? Achieving this requires a deep and connected understanding of technologies as well as digital transformation processes and significantly more investment in digital skills and competences to achieve the so often cited digital literacy. At the same time, it constitutes a challenge that clearly needs to be addressed at all ages and levels of our educational systems through the training of students and educators alike. Precisely this has been Ars Electronica"s educational goal from the very beginning and is a cornerstone of today's activities.

The following pages provide an overview of essential programs, initiatives, and collaborations to illustrate Ars Electronica's educational mission and reason for tapping into endeavors such as the IT:U x Ars Electronica FOUNDING LAB.

Education for All Current Initiatives by Ars Electronica (an overview)

- **Ars Electronica Center Museum and School of the Future**

First and foremost, of course, is the Ars Electronica Center, Ars Electronica's year-round platform for mediation and education on trend-setting technologies, art and social change—always with the focus on the people. For this reason, Ars Electronica Center is not primarily a temple of knowledge that delivers all kinds of interesting facts, but rather a museum that "listens," that is interested in the views, ideas, and concerns of its visitors and gives them a voice.

A playful and creative approach, enthusiasm for new ideas and the commitment to make them accessible to a broader public seem particularly important. Based on the principle of participation and hands-on experience, and by transforming theoretical information into creative material for discussion, formats are developed for all age groups to make the complex themes of the Ars Electronica exhibitions accessible to everyone.

- **Ars Electronica Futurelab Art Science Research**

At the center of all educational programs are correlations at the nexus of art, science, technology, and society. Art Science Research operates at the intersection of art and science, embracing the tension between the subjectivity of art and the objectivity of science.

Ars Electronica's artistic R&D arm, Ars Electronica Futurelab, thrives in this field of tension, exploring new knowledge through methods like "Art Thinking" and "Future Prototyping". As the think and do tank of Ars Electronica, it always places the human being at the center of the research, considering the social aspects of technological developments such as artificial

intelligence, robotics, media architecture, interactive technologies, new aesthetic forms of expression or swarm intelligence, and their effects on the future of society.

Ars Electronica Futurelab has been living this approach systematically and intuitively since its beginnings in 1996 in one way or another, while constantly reflecting and adapting various research topics. The diverse research outcomes, including patents, publications, art thinking methods, educational toolkits, and software/hardware developments, always try to engage the public and industry through artworks and exhibitions, leveraging the Ars Electronica network. Transdisciplinary research is a proven method to facilitate new future approaches, possibilities, and inspiration and has become a multiplier in the process of developing new social and cultural conventions. Close cooperation and collaboration with diverse partners from the fields of business, industry, culture, research, and education exemplify the inter- and transdisciplinary strategy.

- **Future Thinking School by Ars Electronica**

The success of Ars Electronica's educational programs and the increasing demand for offers from practitioners outside of the formal educational sector, led to the launch of the Future Thinking School by Ars Electronica for supporting companies and institutions in 2019. Trainees, employees, or managers can acquire competences for the future and investigate what digitalization means for their field of work, organization or team. The digital transformation constantly brings forth new technologies and business models, and places unknown demands on managers and employees.

In the Future Thinking School's training and education programs, skills are fostered to successfully manage change, to recognize the correlations, and to develop new strategies that set the course for the future. From keynote speeches to full-day workshops, the Future Thinking School develops selected content on the topics of innovation, new technologies, digital humanism, and digital transformation. A constant method used in these activities is "Future Thinking", a mindset and means of being aware of the past and the future and acting accordingly in the present. Becoming truly fit for the future requires more than a technical understanding and calls for holistic future visions and goals.

- **Future Studio for Women**

Ars Electronica also takes a core focus on specific target groups in selected educational programs. To support women re-entering the world of work or changing to a new professional field, a new workshop program was developed in the Future Thinking School together with AMS Upper Austria (Labor Market Service) and VFQ Verein für Frauen und Qualifikation Linz (Association for women and qualifications).

The *Future Studio for Women* gives participants an insight into the world of digitization, especially that of artificial intelligence: what impact could AI have on the world of work as well as on society? In addition to imparting knowledge, the focus is on increasing interest in new technologies. The *Future Studio for Women* program has been run for women in cooperation with AMS Upper Austria since March 2022 and is intended to encourage participants to use new technologies as tools, and to use them to actively shape their future.

- **My FutureWorkshop**

Ars Electronica has also made it its mission to support NEETs (persons who are not in education, employment or training). *My FutureWorkshop* is a program that makes it possible for 120 unemployed young people each year to spend a week getting a behind-the-scenes look at the Ars Electronica Center. The lineup includes various workshops that focus on and utilize the entire spectrum of in-house resources. Supported by the Federal Province of Upper Austria and the AMS Upper Austria, the activities on offer range from experimentation in the Sound Studio to video shoots using professional-grade equipment. Up to 20 youngsters at a time can take part in the curriculum staged en bloc over the course of a single week. So far, two of the participants have even been offered jobs at Ars Electronica and are now members of staff.

- **WeSTEAM project**

Capacity-building for female participants was also the core focus of the Erasmus+ funded *WeSTEAM project,* in which a skills framework was developed that women in STEM can use to self-assess their Art Thinking capacity and to identify areas for improvement. *WeSTEAM* is also developing a training methodology, designed to be utilized by both STEM educators and female students themselves, which is further supported by a VR-based educational game.

From Elementary to Higher Education

In an increasingly complex interconnected world, STEAM (Science Technology Engineering Arts and Mathematics) practices have gained attention at all levels in education. This helps students acquire interdisciplinary skills for the job market, increase intellectual curiosity, and collaboratively develop creative solutions to complex global challenges.

Today, Ars Electronica collaborates with hundreds of institutions worldwide to develop educational programs designed to deliver exactly these 21st century skills. Partnerships include all sectors (academia, culture, policy, research, and education) and range from long lasting regional collaborations (e.g. with Pedagogical Colleges

in Upper Austria, University of Arts Linz, Anton Bruckner Private University, University of Applied Science Upper Austria, Campus Hagenberg and Steyr, or with the Austrian Federal Ministry for Education, Science and Research and the European Commission) to international networks covering partners across the world.

Elementary Education Activities

Digital education starts at elementary school age at Ars Electronica! How can children be introduced to new technologies? Our answer to this question was to create our own research laboratory just for children. With the **Ars Electronica Kids' Research Laboratory,** a versatile playing field has been created that gives children time and space to play and discover our world, the digital as well as the analog, the natural as well as the artificial world. For children, the whole world is a laboratory in which experiments and research journeys are constantly taking place.

Ars Electronica Center's **school program** focuses on **elementary and secondary education** and makes an active contribution to Austria's formal curriculum. It currently offers three topic packages on artificial intelligence, neurobionics, and climate and environment. They are tailored to the "Digital Literacy" curriculum and can be booked either individually or as a complete package. Through a wide network rooted in Austria's school system and appointed educators functioning as Ars Electronica ambassadors, the program can be integrated into a school's annual planning.

To ensure access to new ideas, inspiration, and approaches even in uncertain times, the Ars Electronica Center has developed special services to bring the museum of the future "virtually into the classroom": With the digital offers for schools, digital and analog tools as well as proven didactic methods are used to provide an innovative way of imparting knowledge and engaging with the current issues of our time.

Led by the Kaiserschild Stiftung, a charitable private foundation, Ars Electronica also brings educational offers from the Ars Electronica Center to **elementary school children** in rural areas of Austria through hands-on learning experience on STE(A)M topics—science, technology, engineering, arts, and mathematics. The idea of developing a mobile learning and dissemination concept for elementary schools resulted in **missimo: Deine Mission Morgen** (Your mission tomorrow): a project for children aged eight to ten that offers many experiments on topics such as AI, robotics, and programming and visits schools throughout Austria by truck.

Developed by the Ars Electronica Futurelab, the *missimo* experience starts with a teacher training session, where educators engage with and learn how to teach the contents of the program to their students. As soon as the teachers are trained, the *missimo* truck can visit the elementary school to introduce the children to the subjects through a playful approach. Six main installations that provide different learning experiences and narratives are found inside the truck. At the center is a microcontroller—a so-called micro:bit—with which the children are equipped at the beginning of their stay. Inside each micro:bit "lives" an avatar that can be personalized and accompanies the students from station to station. Finally, a workshop kit is distributed to the school classes. This kit contains components that enable experiments and trials to be carried out in class. *missimo* will be operated by the Kaiserschild Foundation for several years, supported by the Ars Electronica Center, to bring the fun of learning and low-threshold access to technology even closer to elementary school students across Austria.

Besides implementing activities and offering educational programs, Ars Electronica also strives to contribute to the development of digital education in Austria at large. To initiate the opening of this still untapped didactic field, Ars Electronica, in collaboration with the University of Arts Linzs, the Upper Austrian University of Teacher Education, and ÖFEB, joined a working group in 2023 and hosted a conference on **basic digital education**. The now compulsory subject at lower secondary level was implemented, schools were equipped with tablets, and teachers who already teach the subject gained the necessary knowledge and skills in a four-semester university course. This training will be replaced in the long term by a regular teacher training course offered jointly by universities and teacher training colleges. The integration of basic digital education contents into the existing computer science curriculum is underway with varying degrees of success. Ars Electronica opened outcomes from its **create your world program** to provide inspirational examples of this merger and contributes to further the discussion on novel content and possibilities offered by this new subject in Austria's curriculum.

- **Ars Electronica create your world**

Ars Electronica's conviction is to go beyond the formal education framework and be an accessible learning platform to experiment, explore, and develop for all. Every new development must be taught, learned, and trained not only by those who are typically the first to benefit. **create your world** is Ars Electronica's platform to test new learning formats and try out alternative learning structures.

The annual **create your world Festival** (since 2011) is free of charge and not only addresses new technological developments, but also integrates the complex web of art, technology, and society into our everyday life and thus

makes it usable. Sustainability is an important focus—in every form: Whether green event or use of regional resources—the long-term "durability" of ideas and projects is an important goal.

The **create your world Tour** takes exactly such topics directly back into the classroom! Students and teachers have direct access to content by artists and thinkers from the entire Ars Electronica network. Interactive methods, new technologies and materials as well as artistic positions are prepared for the classroom and presented, discussed, and applied in workshops, lectures, and other formats in schools. A joint learning process is launched, and a foundation laid for lasting inspiration for both learners and educators alike. On the one hand, the open form of education serves as motivation here, on the other hand, the fun and the "do-it-yourself" principle is paramount and automatically increases the students motivation and engagement. Some of the programs brought into the classroom are even developed and delivered by peers—from students for students!

Research and Educational Activities in the Field of Transdisciplinary Culture

- **European Collaboration Projects**

European collaboration projects, such as IMPETUS, Critical Change Lab, STEAM INC., funded under Erasmus+ or Horizon Europe, build the main driver for Ars Electronica's research and educational activities in the field of transdisciplinary cultures. The aim is to stimulate and ambitiously drive the societal evolution required by fostering transdisciplinary cultures through education and science engagement, so that we have the expertise to facilitate and put into practice the different types of knowledges needed to achieve transformative change and create a sustainable future.

By fostering a culture of transdisciplinarity across the European Research Area, Ars Electronica and its European partners deliver projects focused on fostering collaborative, practice-driven and transdisciplinary educational activities. By bringing together diverse stakeholders, we can shape a society that works together towards a sustainable future.

0 **IMPETUS** hosts the European Union Prize for Citizen Science on behalf of the European Commission in order to broaden the recognition and disciplinary engagement of Citizen Science by honoring collaborative and diverse approaches that empower civil society and citizens in the development of the future. In 2024, Ars Electronica, on behalf of the European Commission, awards the **European Union Prize for Citizen Science** for the second time.

0 **The Critical Change Lab** aims to ultimately contribute to improve democracy in Europe through this flexible model of democratic education across educational organizations in Europe. By giving power and agency to young people, direct action towards creating a sustainable and socially just future can be inspired. Ars Electronica embeds this model of education within its **create your world program** in the upcoming years.

0 **STEAM INC.** The Erasmus+ project STEAM Innovation and Curriculum (STEAM INC) led by Birmingham City University (BCU), involves seven European partners who have been pioneering STEAM approaches and methods. Using workshops, discussions, hacking processes, and reflective practice, this collaborative work is the first comprehensive attempt to systematically analyze and showcase European approaches to STEAM in higher education. Project outputs include a handbook on STEAM approaches, the development of new STEAM methods, and developing evaluation frameworks.

0 **ESERO.** One of these European networks targeted at transdisciplinary capacity building is ESERO (European Space Education Resource Office), which is ESA's (European Space Agency) umbrella educational project supporting formal education of the sciences (STEM—Science, Technology, Engineering and Mathematics) in European elementary and secondary schools.

Hosted at the Ars Electronica Center since 2016, ESERO Austria utilizes both the educational and scientific networks of the Ars Electronica Center, as well as links with ESA and with the Austrian space sector, to introduce innovative school teaching and learning strategies in STEM disciplines. By offering educational activities specifically tailored to the national curricula and priorities of the ESA Member States, the ESERO offices play an important role in supporting science and technology education, and in inspiring the next generation to pursue STEM-related studies and careers, particularly in the space domain. The three strands designed to achieve this are teacher training activities, classroom resources, and competitions.

Higher Education Activities

Ventures in higher education are a shared mission across all departments of Ars Electronica. The Ars Electronica Futurelab provides opportunities to learn 'how to build the future' through a variety of educational programs. Based on the knowledge gained through the practice of diverse future projects, artistic thinking and prototyping methods have been developed to proactively shape a better future. Futurelab's educational programs use 'creative questions' as a compass,

encouraging participants to experience prototypes of the future. Art can be very effective in finding new ways into the future, because it adds creativity to spaces of reality.

Through the form of Artistic Journalism, art becomes a medium for conveying knowledge that transcends the limitations of books, newspapers, and online media. **Futurelab's Art Thinking workshop**s convey the mindset and engage participants in thought experiments. In close cooperation with international and regional colleges and universities, they offer the use of our Ars Electronica infrastructure, such as Deep Space 8K, for the realization of cooperative projects in dialogue between international students and Futurelab's research in the fields of art and science. As tutors, the researchers and artists teach at international university educational institutions and thus accompany, support, and inspire the broad-based discourse on the future as interdisciplinary mentors.

In Tokyo, the Ars Electronica Futurelab & Ars Electronica Japan regularly open the **School of the Future**, which combines all of these programs and creates opportunities for everyone to learn about the "future" that cannot be learned in a traditional school setting.

Ars Electronica Futurelab Academy

The Ars Electronica Futurelab Academy is a special format with the goal of continuously helping to shape the international university education system. Collaborating universities have been Northeastern University, Media Lab Helsinki, Queensland University of Technology, University of Tsukuba, Hong Kong Design Institute, and China Academy of Arts. Together with researchers from Ars Electronica Futurelab, faculty and students have been developing ideas, concepts, and experimental practices since 2012 that repeatedly lead to outstanding projects. The results are presented at the annual Ars Electronica Festival and give participants the international recognition they deserve.

Ars Electronica Campus

In general, the Ars Electronica Festival is today one of the world's most important platforms for showcasing student projects in the field of digital arts and culture from all over the world. Every year since 2002, Ars Electronica and University of Arts Linz have hosted an exhibition by artists associated with an international higher education institution whose curriculum takes an innovative approach to teaching media art and media culture.

The intention of the Ars Electronica Campus format is to invite outstanding international universities working in the academic fields of media arts and design. Projects highlighted here represent the nature of the mission and activities of invited guest universities from all around the world. These showcases have become an essential part of the festival and an instrument to highlight different models of educational approaches in artistic, creative, and technological areas.

Part of the Ars Electronica Campus mission is to offer young media artists and their work a platform with international exposure. Every year, more than 50 international academic institutions join the Ars Electronica Festival to present the outcomes of the past academic years, full of experimental approaches and prototypes.

The Ars Electronica Festival is increasingly also becoming a platform for artistic and creative collaborations between Ars Electronica and the various regional, academic partners, for example the Fashion & Technology or the Time-Based and Interactive Media Art program at University of Arts Linz, Anton Bruckner Private University or University of Applied Science Upper Austria, Campus Hagenberg.

The Festival University 2021/2022 by Ars Electronica and Johannes Kepler University (JKU)

Within this regional ecosystem, Ars Electronica paired up in 2021 with Johannes Kepler University (JKU) to create a think and do tank for the new Linz-based technical university focused on digitalization and digital transformation. To promote Austria and digitalization, a science policy initiative was started in 2020 to found a new technical university for transformation and transformational change in Upper Austria. The primary focus of this endeavor is to establish its international and interdisciplinary character, an excellent research environment, and new, forward-looking teaching models.

To promote this exciting venture internationally, to attract young people from all over the world and also to harness the experiences and ideas of interested communities from all fields, Johannes Kepler University and Ars Electronica started the **Festival University** in **2021** under the motto "Transform your World," serving as a prototype and showcase for a university of the 21st century. Global challenges of tomorrow require a new approach—one based on creativity and co-creation. Supported by the Austrian Federal Ministry for Education, Science and Research as well as the Federal Province of Upper Austria, the inaugural program took place in a hybrid form, with 100 participants joining online as well as in-person in Linz, Austria, between August 30, 2021 – September 19, 2021.

The **Festival University** program by Ars Electronica and Johannes Kepler University was continued in **2022** under the title "Welcome to

Martin Hieslmair

Planet B." 200 students from over 70 countries spent four weeks at the Festival University of Ars Electronica with JKU scientists, artists, and many other high-ranking experts from all areas of art, technology, science, and society. They developed strategies and solutions and experienced the complexity of one of the most significant challenges of our time in a fictitious international environmental court simulation—"The International Environmental and Climate Court." The IECC met on Sept. 9, Sept. 10 and Sept. 11 at and centered petitions on water, climate migration, and energy.

The activities of the Festival University 21/22 led on to development of the IT:U x Ars Electronica FOUNDING LAB Summer School and Fall Term in 2023/2024.

IT:U x Ars Electronica FOUNDING LAB

Summer School and Fall Term 2023/2024

The kick-off for the IT:U x Ars Electronica FOUNDING LAB was in June 2023 with two Open Calls. The FOUNDING LAB was open to anyone who submitted to the Open Calls until July 3, 2023, and who met the eligibility criteria.

In early July, 2023, IDSA (now IT:U) and Ars Electronica selected 75 students and 15 Fellows who were invited to Linz.

The program Ars Electronica and IT:U developed for the FOUNDING LAB had three formats that were closely linked both time-wise and content-wise:

- the **FOUNDING LAB Summer School** (August 23 to September 13, 2023)
- the **FOUNDING LAB Forum** in the framework of the Ars Electronica Festival (September 6 to 10, 2023), and
- the **FOUNDING LAB Fall Term** (October 2023 to January 2024).

All formats were aimed at PhD and Master students as well as Fellows, i.e. scientists, artists, designers, and developers who wanted to shape the future of digital transformation together.

The FOUNDING LAB was one of the building blocks of the IT:U fall program, which included other dialogue formats as well a series of lectures, for an exchange with the community, and workshops with other teaching and research institutions, as well as with industry, to determine upcoming research activities.

The **IT:U x Ars Electronica FOUNDING LAB** was an **important component for the starting of the new university.** This prototypical laboratory focused on questioning and testing various aspects of the digital transformation, such as the coexistence of robots and humans and the integration of artificial intelligence into our everyday lives. Furthermore, innovative formats, methods, and strategies of teaching and learning, which have to be established at the IT:U as a forward-looking university, were being developed.

With the FOUNDING LAB, we wanted to outline the basic features of university teaching and research in the 21st century with young committed people and internationally renowned experts.

Veronika Liebl (AT) is currently Ars Electronica's Director of European Cooperation and Managing Director of its Festival/Prix/Exhibitions department. She studied economics and business science at Johannes Kepler University in Linz (graduated in 2010), with study visits to Harvard University (US) and the Université de Fribourg (CH), and also has an interdisciplinary background in non-profit and innovation management. Since 2011, she has been in charge of cultural management and European project development at Ars Electronica Linz and serves as an advising member of the City of Linz Culture Council and the executive board of the Linz UNESCO City of Media Arts. Furthermore, for over ten years she has been involved in programming and the production of collaborative programs with partners from the arts, sciences, and industry. She heads Ars Electronica's European collaboration projects in the fields of culture, research & education, and in this regard, together with her team, has evolved, launched, and completed numerous EU projects such as the STARTS Prize and the European Digital Deal.

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Summer School & Forum

at Ars Electronica Festival 2023

Vanessa Hannesschläger

The IT:U x Ars Electronica FOUNDING LAB Summer School (August 23 – September 13, 2023) was the kick-off event for 20 Fellows and 75 students from all over the world who envisioned the future of academia together for two weeks.

The FOUNDING LAB Summer School culminated in the FOUNDING LAB Forum, a central component of the Ars Electronica Festival 2023 in Linz, Austria.

IT:U started its operation in 2023 with the IT:U x Ars Electronica FOUNDING LAB **Summer School**, supported by experts from Ars Electronica. The overall goal of this collaborative prototype was to identify and develop new methods and formats for shaping a pioneering university. By overcoming disciplinary boundaries, it confronts the contradictory and conflicting realities of today and cultivates the skills to navigate an increasingly digital world. Experts, leading thinkers, scientists, and innovators from all disciplines convened to explore and define new pathways towards transformative digital change.

The FOUNDING LAB **Forum** at the Ars Electronica Festival 2023 served as a public platform to showcase initial ideas and outcomes from the FOUNDING LAB Summer School. The results were further explored during the FOUNDING LAB **Fall Term**, the first experimental semester taking place at the new Interdisciplinary Transformation University Austria (IT:U).

Summer School

The IT:U x Ars Electronica FOUNDING LAB Summer School gave 75 interdisciplinary students from across the globe an opportunity to enter into a joint discourse about the future of research and academia.

Expert Talks

In expert talks with subsequent plenaries, the participants developed a common thinking space, engaging with artistic, technological, economic, and scientific perspectives. Speakers ranged from economic experts like Petia Niederländer, Director for Payments, Risk Monitoring and Financial Literacy of the Oesterreichische Nationalbank (OeNB), to interdisciplinary artists like Špela Petrič, from discourse leading researchers like software engineer Johanna Pirker to high-level government representatives like Martin Polaschek, Federal Minister of Education, Science & Research, and Leonore Gewessler, Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology, (among others).

Summer School

3 weeks to create impulses for the digital transformation of our world

Students' visions & prototypes for the University of the Futures

August 23 – September 13, 2023

Forum

5 days to create impulses for a pioneering university

Joint visions by students & fellows

Kick-off of Fall Term

Ars Electronica Festival 2023

Fall Term

Workshops and online mentoring to share expertise and gain new insights

University visions brought to life

Tangible models of future visions

October 2023 – January 2024

Project topics

In addition to the dense input they jointly received in these sessions, the students built upon their personal disciplinary expertise, complementing each other in working groups to develop their group projects.

Project topics ranged from Future Materials and New Design Paradigms to AI and Data Bias, from Sensing, Signals, and Interactivity to Brain-Computer Interfaces. Experts and pioneers like creator of Max and Pure Data, Miller Puckette, bio artist Charlotte Jarvis, intersectional machine learning expert Sarah Ciston, and others worked with the groups to support the development of their approaches and experimentation.

In elective workshops, the students pursued their personal interests, widening the scope of their thinking and bringing back new insights and ideas to their working groups. Workshop hosts included Storyteller from the Future Karen Palmer, European policy expert Rosanna Fanni, responsible AI researcher Andrés Colmenares, and others.

To ensure the broadest possible representation of thought directions, the working groups then split up and members of each group rejoined in task forces which developed representative outcomes of these exploratory processes. Some task forces dedicated their efforts to the production of artworks and performative approaches, while others worked on policy recommendations, public communication, and scientific analysis.

FOUNDING LAB Forum

The impressive outcomes of their collaborations were presented at the Ars Electronica Festival 2023, at the FOUNDING LAB Forum, showcasing visions for a new approach to the setup of an academic institution tackling the challenges of our time. In a full day conference, an opening night performance, a policy meeting, extensive media documentation, and an exhibition, the international next-gen intelligence showed new perspectives developed in Linz, to change the future of the city and the world.

Vanessa Hannesschläger (AT) is head of European Collaboration at Ars Electronica, steering the company's engagement in numerous pan-European partnerships. She holds a PhD in literature from the University of Vienna, and teaches courses on digital humanities, research policy frameworks, and digital legal literacy at universities across Europe. Before joining Ars Electronica, Vanessa contributed to the implementation of European digital research infrastructures at the Austrian Academy of Sciences and focused her scholarly work on digital editing and multilingualism in contemporary literature. Her current research focuses on new narratives and experimental form in contemporary performance and text, a topic she explores at Ars Electronica in projects around digital theater and new approaches to XR. She is particularly interested in integrating philosophical thought in art-science approaches, as well as intersectional feminism and gender philosophy. In the European policy context, Vanessa advocates for digital infrastructure for the arts and humanities, data and legal literacy, the Commons, and Open approaches.

Patrick Münnich


Who Owns
the Truth?


welfare
Who Owns
the Truth?

IT:U
x
Ars Electronica
FOUNDING
LAB

Summer
School

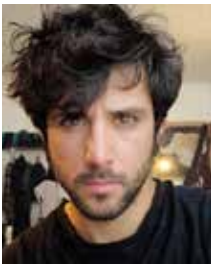
Experts

The Summer School Experts gave expert talks and hosted workshops that fostered creative thinking and produced outcomes ranging from artworks to policy recommendations.

Amir Bastan, Patrick Münnich

Amir Bastan

(IR/AT) As a new media artist with a fine arts and philosophy background, Amir Bastan (*1991) explores the gap between the conscious and the unconscious. He realizes his works by designing narratives through real-time processes. *The Human Robot Transference* is the centerpiece of his current research, drawing parallels between psychoanalysis theories and human-robot interaction within the context of new media arts. Alongside his artistic practice, Amir is developing *The Bunraku Project,* a software utilized for real-time control, visualization and simulation of industrial robots. Amir is based in Linz, where he is pursuing his PhD and is currently a researcher at Creative Robotics and a lecturer at the University of Arts Linz.



Amir Bastan co-hosted the workshop **GAZE: About Looking and Being Looked At** together with Johannes Braumann, professor for Creative Robotics at University of Arts Linz. In this workshop they examined human-robot interaction from a psychoanalytic perspective, discussing transference, fantasies, fears, and desires experienced while working, making, and being with robots.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Originally from: Iran, Asia
Area: Natural Sciences, Mathematics and Data Science, Engineering, Applied Arts

Andrés Colmenares

(CO) is the co-founder of IAM, a creative research lab exploring the socio-ecological impacts of digital technologies through collective learning initiatives, partnerships, and commissioned projects. He is also the director of the pioneering Master program Design for Responsible AI at ELISAVA and co-founder of the Billion Seconds Institute, a lifelong learning initiative to reimagine the digital economy. He is also a strategic advisor to The Supporting Act Foundation.

Andrés Colmenares hosted the workshop **Designing for Responsible AI in a State of Climate Emergency** which gave comprehensive insight into the process of transforming an idea into a thriving business, placing a strong emphasis on practical approaches and tangible examples.

Role: FOUNDING LAB Summer School—Expert
Based in: Spain, Europe
Originally from: Colombia, South America
Area: Social Sciences, Natural Sciences, Mathematics and Data Science, Life Sciences

Johannes Braumann

(AT) Johannes Braumann is professor for Creative Robotics at University of Arts Linz, leading an interdisciplinary team of researchers towards exploring robots as an interface between the digital and physical world. As co-founder of the Association for Robots in Architecture, Johannes is tightly linked with both the robotics and design community. He is the main developer of the accessible robot simulation and programming tool KUKA|prc, which is used for high-end robotic fabrication at both universities and companies world-wide.

Johannes Braumann, professor for Creative Robotics at University of Arts Linz, co-hosted the workshop **GAZE: About Looking and Being Looked At** together with Amir Bastan. In this workshop they examined human-robot interaction from a psychoanalytic perspective, discussing transference, fantasies, fears, and desires experienced while working, making, and being with robots.

Role: FOUNDING LAB Summer School – Expert
Based in: Austria, Europe
Originally from: Austria
Area: Natural Sciences, Mathematics and Data Science, Engineering, Economics, Applied Arts

Sarah Ciston

(US) Sarah Ciston builds critical–creative tools to bring Intersectional approaches to machine learning. They were recently named an “AI Newcomer“ by the Gesellschaft für Informatik, an “AI Anarchies Fellow“ by the Akademie der Künste Berlin, and a Mellon PhD Fellow in Media Arts + Practice at the University of Southern California. Sarah is author of “A Critical Field Guide to Working with Machine Learning Datasets”, realized in the framework of the Knowing Machines research project. She leads Code Collective: an approachable, interdisciplinary community for co-learning programming.

Sarah Ciston hosted the workshop **Is another world possible? AI against the grain**, which investigated the theoretical and technical underpinnings of GenAI systems by exploring the data that construct them.

Role: FOUNDING LAB Summer School—Expert
Based in: Germany, Europe
Originally from: United States of America
Area: Natural Sciences, Mathematics and Data Science, Machine Learning

Milena Calvo Juarez

(BR) is a Brazilian environmental engineer with a Master in Interdisciplinary Studies in Environmental, Economic and Social Sustainability and specialization in Industrial Ecology. Milena has been actively involved in various interdisciplinary projects in the field of circular economy, resilient cities, community development, and innovative materials. Milena supports the local activities at the Barcelona Fab City Hub and is a member of the Remix EcoDesign Collective, winner of the S+T+ARTS Prize 2021.

Milena Calvo Juarez held the expert talk **Materials Innovation and Circular Strategies: Co-Creating Resilient Urban Futures.**

Role: FOUNDING LAB Summer School—Expert
Based in: Spain, Europe
Originally from: Brazil, South America
Area: Life Sciences, Engineering, Sustainability, Community development

Andrés G. Delannoy

(US) is a CERN-based research scientist with the University of Tennessee, Knoxville. Born and raised in Puerto Rico, he completed his Bachelor's degree in Mechanical Engineering at the University of Puerto Rico at Mayagüez. He then embarked on a PhD in Physics at Vanderbilt University where he carried out the first search for dark matter using the Vector-Boson Fusion signature at the Large Hadron Collider. As part of the Compact Muon Solenoid collaboration, he is very active in the Beam Radiation, Instrumentation, and Luminosity (BRIL) group. His current roles include BRIL Detector Performance Group coordinator and Pixel Luminosity Telescope (a silicon-pixel detector dedicated to luminosity measurement at CMS) project coordinator.

Andrés G. Delannoy held the expert talk **Physics at Scale: particle physics infrastructure, collaboration, and innovation at CERN's Large Hadron Collider**, covering the challenges of technological innovation, coordination in the context of worldwide collaborations, and large-scale distribution of data and computation.

Role: FOUNDING LAB Summer School—Expert
Based in: Switzerland, Europe
Originally from: United States of America
Area: Natural Sciences, Mathematics and Data Science, Engineering

Rosanna Fanni

(IT/DE) researches the implications of technology governance and international relations at the Centre for European Policy Studies in Brussels. She also coordinates an EU-funded project to support the EU-U.S. Trade and Technology Council with stakeholder engagement. Rosanna holds a MA in Digital Communication Leadership from the University of Salzburg & Vrije Universiteit Brussel.

Rosanna Fanni held the elective workshop on **Research, Funding and Politics: A Contradiction in Terms?**

Role: FOUNDING LAB Summer School—Expert
Based in: Belgium, Europe
Originally from: Italy, Germany, Europe
Area: Natural Sciences, Mathematics and Data Science, Economics, Policy

Matthew Gardiner

(AU) is a world leading expert in the field of Oribotics, having coined the field, and pioneered the fusion of origami, folding and robotics. With his generations of Oribotic artworks Gardiner's artistic contexts include team-based research within commercial institutions and universities, and individual artworks with experience extending across aesthetic and interactive experience design, digital manufacturing, rapid prototyping, expert-level origami, and writing code. Matthew joined Ars Electronica Futurelab in 2010 as an Australia Council for the Arts supported artist-in-residence. During this time, he produced his opus magnum *Oribotics [the future unfolds],* and later joined their Research and Innovation Group, as a key researcher in the field of Functional Aesthetics. Gardiner was instrumental in the curation and production of the flagship exhibition *Project Genesis* on the topic of Synthetic Biology, a follow-up from the workshop program *Living Logic* as part of a 3-year European Union FP7 project *Studiolab.* Current research activities include doctoral work on the topic of Folding and Technology and a major Art Science research FWF PEEK funded program: *ORI—On the Language and Aesthetics of Folding and Technology.* Gardiner is the best-selling author of *Everything Origami,* and Artistic Director of the Origami Convention Folding Australia from 2003–2009.

Matthew Gardiner hosted the workshop **Folding the future: materials and design strategies for origami robotics**, which gave an overview of state-of-the-art origami and robotics technologies and processes, as well as the opportunity to create pre-designed oribots.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Originally from: Australia
Area: Natural Sciences, Mathematics and Data Science, Life Sciences, Applied Arts

Leonore Gewessler

(AT) is the Austrian Federal Minister for Climate Action, Environment, Energy, Mobility, Innovation and Technology since January 2020. From October 2019 – January 2020 she served as a Member of the National Council (27th legislative period), Green Parliamentary Group, and the European Parliament. From 2014 – 2019 she was Executive Director of the environmental protection organization Global 2000. From 2008 – 2014 she was the Director of the Green European Foundation ASBL, in Brussels.

Leonore Gewessler hosted the expert talk **The Realities of Policy Negotiations.**

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Originally from: Austria
Area: Environmental agendas and policies

Christoph Guger

(AT) is a biomedical engineer from the University of Technology Graz and Johns Hopkins University in Baltimore, USA. He conducted research at the Department of Medical Informatics (Prof. Pfurtscheller) at Graz University of Technology and received his PhD degree in 1999. The topic of his PhD work was the design of an EEG-based Brain-Computer Interface. This was the first real-time BCI system with continuous feedback. He also developed the real-time analysis with common spatial patterns which is still the fastest and most accurate approach for oscillatory BCIs and developed also a P300 BCI with very high accuracy and speed. He is a co-founder of g.tec where he has been working since 1999. The company develops hardware and software for biosignal acquisition and analysis (mainly EEG and ECG). g.tec sells biomedical equipment in more than 60 different countries worldwide together with distribution partners in 20 countries and is the world's leading supplier of Brain-Computer Interface technology. The technology of g.tec has received several innovation awards from 2000-2011 (Fast Forward Award, GEWINN-Award, European Information and Communication Technology prize (ICT-prize), Well-Tech Award, Econovius, Microsoft Award and Pegasus). Currently g.tec has received research funding from national (FFF, SFG) and European programs: Presenccia, Better, BrainAble, Vere, SM4all, Decoder, ALIAS, Rehabilitation Gaming System, Central Nervous System Imaging, High Profile, ECoG. Research projects are developing invasive and non-invasive recording systems for brain activity.

Christoph Guger, together with artist Anouk Wipprecht, co-hosted the NeuroTech-workshop **Create Interactions using a Brain Computer Interface** with the goal to teach students how to develop a brain-controlled interface using gtec's EEG headsets.

Role: FOUNDING LAB
Summer School—Expert
Based in: Austria, Europe
Originally from: Austria
Area: Engineering

Charlotte Jarvis

(GB) is an artist working at the intersection of art and science. She has recorded music onto DNA, seen her heart beat outside of her body and is currently making the world's first "female sperm". Charlotte has exhibited her work in eleven international solo shows and over two hundred group exhibitions. Charlotte's work has won the Bioart and Design Award and has been peer-review published in *Leonardo* journal. She is currently a lecturer at The Royal College of Art.

Charlotte Jarvis, together with Patricia Saragüeta, co-hosted the workshops **Wet & Sexy: Bioart, Creative Activism** and **A Collaborative Uterus**, which introduced students to Bioart, post-disciplinary art / science practice and collaborative methodologies, and gave them the opportunity to participate in the project *Organ of Radical Care: Una Matriz Colaborativa.*

Role: FOUNDING LAB
Summer School—Expert
Based in: United Kingdom, Europe
Originally from: United Kingdom
Area: Natural Sciences, Mathematics and Data Science, Life Sciences, Applied Arts

Rosemary Lee

(US) is an artist and scholar whose work considers how current developments in image production fit within larger narratives about art, vision, knowledge, and relations between humans and machines. Informed by the perspective of media archaeology, she seeks to develop a better understanding of how current methods and ideas about art and technology are influenced by those of the past. Lee's forthcoming book, *Algorithm, Image, Art,* considers recent developments in artificial intelligence in relation to historical tendencies in image production. That work expands on her PhD project, *Machine Learning and Notions of the Image,* looking into how contemporary artists' approaches to algorithmic media are connected to longer discourse on the mediation of perception. Rosemary Lee teaches at the University of Porto Faculty of Engineering and has given guest lectures internationally at institutions including Abertay University, the LUCA School of Art, Edinburgh University, and The Royal Danish Academy of Fine Art.

Rosemary Lee's expert talk, **Behind the Algorithmic Image**, explored the application of machine learning and the broader issues surrounding artificial intelligence in contemporary artistic practice, contextualizing current technological developments in relation to art history, visual technologies, and theories of the image.

Role: FOUNDING LAB Summer School—Expert
Based in: Portugal, Europe
Originally from: United States of America
Area: Natural Sciences, Mathematics and Data Science, Applied Arts

Petia Niederländer

(BG/AT) took over the role of Director for Payments, Risk Monitoring and Financial Literacy of the Oesterreichische Nationalbank (OeNB) in February 2021. She leads the payments strategy and policy as well the work on the digital Euro project within the central bank of Austria. She is member of ECB's Market Infrastructure Board, chairs the National Payments Committee and acts as a non-executive board member at the Austrian payments' innovations hub—OeNPAY. Beyond payments, Petia is interested in improving the financial education and competences of the citizenship. She works together with her team in several national initiatives. She is a member of the executive board of the National Financial Literacy Strategy of Austria and holds the role of chairperson of the supervisory board of the Foundation for Economic Education. Prior to her role in the Austrian National Bank, Petia had several management positions in one of the biggest retail banks in Austria and served on the board of EBA Clearing as well as national and international payments bodies. She has more than 15 years of professional experience in payments and banking and holds a master degree in investment banking from Vienna University of Economics.

Petia Niederländer held an expert talk on the topic of **The Digital Euro**.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Originally from: Bulgaria, Europe
Area: Natural Sciences, Mathematics and Data Science, Machine Learning, Economics

Albert Ortig

(AT) Albert Ortig is an experienced entrepreneur and visionary with a deep passion for digital solutions and business models. With over two decades in the industry, he has spun out several successful startups from his company Netural, founded in 1998, including Roomle and Storyblok. As a business administration graduate and father of two, his passion lies in pushing boundaries and realizing innovation.

Albert Ortig hosted the workshop **Entrepreneurship in the context of AI**, which gave students comprehensive insight into the process of transforming an idea into a thriving business.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Originally from: Austria, Europe
Area: Natural Sciences, Mathematics and Data Science, Economics

Karen Palmer

(AT) As the Storyteller from the Future, Karen Palmer is an award winning XR creator and futurist who explores the implications of AI and technology on societal structures and the impact of inequality. She does this through enabling participants to experience the future today through her immersive experiences. Karen recently won the coveted XR Experience Competition at SXSW 2023 with her film *Consensus Gentium.* It is a powerful exploration into the implications of today's AI technology. This immersive experience is designed to drive discussion about data privacy, unconscious biases, and the power of technology. She creates films that watch you back using artificial intelligence and facial recognition technologies. The narrative branches in real time depending upon the participants' eye gaze and emotions, enabling participants to simultaneously experience surveillance technologies and their potential integration into the everyday world around us and how that could be used to impact societal structures, human rights and civil liberties.

Karen Palmer hosted the futurist workshop **Envisaging the University of the Future**, which intersects art, storytelling, and neuroscience to harness the power of future narratives as a catalyst for change in the present.

Role: FOUNDING LAB Summer School—Expert
Based in: United Kingdom, Europe
Originally from: United Kingdom
Area: Applied Arts

Netural, Karen Palmer, tom mesic, Špela Petrič

John Palmesino

(CH) John Palmesino is an architect and urbanist. Together with Ann-Sofi Rönnskog he is the founder of Territorial Agency, an independent organization that combines contemporary architecture, science, art, advocacy, and action. Recent projects include *Plan the Planet, Sensible Zone, Oceans in Transformation,* and the *Museum of Oil and Anthropocene Observatory.* They are chief curators of the Lisbon Triennale 2025. Territorial Agency are the recipients of the European Commission's STARTS Prize'21—Grand Prize for Artistic Exploration, honoring innovation in technology, industry and society stimulated by the arts.

John Palmesino held the elective workshop **Environmental Issues, Weight of the City**

Role: FOUNDING LAB Summer School—Expert
Based in: United Kingdom, Europe
Originally from: Switzerland, Europe
Area: Natural Sciences, Mathematics and Data Science, Life Sciences

Špela Petrič

(SI) Špela Petrič is a Ljubljana and Amsterdam-based new media artist who has been trained in the natural sciences and holds a PhD in biology, currently working as a post-doc researcher at the Smart Hybrid Forms Lab at Vrije Universiteit Amsterdam. Her artistic practice combines the natural sciences, wet biomedia practices, performance, and critically examines the limits of anthropocentrism via multi-species endeavors. She envisions artistic experiments that enact strange relations to reveal the ontological and epistemological underpinnings of our (bio)technological societies. Her work revolves around the reconstruction and re-appropriation of scientific methodology in the context of cultural phenomena, while working towards an egalitarian and critical discourse between the professional and public spheres. Petrič received several awards, such as the White Aphroid Award for outstanding artistic achievement (SI), the Bioart and Design Award (NL), and an Award of Distinction at Prix Ars Electronica 2019 (AT).

Špela Petrič hosted the expert talk **How (Not) To Leave the Lab**, which highlighted the epistemological insights, challenges of interdisciplinary collaboration, and future perspectives as experienced through a decade of practice in the hybrid field of art, science, and technology.

Role: FOUNDING LAB Summer School—Expert
Based in: Ljubljana/Slovenia, Amsterdam/Netherlands, Europe
Originally from: Slovenia
Area: Natural Sciences, Mathematics and Data Science, Applied Arts

Johanna Pirker

(AT) Dr. Johanna Pirker is a professor at Ludwig-Maximilians-Universität in Munich and an assistant professor at Graz Technical University. She leads the Game Lab Graz research group and studies digital environments and games with a focus on AI, HCI, data analysis, and VR technologies. Johanna was included in the Forbes 30 Under 30 list in the field of science and has been honored with the Futurezone Women in Tech Award (2019), the Käthe-Leichter Prize (2020), and the Hedy Lamarr Prize (2021).

Johanna Pirker co-hosted the workshop **Inventing the University of the Future** and gave the expert talk **It's not a game—it's a game changer**.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Based in: Graz/Austria, Munich/Germany, Europe
Area: Data Science

Martin Polaschek

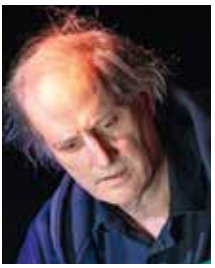
(AT) Assoc. Prof. Dr. Martin Polaschek (*1965) is the Austrian Federal Minister of Education, Science & Research. After studying law, he completed his doctorate in Austrian and European legal developments, contemporary legal history and federalism research in 2000 and was appointed associate university professor. From 2003 to 2019, he was Vice Rector for Studies and Teaching and Director of Studies at the University of Graz. Polaschek was also spokesperson for the Austrian Vice Rectors for Teaching. Martin Polaschek's research focused on the areas of post-war justice, university law, and municipal research.

Martin Polaschek hosted the expert talk "How (Not) To Leave the Lab", which highlighted the epistemological insights, challenges of interdisciplinary collaboration, and future perspectives as experienced through a decade of practice in the hybrid field of art, science, and technology.

Role: FOUNDING LAB Summer School—Expert
Based in: Austria, Europe
Based in: Austria
Area: Education Policy and Research

Miller Puckette

(US) Dr. Miller Puckette (Harvard; mathematics) is known as the creator of Max and Pure Data. As an MIT undergraduate he won the 1979 Putnam Mathematical Competition. He was a researcher at the MIT Media lab from its inception until 1986, then at IRCAM, and is now distinguished professor emeritus at the University of California, San Diego. He has been a visiting professor at Columbia University and the Technical University of Berlin, has been awarded two honorary degrees, the SEAMUS Award (US), and the 2023 Silver Lion award of the Venice Biennale Musica.



Miller Puckette hosted the workshop **Sensing, Signal Detection, and Interactivity**, which looked at possible ways systems can react to incoming signals.

Role: FOUNDING LAB Summer School—Expert
Based in: United States of America
Originally from: United United States of America
Area: Natural Sciences, Mathematics and Data Science, Applied Arts

Patricia Saragüeta

(AR) has a degree and PhD in Chemistry. She is a CONICET Researcher and Professor at the Department of Physiology and Molecular and Cellular Biology, School of Exact and Natural Sciences, University of Buenos Aires (UBA). She is a scientist and an artist, interested in genomics, cellular and molecular biology. She works for the meeting of art and science both in her work and at the institutional level. She has published three books of poetry, several articles, and many essays.

Patricia Saragüeta, together with Charlotte Jarvis, co-hosted the workshops **Wet & Sexy: Bioart, Creative Activism** and **A Collaborative Uterus**, which introduced students to Bioart, post-disciplinary art / science practice and collaborative methodologies, and gave them the opportunity to participate in the project *Organ of Radical Care: Una Matriz Colaborativa.*

Role: FOUNDING LAB Summer School—Expert
Based in: Argentina, South America
Originally from: Argentina
Area: Natural Sciences, Mathematics and Data Science, Life Sciences, Applied Arts

Katja Schechtner

(AT) Katja Schechtner is an urban scientist who advises global governments and businesses on how they can build the cities of the future. Previously, she developed technology and innovation policy at the OECD in Paris, led infrastructure programs at the Asian Development Bank (ADB) in Manila and a research lab at the Austrian Institute of Technology (AIT) in Vienna. As part of the MIT Senseable City Lab in Boston, she regularly publishes her work, which has been featured, inter alia, at the Architecture Biennale in Venice, Ars Electronica in Linz, and the Seoul Biennale for Urbanism.

Katja Schechtner co-hosted the Fireside Chat **Careers at the Crossroads of Art, Science, and Business**, the workshop **IDSA what and how? Inventing the University of the Future**", and moderated the expert talk by Austrian Federal Minister Martin Polaschek ,**The role of a new university for digitalization in strengthening Austria in the European Higher Education Area**, and the expert talk by Austrian Federal Minister Leonore Gewessler, **The realities of policy negotiations on the European level—insights from EU Ministerial Level Negotiations on Transport and Energy Policy Making**.

Role: FOUNDING LAB Summer School Expert & Member of IT:U Founding Convention
Originally from: Austria, Europa
Based in: Vienna, Austria
Area: Urban science

Fabian Scheidler

(DE) Fabian Scheidler studied history, philosophy, and theater directing and works as a freelance book author, journalist, speaker, and visual artist. His book *The End of the Megamachine. A Brief History of a Failing Civilization* was translated into several languages (www.end-of-the-megamachine.com). His most recent book is *The Stuff We Are Made Of. Rethinking Nature and Society* (Piper 2021). In 2009, he received the Otto Brenner Media Prize for critical journalism.

Fabian Scheidler held the expert talk **Technology and Power: From the Invention of Writing to AI**.

Role: FOUNDING LAB Summer School—Expert
Based in: Germany, Europa
Originally from: Germany
Area: Social Science, Natural Sciences, Mathematics and Data Science, Applied Arts

Florian A. Schmidt

(DE) is a professor for conceptual design and media theory at the University of Applied Sciences HTW Dresden. He has a background in visual communication, holds a PhD from the Royal College of Art (RCA) in London, and has been doing research on the economies of platform-based image production in various forms since 2006.

Florian A. Schmidt hosted the **Prompt Battle workshop**. The prompt battle addresses the numerous controversial questions that tools such as DALL·E, Stable Diffusion, and Midjourney raise for professional creatives.

Role: FOUNDING LAB Summer School—Expert
Based in: Germany, Europe
Originally from: Germany
Area: Humanities, Applied Arts

Anouk Wipprecht

(NL) Dutch FashionTech Designer Anouk Wipprecht creates designs ahead of her time; combining the latest in science and technology to make fashion an experience that transcends mere appearances. She wants her garments to facilitate and augment the interactions we have with ourselves and our surroundings. Her Spider Dress is a perfect example of this aesthetic, where sensors and moveable arms on the dress help to create a more defined boundary of personal space while employing a fierce style. Partnering up with companies such as Intel, AutoDesk, Google, Arduino, Microsoft, Samsung, Adobe, Adidas, Cirque Du Soleil, Audi, Disney, Swarovski, and 3D printing companies Shapeways, HP, and Stratasys she researches how our future would look as we continue to embed technology into what we wear, and, more importantly, how this will change our perspective on how we will interface with technology.

Her work has been exhibited internationally at multiple International Fashion Weeks, during CES and Art Basel Miami, Premiere Vision Paris, ARS Electronica Festival, IAA, has been featured in magazines like *WIRED, Vogue, Elle,* and *IEEE Spectrum,* and has been broadcasted and interviewed on TV show stations CNN, Discovery Channel, Red Bull TV, and NFL. She curated two successful exhibitions; "Technosensual – Where Fashion Meets Technology" at MuseumsQuartier Vienna in 2012, and "Robotic Couture" at Tetem Netherlands in 2017, and is part of the TED speaker family.

Anouk Wipprecht, together with Christoph Guger, g.tech, co-hosted the NeuroTech workshop **Create Interactions using a Brain Computer Interface**, which had the goal of teaching students how to develop a brain-controlled interface using gtec's EEG headsets.

Role: FOUNDING LAB Summer School—Expert
Based in: New York City, United States of America
Originally from: The Netherlands, Europe
Area: Applied Arts, Neuroscience

IT:U
x
Ars Electronica
FOUNDING
LAB

Summer
School

Topics & Students

Patrick Münnich

Students and Fellows from different countries, cultures, research disciplines, the arts, business and civil society made the FOUNDING LAB Summer School exactly what IT:U and Ars Electronica had hoped for: an inspiring kick-off for a new university that will be characterized from the very beginning by openness to dialogue, inclusion, and innovation.

The FOUNDING LAB **Summer School program** lasted three weeks. The first week focused on the interplay between nature, technology, and humans, with an emphasis on analyzing structures and systems and identifying interrelationships. In the second week, they took stock of the digital transformation: What are the sources of our information? What lobbies and structures influence public opinion? What are the frictions between technology and human values? Questions about the ownership of knowledge and data were explored, as well as the role of universities in creating new knowledge. The third and final week was devoted to preparing and presenting the answers and questions developed.

In the **Expert Talks**, the FOUNDING LAB Summer School students were inspired to reflect on the bigger picture context of academic investigation by thinkers, makers, technologists, artists, scientists, and policy makers. The experts shared their experience, gave exclusive insights into their fields, and challenged the students to ask their own questions. In the discussion rounds following the lectures, the students had the opportunity to develop their joint approach to the big challenges of our time.

Divided into **six topics**, the Summer School focused on core aspects of digital transformation. The students conducted research and experiments in the areas of

① **Biotechnology & Arts**

② **Machine Learning / AI & Data Bias**

③ **Creative Robotics**

④ **Sensing, Signal Detection & Interactivity**

⑤ **Brain-Computer Interfaces**

⑥ **Future Materials & New Design Paradigms**

In addition, these topics were explored in greater depth in **workshops**:

- **Wet & Sexy: Bioart, Creative Activism, and a Collaborative Uterus**
  Charlotte Jarvis and Patricia Saragüeta
- **Is Another World Possible? AI against the grain**
  Sarah Ciston
- **GAZE: About Looking and Being Looked At**
  Johannes Braumann and Amir Bastan
- **Sensing, Signal Detection, and Interactivity**
  Miller Puckette
- **NeuroTech Workshop—Creating Interactions using a Brain-Computer Interface**
  Christoph Guger and Anouk Wipprecht
- **Folding the Future: Materials and Design Strategies for Origami Robotics**
  Matthew Gardiner

Out of the 75 students of the IT:U x Ars Electronica FOUNDING LAB Summer School, 25 students pursued the topics in the FOUNDING LAB Fall Term and translated them into concrete projects. A documentation of these projects can also be found in this book.

↗ page 192

Topic ①

Biotechnology & Arts

Rethinking Reproduction and Care radically

Can a collective uterus exist? If so, how? What does it mean to reproduce collectively? Is this the future of human reproduction? When biotechnology and artificial intelligence intersect, revolutions and important questions can arise.

FOUNDING LAB students, together with artists, focused on reproduction and care. The starting point was the media art project *Organ Of Radical Care: Una Matriz Colaborativa* by Charlotte Jarvis and Patricia Saragüeta, which operates at the intersection of art, technology, science, and society. The Uterus-Organoid, a simplified version of a laboratory-produced organ made from endometrial cells from different donors, inspired students to explore its poetry, conduct performative research, and consider what new forms of care could look like—and how a queer understanding of nature could transform it.

Marta Zgierska

Songyu Bao

Academic Discipline(s):
● Interdisciplinary ● Arts ● Technology ● Humanities

Research Areas(s):
● Interactivity ●Robotic Agents ● Interface Design ● Storytelling

Role: FOUNDING LAB Summer School—Student
Based in: Nanyang Technological University, Singapore, Asia
Originally from: Singapore
Education: Master of Arts, Nanyang Technological University

Vision statement
Songyu Bao

The pioneering university should start with planning and designing courses that serve as conduits between different disciplines, emphasizing the interconnectedness of knowledge. This could involve designing coursework that scrutinizes the impact of art on technological design or the societal ramifications of technology. I can attest to the significance of this approach, having participated in several interdisciplinary projects myself. Through these experiences, I observed that many professionals, despite their high level of expertise in their respective fields, often found it challenging to communicate due to the extensive use of discipline-specific jargon. If we can successfully unify different fields through integrated courses or programs, even a basic understanding in each field can significantly facilitate collaboration. This creates a common ground that enables individuals from diverse backgrounds to understand each other better and work more effectively together.

Amanda Bennetts

Academic Discipline(s):
● Arts ● Interdisciplinary

Research Areas(s):
● Disability Studies ● Healthcare and Technology ● Illness Experiences ● Philosophy

Fall Term Project:
Stealth Care: wellness from the algorithm ↗ page 228

Role: FOUNDING LAB Summer School & Fall Term—Student
Based in: Brisbane, Australia
Originally from: Australia

Patrick Münnich

Vision statement

Amanda Bennetts

As an art student interested in the intersection of art and science, I have always believed in the power of collaboration across different fields of study. However, I have often faced challenges when trying to connect with science and tech students on my university campus. Unfortunately, the lack of familiarity between faculties and the physical separation of the art school can hinder these important cross-discipline collaborations. As we move towards a more interconnected future, universities must prioritize providing their students with the resources and experiential learning opportunities necessary to facilitate these valuable partnerships.

Youngjun Choi

Education:
●PhD Candidate, Graduate School of Culture Technology, KAIST

Academic Discipline(s):
●Arts ●Interdisciplinary
●Technology

Research Areas(s):
●Deep Learning ●Spatial Experience
●Technological Sublime

Fall Term Project:
Streams in the Veins ↗ page 232

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Daejeon, South Korea, Asia
Originally from: South Korea

Vision statement

Youngjun Choi

A new university should be promoting industry collaboration: Universities should foster projects in partnership with relevant industries. Such collaborations expose students and faculty to real-world problems, which come with inherent restrictions that demand practical and creative approaches. These partnerships ground academic knowledge, preventing excessively idealistic solutions, and foster a sense of social responsibility. The pioneering university has to implement revising assessment and reward systems: Traditional forms of assessment and reward may not be suitable for interdisciplinary work, which often involves longer time frames and doesn't fit neatly into one category.

Dorotea Dolinšek

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Ljubljana, Slovenia, Europe
Originally from: Slovenia

Education:
● Bachelor degree 2015 – 2019, Painting and Visual Arts, Academy for Fine Arts Venice (IT) ● Master degree (2020 – ongoing), Video and New Media Art, Academy for Fine Arts and Design Ljubljana (SLO) ● 2021 – Festival University: Transform your World, Ars Electronica & Johannes Kepler Universität (AT)

Academic Discipline(s):
●Applied Arts ●Arts
●Interdisciplinary ●Humanities

Research Areas(s):
●Queer Materiality ●Bodily Landscapes
●Technology as a xeno lens
●Transmedia Storytelling

Fall Term Project:
Flagged in Flux ↗ page 204

Patrick Münnich, Mario Zupanov

Nikola Gruev

Education:
● Undergraduate Degree in Gastronomic Sciences at the University of Gastronomic Science, Pollenzo, Italy ● Currently: Master in Food Safety at Wageningen University & Research, Wageningen, Netherlands

Academic Discipline(s):
● Medicine and Health ● Interdisciplinary

Research Areas(s):
● Gastronomy ● Food Law

Role: FOUNDING LAB Summer School—Student
Based in: Wageningen, Netherlands, Europe
Originally from: Bulgaria

Vision statement
Nikola Gruev

The new university should advocate for a paradigm shift in an academic reductionist approach and embrace open, interdisciplinary thinking that generates more questions than answers and encourages questions that lead to further questions. Various media should be accepted as a means to pose these questions, promoting diverse and creative approaches. The university should allow for flexible methodologies that transcend the limitations of a single discipline. These methodologies can serve as focal points for building connections or as additional research methods. By adopting this approach, all stakeholders, including individuals from outside academia, can actively participate, bringing value to the entire community and recognizing the power of diverse experiences as a form of knowledge. In fostering inclusivity and openness, the University can promote the synergy of interdisciplinary collaboration among art, technology, and society. When examining the system as a whole and embracing multilateral connections, the University would go beyond the codified approaches of traditional academia. By doing so, it multiplies the value created and ensures a fair and sustainable distribution of knowledge and benefits.

Dimitris Mertzos

Education:
● Master Degree in Visual and Applied Arts specializing in Media Arts from the Aristotle University of Thessaloniki—AUTH

Academic Discipline(s):
● Arts ● Humanities
● Interdisciplinary ● Technology

Research Areas(s):
● Queer Materiality ● Bodily Landscapes
● Technology as a xeno lens ● Transmedia Storytelling

Fall Term Project:
Ὅσιο ↗ page 254

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Thessaloniki, Greece, Europe
Originally from: Greece

Vision statement
Dimitris Mertzos

A pioneering university should prioritize diversity in problem-solving and personality traits, abolishing societal norms that restrict academic growth due to social biases. Emphasizing interdisciplinary projects and problem-solving is crucial, as modern challenges are increasingly complex. By fostering an inclusive environment, where individuals are encouraged to authentically express themselves, unique perspectives can be leveraged to drive positive change. Collaboration between art, technology, and society will lead to innovative solutions that challenge existing paradigms and reshape our understanding of reality. This approach enables the university community to co-create groundbreaking works that address real-world issues, propelling academic growth and societal progress towards a more equitable and thriving future.

Patrick Münnich

Julie-Michèle Morin

Education:
● Bachelor in theatrical studies (University of Quebec in Montreal + 2 semesters at Paris 3 Sorbonne Nouvelle) ● Master degree in Theater (University of Quebec in Montreal) / PhD in Literature (University of Montreal + Antwerp University)

Academic Discipline(s):
● Humanities ● Arts ● Interdisciplinary

Research Areas(s):
● Theater and Performance ● Robotic art ● Critical Science Studies ● Feminist, Queer and Decolonial studies

Fall Term Project:
Glitching Optimization in a Few Steps: a performance-lecture about robotic failures ↗ page 207

Role: FOUNDING LAB School & Fall Term—Student
Based in: Montréal, Canada
Originally from: Canada

Vision statement
Julie-Michèle Morin

Usually, technical experts and scientists collaborate on art projects when it comes to interdisciplinary collaboration. In contrast, artists are rarely asked to collaborate on technical, technological, and political projects. And yet, artistic disciplines are just as situated and rigorous as scientific ones, even if their methods and objectives differ. In addition to the many other fields that greatly inspire art, I would like to see the emergence of a scientific mindset that more closely recognizes the creative processes, methodologies, and methods of doing things unique to the humanities and arts. The future lies in research-creation, in all fields. We need to take art seriously and take a serious interest in it. Interdisciplinarity should also break free from dominant scripts while embracing decolonial, feminist, queer, and anti-capitalist perspectives. A collaborative process begins with considering heterogeneous and multiple perspectives. Our methods must be both open and welcoming, not only in terms of building interdisciplinary research but also for the benefit of the margins.

Natalia Rivera

Education:
● MA Visual Communication – New Media. Berlin University of the Arts UdK.
● BA Industrial Design. Universidad Nacional de Colombia

Academic Discipline(s):
● Arts ● Interdisciplinary

Research Areas(s):
● Emerging bio-digital media ● Life sciences
● Non-anthropocentric biocomputing

Role: FOUNDING LAB Summer School—Student
Based in: Bogotá, Colombia, South America
Originally from: Colombia
Area: Life Sciences, Humanities, Applied Arts

Vision statement
Natalia Rivera
A pioneering university needs to find and create ways to embrace diversification of knowledges, methodologies, processes, and practices, without hierarchies and separations. To open a space for the creation of queer/indeterminate knowledges, more life-like and life-enabling ones.

Jul Marian Schadauer

Education:
● Currently attending University of Applied Arts (Vienna)

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● media arts ● queer feminism
● bioart

Role: FOUNDING LAB Summer School – Student
Based in: Vienna, Austria, Europe
Originally from: Austria

Patrick Münnich

Vision statement
Jul Marian Schadauer
As the university should go beyond the academic disciplines, students from different backgrounds need to have space, time, and resources to learn from each other, to build a common ground, to go beyond the knowledge and methods of their individual practices.

Priyanka Shrestha

Education:
● BA in Economics & Social Work, Tribhuvan University

Academic Discipline(s):
● Arts ● Economics ● Interdisciplinary

Research Areas(s):
● Bringing change through successful new generational leadership. ● Coordinated knowledge and shared responsibility. ● Implementation of creative and innovative projects on digital transformation. ● Science-policy interfaces.

Role: FOUNDING LAB Summer School—Student
Based in: Nepal, Asia
Originally from: Nepal

Vision statement
Priyanka Shrestha
A new university should be providing the opportunities of research, training, collaboration, mentorship, and networking for aspiring students, researchers, and academia from diverse backgrounds around the world. By becoming a center of excellence for interdisciplinary research and collaboration is important for a pioneering university. This can be implemented by developing unique, creative, and innovative practice-based curricula, unlike traditional universities.

Letta Shtohryn

Education:
● MFA Digital Arts (University of Malta)

Academic Discipline(s):
● Arts ● Humanities

Research Areas(s):
● XR ● Embodiment
● Performance ● Video Game

Fall Term Project:
Чули? Чули ↗ page 257

Role: FOUNDING LAB
Summer School & Fall Term – Student
Based in: University of Arts, Msida, Malta, Europe
Originally from: Ukraine
Area: Humanities, Applied Arts

Marta Zgierska

Education:
● MFA, Lodz Film School, Poland
● MA, Marie Curie-Sklodowska University in Lublin, Poland

Academic Discipline(s):
● Arts ● Interdisciplinary
● Humanities

Research Areas(s):
● Visual Art ● Social Issues From The Perspective Of Contemporary Changes And Shifts In Perception
● Challenges Of The Future

Role: FOUNDING LAB
Summer School—Student
Based in: Bratislava, Slovakia, Europe
Originally from: Poland

Patrick Münnich, Marta Zgierska

Vision statement

Marta Zgierska

It's important to foster openness and exchange between disciplines, which are unfortunately still very closed in many universities. Creating bridges and platforms with direct interaction between students and scholars from different fields can be crucial in initiating cooperation and changing stagnant academic structures. Contemporary art is a great place to create points of contact for all of us.

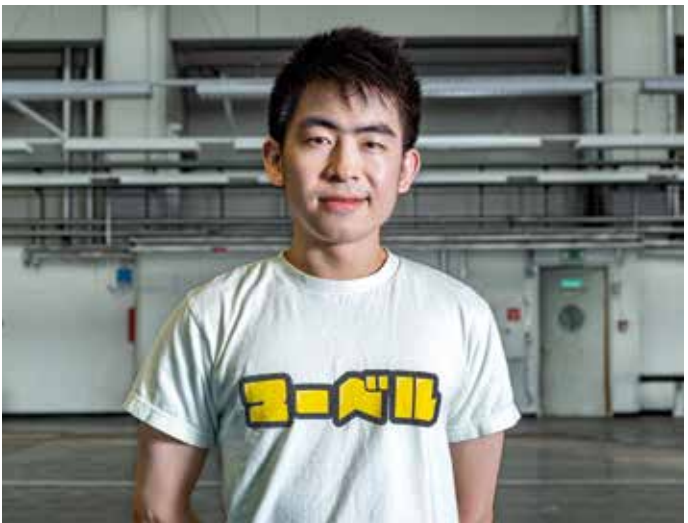
Annan Zuo

Education:
● MPhil in Architecture and Urban Design, University of Cambridge.
● BEng/BA Architecture in Xi'an Jiaotong-Liverpool University/University of Liverpool

Academic Discipline(s):
● Technology ● Arts ● Interdisciplinary

Research Areas(s):
● Game design ● Immersive Technologies
● Virtual Reality ● Augmented Reality

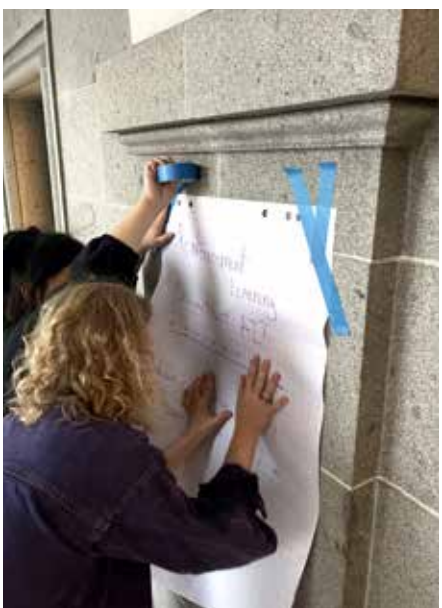
Role: FOUNDING LAB Summer School—Student
Based in: University of Cambridge, United Kingdom, Europe
Originally from: China



Machine Learning / AI / Data Bias

Making Machine Biases Visible

FOUNDING LAB students, along with researcher Sarah Ciston from the AI & Society Lab at the Alexander von Humboldt Institute for Internet and Society in Berlin, have been investigating how biased our AI systems—and we ourselves—are. As data and computational power increase, algorithms become more powerful. While they continually improve, they do not escape our human biases. The students, together with Sarah Ciston, playfully investigated the matter. Three games were created to show how preconceptions influence decisions and, consequently, find their way into technological decision-making processes. Machine learning is a complex technical process that operates differently from human learning. It is based on identifying recurring patterns and processing positive or negative feedback. In this project, the FOUNDING LAB switched roles: it was not the machine learning, but people learning to understand how machines gather information to make decisions.



Patrick Münnich, Sarah Ciston


FREE
FRUIT

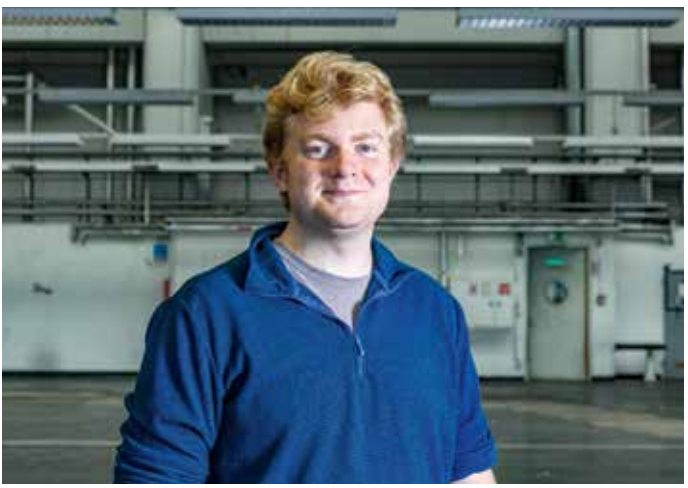
Nathan Cornish

Academic Discipline(s):
● Humanities

Research Areas(s):
● Environmental History ● Plant Humanities
● History of Science ● Digital Humanities

Fall Term Project:
Mechanical Learning and the Book of Nature ↗ page 210

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Uppsala, Sweden, Europe
Originally from: United Kingdom



Vision statement
Nathan Cornish
The new university should have a critically intentional view of its purposes, working to create a safe place for study and research that allows a true diversity of people to study without hardship. Interdisciplinary work must be intersectional across cultural, social, and economic lines. This means that the university should be shaped with a strong commitment to the welfare of its students and teachers.

Johanna Einsiedler

Education:
● BSc in Business, Economics and Social Sciences, Vienna University of Economics and Business ● MSc in Economics, Vienna University of Economics and Business ● currently: PhD in Social Data Science, University of Copenhagen

Academic Discipline(s):
● Economics ● Technology

Research Areas(s):
● Artificial Intelligence ● Economics
● Entrepreneurship ● Data Science

Fall Term Project:
Metalens ↗ page 213

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Copenhagen, Denmark, Europe
Originally from: Austria

Patrick Münnich

Vision statement
Johanna Einsiedler
The pioneering university should be very hands-on and project focused. Furthermore, it should actively encourage thoughts that are out of the box and give room to discuss controversial ideas.

Jack Heseltine

Education:
● BA, Sarah Lawrence College

Academic Discipline(s):
● Technology

Research Areas(s):
● Artificial Intelligence ● Software Engineering
● Social Impact ● Non-Profit Sector

Role: FOUNDING LAB
Summer School School—Student
Based in: Johannes Kepler University, Linz, Austria, Europe
Originally from: Austria

Vision statement
Jack Heseltine
For the new university there should be a hands-on focus with special attention to valuable institutions that need transformation the most, such as non-profits.

Radina Kraeva

Education:
● MEng Computer Science, University of Strathclyde

Academic Discipline(s):
● Technology

Research Areas(s):
● Ethical AI ● AI in UX ● Human-Computer Interactions (HCI) ● Data-Driven Product Design

Role: FOUNDING LAB Summer School—Student
Based in: Bratislava, Slovakia, Europe
Originally from: Poland

Vision statement
Radina Kraeva

The new university must embrace interdisciplinary collaboration between art, technology, and society as a cornerstone of its educational approach. By cultivating an environment that fosters creativity, innovation, and holistic problem-solving, this paradigm shift in academia will produce alumni who are not only technically skilled but also possess a broader understanding of the world. These alumni will be equipped to make a meaningful impact on society, driving positive change and shaping a brighter future for all.

Maria Kuzmina

Education:
● University of Illinois Urbana-Champaign, USA

Role: FOUNDING LAB Summer School—Student
Based in: Tel Aviv, Israel
Originally from: Israel
Area: Law, Applied Arts

Patrick Münnich

Vision statement
Maria Kuzmina

The new university could embrace the principles of self-governance, flexible transdisciplinary curriculum, openness, and collaboration with industry when, inter alia, industry relies on the university for support in theory and ethics.

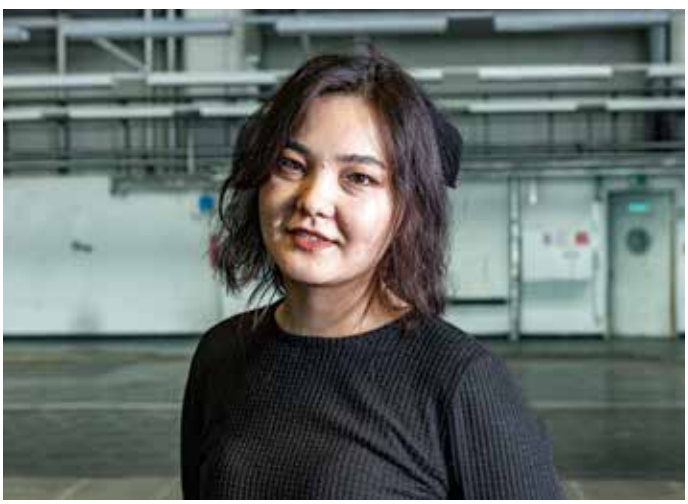
Adele Mukhitzhan

Education:
● Master's degree at Johannes Kepler University ● Bachelor's degree at East China Normal University

Academic Discipline(s):
● Technology

Research Areas(s):
● AI ● Web Development

Role: FOUNDING LAB Summer School School—Student
Based in: Linz, Austria, Europe
Originally from: Kazakhstan



Vision statement

Adele Mukhitzhan

The university should offer flexible and integrated curricula, promoting cross-disciplinary exploration and a holistic understanding of the interconnectedness between art, technology, and society. Collaborative spaces should be incorporated to facilitate interaction among students and faculty from diverse disciplines, fostering innovation and providing necessary resources for collaborative projects. Interdisciplinary programs and departments should bridge the gap between art, technology, and society, while project-based learning enables hands-on experience and a deeper understanding of societal impact. Collaboration with external partners ensures relevance, and ethical considerations are emphasized, integrating ethical literacy into the curriculum. Lifelong learning opportunities and a diverse, inclusive community further foster innovation, creativity, and social impact.

Andrea Sante

Education:
- MPhys Physics with Astrophysics (The University of Manchester)
- PhD Astrophysics (Liverpool John Moores University)

Academic Discipline(s):
- Technology

Research Areas(s):
- galaxy formation
- artificial intelligence
- ethical research

Role: FOUNDING LAB Summer School—Student

Based in: Liverpool, United Kingdom, Europe

Originally from: Italy

Vision statement

Andrea Sante

Coming from a scientific background, a way to promote the interplay between art and technology would be to have a mandatory coursework project on the design of an outreach activity. This could be done in the first or second year of undergraduate study to avoid an overlap with the thesis work. In this way, students from scientific subjects are encouraged to use their creativity to present a technologic application of their subject to the public. All projects could then be presented in an open exhibition so that the artists could directly engage with the local community; hence understanding their perspective and concerns on the application of their subject of study.

Patrick Münnich

Nathanya Queby Satriani

Education:
● Artificial Intelligence (BSc — Johannes Kepler University Linz)

Academic Discipline(s):
● Technology ● Arts
● Interdisciplinary

Research Areas(s):
● Neuroscience
● Artificial Intelligence
● Design ● Philosophy

Role: FOUNDING LAB
Summer School—Student
Based in: Johannes Kepler University, Linz, Austria, Europe
Originally from: Indonesia, Asia

Vision statement
Nathanya Queby Satriani

I picture the pioneering university as a place where academia transcends its rigid silos and students are encouraged to venture beyond the prescribed norms. In the new university, boundaries should blur as disciplines intertwine, allowing the artist to engineer, the technologist to paint, and the sociologist to code.

Linas Vaštakas

Education:
● Escuela Superior Politécnica del Litoral, Ecuador

Fall Term Project:
Metalens ↗ page 213

Role: FOUNDING LAB
School & Fall Term—Student
Based in: Linnaeus University, Växjö, Sweden, Europe
Originally from: Lithuania
Area: Law, Humanities

Vision statement
Linas Vaštakas

A pioneering university should have its fundamental architecture changed to encourage collaboration: it should have open spaces, research centers, and curricula that have the idea of interdisciplinarity at their core. Professionals from varying fields should be made aware of and allowed to easy access to these resources at any point.

Topic ③

Creative Robotics

From Seeing to Being Seen

Robots are not only used in industry but also in art installations, dance performances, and theater, becoming tools and mediums for creative expression. The world is now familiar with robots that assist workers in industrial tasks. Much less known are robots used in artistic contexts.

Supported by Johannes Braumann, Professor of Creative Robotics at Art University Linz, and Amir Bastan, media artist and robotics researcher, the FOUNDING LAB students focused on creative robotics and delved into the act of seeing and being seen. Ethical and social questions were at the center: What does it mean to have empathetic robots in our midst—in times of polarization, inequality, and political instability? How do we ensure that this technology benefits everyone equally and does not become a monopoly of a privileged minority? How do we protect ourselves from unchecked data collection? And, above all, how do we feel as humans when confronted with non-human entities in our daily lives?

Tiziano Leonardi, Kaisa Lindström

Cyan D'Anjou

Education:
● BS in Human Immersive Design Engineering from Stanford University
● MA in Information Experience Design from the Royal College of Art

Academic Discipline(s):
● Arts ● Interdisciplinary

Research Areas(s):
● Creating immersive speculative futures
● Exploring empathy between humans and nonhuman agents
● Building experiential installation artworks
● Learning through practice-based research

Fall Term Projects:
The Sketches for Self-Analysis ↗ page 240
Anamnesis ↗ page 241
Unknowable Uncertainty ↗ page 244

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: London, United Kingdom, Europe
Originally from: Netherlands

Vision statement
Cyan D'Anjou

I believe it's worth questioning the logics that education has adopted around the learning structures that model a hierarchical and asymmetrical educational system, and to begin thinking about educational processes from the interconnection between various disciplines, under critical perspectives and with a creative view, especially regarding the technological phenomena that are inserted into everyday life and in the university. The introduction of technological devices not only shapes individual ideas and beliefs, but also collective thoughts and perceptions regarding social, political, and cultural phenomena that permeate the academic and university environment. It is in this context that the role of art becomes fundamental in raising awareness about the use of these technologies and their objectives, to reflect on their production, distribution, and consumption, as well as on how they are adopted by developing countries that do not participate in the design of these technologies. The implementation of experimental techniques, diverse creative processes, and dissident forms of thinking become necessary when constructing multicultural and inclusive forms of academia.

Patrick Münnich

Matteo Johannes Bürgler

Education:
● LLB (WU) at Vienna University of Economics and Business ● LLM (WU) at Vienna University of Economics and Business in June 2024

Academic Discipline(s):
● Applied Arts ● Arts ● Interdisciplinary ● Humanities

Research Areas(s):
● Humanities ● Technology ● Economics ● Interdisciplinary

Role: FOUNDING LAB Summer School—Student
Based in: Vienna, Austria, Europe
Originally from: Austria

Vision statement
Matteo Johannes Bürgler

We should embrace an interdisciplinary approach, promote open and collaborative discourse, and foster flexible academic structures, rather than operating in silos.

Brian Contreras

Education:
● Master of Arts - Media Arts Cultures, Erasmus Mundus (Donau Universität Krems, Aalborg Universitet, LASALLE College of the Arts, Uniwersytet Łódzki)
● Master of Digital Information – Usability, Interaction Design, and User Experience (Universitat Pompeu Fabra)

Academic Discipline(s):
● Technology ● Arts ● Interdisciplinary ● Humanities

Research Areas(s):
● Design ● Science ● Language ● Culture

Role: FOUNDING LAB Summer School—Student
Based in: Singapore, Asia
Originally from: Guatemala, South America

Vision statement
Brian Contreras
A new university must foster interdisciplinary collaboration, flexible curricula, strategic partnerships, cutting-edge technology, interdisciplinary research, and inclusivity to realize transformative visions in art, technology, and society.

Benedikt Friedl

Education:
● Bachelor degree in Interactive Media, Technical University of Applied Sciences Augsburg

Academic Discipline(s):
● Arts ● Technology ● Interdisciplinary

Research Areas(s):
● Prototyping
● Creative Coding
● Human-computer interaction
● Physical Computing

Role: FOUNDING LAB Summer School—Student
Based in: Augsburg, Germany, Europe
Originally from: Germany

Patrick Münnich

Vision statement
Benedikt Friedl

I believe that the first step of a new university is to teach the basic concepts of the various subdisciplines so that the next step is to be able to draw links and connections from what has been learned. I think it is important to have professors and lecturers who teach you to build on existing research, but also support experimental approaches and out-of-the-box thinking. Also, labs and spaces should be created where interdisciplinary exchange is encouraged, even away from teaching and maybe even publicly for everyone to join in.

Alec Garcia

Education:
● Agriculture and Fisheries, Batangas State University ARASOF Nasugbu
● BS Electrical Engineering, Polytechnic University of the Philippines
● Festival University 2022, Johannes Kepler Universität Linz

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● Service Science ● Information Systems
● Mental Health ● Psychology

Role: FOUNDING LAB Summer School—Student
Based in: Perhaps Perhaps Art, Manila, Philippines, Asia
Originally from: Philippines

Vision statement
Alec Garcia

Intentions whenever rooted in historical sincerity, and love, systems of synergy—between art, tech, and society—recenter its core back towards care, and sovereignty.

Marcello Giuttari

Education:
● Master in Applied Ecology – Universidad Austral de Chile ● Diploma of Urban Ecology and Green Infrastructure – Universidad Católica de Chile ● Environmental science Degree – Universitá di Padova

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● landscape architecture ● urban ecology ● landscape art ● bio art

Role: FOUNDING LAB
Summer School—Student
Based in: Universidad Austral de Chile, Valdivia, Chile, South America
Originally from: Italy, Europe
Area: Life Sciences

Vision statement
Marcello Giuttari
The new university should show practices and testimonials from experts and visionaries that, in turn, can be fed from the experiences of the students of the program.

Chelsi Goliath

Education:
● Bachelor Degree in Information Systems—University of Johannesburg ● Postgraduate Degree in Data Science & Machine Learning – University of the Witwatersrand
● MSc Candidate 2024 Machine Learning & Robotics – University of the Witwatersrand

Academic Discipline(s):
● Technology ● Interdisciplinary
● Machine Learning ● Data Science

Research Areas(s):
● Machine Learning ● Data Science
● Robotics ● Artificial Intelligence

Fall Term Project:
Mirror Mirror ↗ page 216

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Johannesburg, South Africa
Originally from: South Africa
Area: Natural Sciences, Mathematics and Data Science, Machine Learning

Patrick Münnich

Vision statement

Chelsi Goliath

A pioneering university, as I imagine it, must transcend traditional boundaries of disciplines, and embrace the fluidity of knowledge and skills. This vision proposes a shift from the rigid structure of specific faculties and departments to more adaptive “liquid faculties”. These entities could take the form of collaborative clusters such as Artificial Intelligence & Society, Digital Humanities, or Immersive Technologies & Art, where students and faculty across disciplines come together to push the boundaries of innovation.

The curriculum must be reimagined around problem-based learning, encouraging students to apply their knowledge to real-world scenarios. Instead of viewing disciplines as separate fields, this approach acknowledges that many of the world’s problems require interconnected solutions. As an illustration, a discussion on the ethical implications of AI in society could draw upon computer science, sociology, ethics, law, and the arts to foster a comprehensive understanding of the issue. Utilizing advanced collaborative technologies should become a norm within the university structure. Implementing Augmented Reality (AR) and Virtual Reality (VR) can offer immersive collaborative environments where students from different backgrounds interact, design, and create. These digital environments could be used to hold interdisciplinary seminars, collaborative projects, and shared exhibitions, fostering a sense of community and collaborative spirit.

An important aspect of this transformation would be the implementation of an Artist-in-Residence Program. Such a program would welcome artists to work within the academic landscape, engaging with technology and social science researchers. These artists, through their unique perspective and creativity, can help steer the direction of research, technology development, and societal impact assessments, bringing a fresh perspective to these disciplines. The future university should be an active participant in society, not just an observer. This means active engagement with the surrounding communities, where students and faculty collaborate on projects that use art and technology to address societal needs. Such initiatives not only offer students real-world experiences but also make academic research more relevant and impactful, grounding it in the needs and aspirations of society.

The educational journey needs to be student-directed, and to achieve this, the curriculum should be dynamic and adaptable. AI-powered learning platforms can personalize education, offering students the freedom to carve their interdisciplinary paths. They can choose the subjects they want to learn, the problems they want to solve, and the communities they wish to engage with, making education a deeply personal and transformative experience. The reach of the future university should extend beyond the physical campus or national boundaries. It should form a global network through partnerships with other universities, research institutions, NGOs, and companies worldwide. This international collaboration encourages the exchange of ideas and the creation of culturally and regionally diverse solutions, expanding the university’s influence and enriching its educational offerings.

Finally, the university must champion the concept of lifelong learning. It needs to acknowledge that the learning journey does not end at graduation. Offering continuous learning opportunities for alumni and the public through short courses, seminars, and collaborative projects can keep everyone updated with the latest interdisciplinary developments. In summary, the university is more than just a hub of knowledge; it is a thriving ecosystem of interdisciplinary collaboration, societal engagement, and continuous learning. It harnesses the power of technology to foster creativity and innovation, preparing students for adaptability and growth in a rapidly evolving world.

Bart Kuipers

Education:
● BSc + MSc Computer Science
● BA Screen Writing ● MFA Creative Writing

Academic Discipline(s):
● Humanities ● Arts
● Technology

Research Areas(s):
● Visual Storytelling ● Hybrid Writing
● Code Poetry ● Grassroots Activism

Fall Term Project:
Shared Futures ↗ page 222

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Germany, Europe
Originally from: Netherlands, Europe

Vision statement
Bart Kuipers
I feel what is key to true interdisciplinary collaboration is that the university reflects the values of the society it strives to create. That means it would have to be a truly open structure to inspire real collaboration—moving away from harmful neoliberal, ego-driven, competitive dynamics—to optimally profit from interdisciplinary cross pollination and to freely move towards the common goal: creating an open and inclusive society and a sustainable way of life for everyone.

Kaisa Lindström

Education:
● Aalborg University, Masters

Academic Discipline(s):
● Interdisciplinary ● Humanities
Technology

Research Areas(s):
● Intersection of art and technology
● Techno-anthropology

Role: FOUNDING LAB
Summer School—Student
Based in: Copenhagen, Denmark,
Europe Design Academy Eindhoven,
Eindhoven, Netherlands
Originally from: Estonia, Europe

Vision statement
Kaisa Lindström

The pioneering university can be shaped by embracing experimental learning and collaboration.

Mar Osés

Education:
● Fine Arts Bachelor Degree (Complutense University of Madrid, Spain)
● Visual Arts and Multimedia Master's Degree (Polytechnic University of Valencia, Spain)
● Festival University 22 (Ars Electronica and Johannes Kepler University Linz, Austria) ● Eramus+ Exchange program at Interface Cultures Master's Degree (University of Arts Linz, Austria)

Academic Discipline(s):
● Arts

Research Areas(s):
● Gender Performance
● Xenofeminism
● AI visualities
● DIY Physical Computation

Fall Term Project:
Bimbo Dildo ↗ page 194

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Linz, Austria, Europe
Originally from: Spain, Europe

Vision statement

Mar Osés

As an artist and researcher, I am deeply passionate about exploring the convergence of technology, gender, and art. There are two compelling aspects of this program that deeply resonate with me. Firstly, I am amazed by Ars Electronica's and IT:U's commitment to establishing a genuine transdisciplinary approach to the subject of Digital Transformation. I strongly believe in the power of collaborative work and the generation of knowledge across diverse disciplines. Additionally, the prospect of participating in such an inclusive and multicultural program seems extremely exciting, since working, talking and thinking with people from multiple backgrounds is an enriching experience that enables intellectual growth as both a researcher and an individual.

I also aspire to acquire an even more technology-focused education that will equip me with a deep understanding of the current "Onlife" context, our hybrid situation in which binary classifications and dichotomies such as natural/artificial have become obsolete and where data, algorithms, and interfaces permeate nearly every aspect of our lives. I am particularly drawn to the program's emphasis on discussing these themes in a constructive manner.

I am excited to join an institution that actively fosters dialogue and encourages students to explore innovative ideas for creating a brighter future.

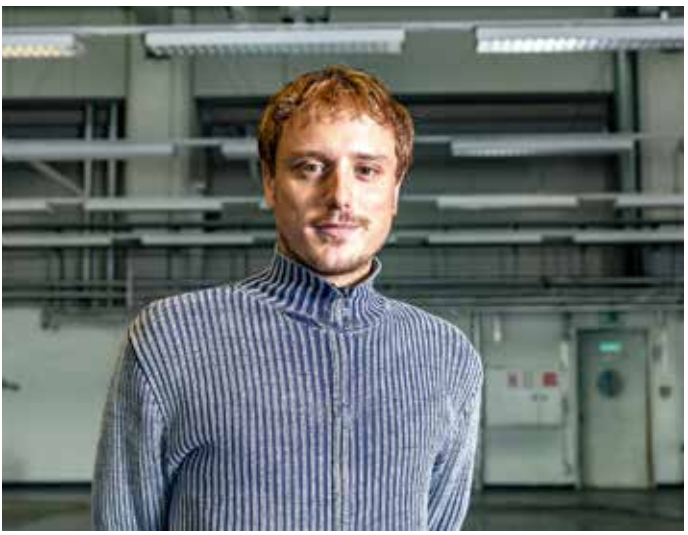
Riccardo Petrini

Education:
● BSc Media Engineering—Polytechnic University of Turin ● MA Geo-Design—Design Academy Eindhoven

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● Extractivism ● Computation
● Performance ● real-time

Role: FOUNDING LAB Summer School—Student
Based in: Eindhoven, Netherlands, Europe
Originally from: Italy, Europe



Patrick Münnich, Yue Selina Song

Vision statement
Riccardo Petrini
The pioneering university should fundamentally ground itself in the principles of radical empathy and intersectionality. It's about cultivating a profound sense of empathy that extends beyond our own circumstances to the varied spectrum of knowledges and experiences of others.

Yue Selina Song

Area:
● Natural Sciences, Mathematics and Data Science, Engineering

Role: FOUNDING LAB Summer School—Student
Based in: London, United Kingdom, Europe
Originally from: China, Asia

Vision statement
Yue Selina Song
The pioneering university should be designed as a dynamic and inclusive ecosystem that embraces the power of interdisciplinary collaboration, fostering innovation, creativity, and critical thinking.

Sensing, Signal Detection & Interactivity

Listening to Networks

Students uncovered hidden systems at Linz main station and developed a performance with computer music.

A train station serves various functions. For some, it's merely a crossing point, while others spend their leisure or work time there. It consists of complex networks connecting the private with the public, the individual with the collective, and machines that generate, transmit, and process data.

The FOUNDING LAB students examined those invisible systems developed and used by computers. Together with Miller Puckette, a pioneer in computer music and creator of *Pure Data,* they explored Linz main station and created a computer music performance by recording, reinterpreting, and playing familiar sounds—from speaker announcements to supermarket checkout noises.

Cristóbal Parra, Barbara Kiolbassa

Ahmad Abou Adla

Education:
● Bachelor of Engineering in Computer and Communications Engineering from the American University of Beirut

Academic Discipline(s):
● Technology

Research Areas(s):
● Machine Learning ● AI ● Automation ● Computer Vision

Role: FOUNDING LAB Summer School—Student
Based in: Beirut, Lebanon, Asia
Originally from: Lebanon

Vision statement
Ahmad Abou Adla
The new university should foster interdisciplinary learning by designing a flexible curriculum that enables students to explore the intersections between art, technology, and society through cross-disciplinary courses. Moreover, a more hands-on, project-based approach led by domain experts and thinkers would bring together all the above fields, bridging the gap between theory and practice.

Hotti Böhm

Role: FOUNDING LAB Summer School—Student
Based in: Berliner Hochschule für Technik, Berlin, Germany, Europe
Originally from: Germany
Area: Music, Performance, Engineering

Patrick Münnich

Vision statement
Hotti Böhm
We need highly developed DIY skills and knowledge sharing that does not rely on the ways of the late capitalist commodity processing, but on new ways of socialization. I would like to get to know technical applications that are suitable for art production. What can these virtual or analogue machines do? And how can we ensure people have open access to them?

Qi Chen

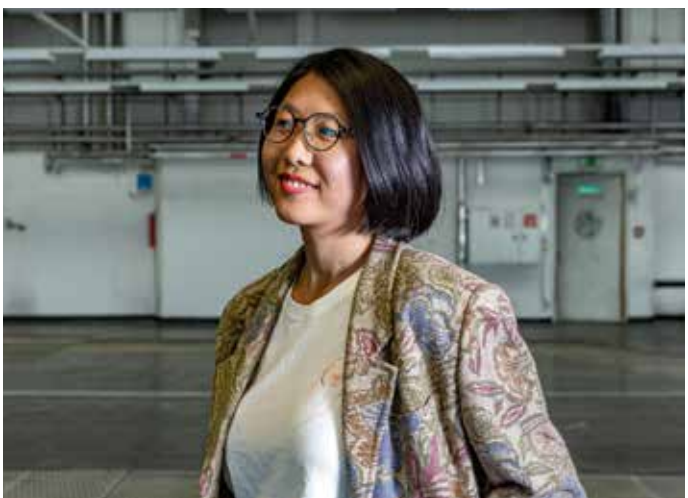
Education:
● MSc, Creative Computing Institute – University of the Arts London

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● Feminism ● Data Privacy
● Machine Learning ● BioArt

Fall Term Project:
DinkA ↗ page 201

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: United Kingdom, Europe
Originally from: China, Asia
Area: Engineering



Vision statement

Qi Chen

I believe that the pioneering university should emphasize the importance of social impact in broadening disciplinary research, with experimental collaborations bringing artists, scientists, and sociologists together to explore new possibilities for research. Sociologists ask social questions and use art and science to solve them. Schools should encourage interdisciplinary electives and interdisciplinary majors that will allow students to gain a broader perspective; schools should provide interdisciplinary labs and maker spaces to foster collaboration between art, technology, and society. In addition, virtual platforms should be established to connect researchers and students from different faculties and institutions to promote global collaboration.

Nico Espinoza

Education:
● MA Sound Studies and Sonic Arts, UdK Berlin ● MSc Electronics, USM Valparaíso Chile

Academic Discipline(s):
● Arts ● Technology ● Interdisciplinary

Research Areas(s):
● Sound Art ● Artistic Research ● Techno-diversity

Role: FOUNDING LAB Summer School—Student
Based in: Universidade Nova de Lisboa, Lisbon, Portugal, Europe
Originally from: Chile, South America

Vision statement

Nico Espinoza

A pioneering university should be shapeless, or open to be shaped by the vision for changes. Another way of saying this would be that its shape should emerge with the visions of change and should not be imposed beforehand. Those visions might have some stability, but they will change with the unfolding of time, so the shape needs to be able to change with it. What needs to be shaped is an operation, an informational process, an operation of transdisciplinary open to inner changes and changes from the medium, constantly stretching the limits of what we understand as academic fields.

Patrick Münnich

Jeri Ho

Role: FOUNDING LAB
Summer School—Student
Based in: National Tsing Hua University, Hsinchu City, Taiwan, Asia
Originally from: Taiwan
Area: Medicine & Health

Vision statement
Jeri Ho

A pioneering university should embrace open-mindedness, incorporate diverse expertise, and promote community engagement.

Claudio Hontana

Education:
● Degree in Art History, Master of Contemporary Art and Visual Culture at Universidad Complutense de Madrid, Universidad Autónoma de Madrid, Museo Nacional Centro de Arte Reina Sofía.

Academic Discipline(s):
● Humanities ● Arts

Research Areas(s):
● Memory ● Conceptual Art
● Performance ● Urban Landscapes

Role: FOUNDING LAB
Summer School—Student
Based in: Madrid, Spain, Europe
Originally from: Spain

Vision statement

Claudio Hontana

I believe that the pioneering university will be defined by the interdisciplinarity that frees information from monolithic specialization to provide fractures and vertices to a porous and open knowledge. Likewise, the question reminds me of the "Ignorant Teacher": perhaps a new university should teach what is ignored to escape from the rigidity of what is already known.

George Micah Kuhn

Role: FOUNDING LAB
Summer School – Student
Based in: London, United Kingdom, Europe
Originally from: United States of America
Area: Applied Arts, Game Development, Visual Effects

Patrick Münnich

Vision statement
George Micah Kuhn

The pioneering university should work with its community to tie its technics to guiding visions and metaphors that brim with energy and warmth.

Kaito Muramatsu

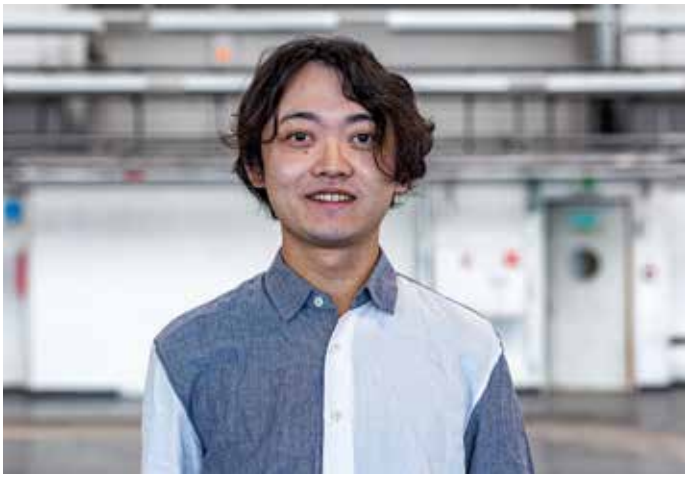
Education:
● PhD candidate at the University of Tokyo
● Master's and Bachelor's degree from the University of Tokyo

Academic Discipline(s):
● Technology ● Interdisciplinary ● Arts

Research Areas(s):
● Musical Dynamics ● Piano Performance
● Arts And Science ● Neuroscience

Fall Term Project:
Streams in the Veins ↗ page 232

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Tokyo, Japan, Asia
Originally from: Japan



Vision statement

Kaito Muramatsu

Usually, technical experts and scientists collaborate on art projects when it comes to interdisciplinary collaboration. In contrast, artists are rarely asked to collaborate on technical, technological, and political projects. And yet, artistic disciplines are just as situated and rigorous as scientific ones, even if their methods and objectives differ. In addition to the many other fields that greatly inspire art, I would like to see the emergence of a scientific mindset that more closely recognizes the creative processes, methodologies, and methods of doing things unique to the humanities and arts. The future lies in research-creation, in all fields. We need to take art seriously and take a serious interest in it. Interdisciplinarity should also break free from dominant scripts while embracing decolonial, feminist, queer, and anti-capitalist perspectives. A collaborative process begins with considering heterogeneous and multiple perspectives. Our methods must be both open and welcoming, not only in terms of building interdisciplinary research but also for the benefit of the margins.

Dorothy Orina

Education:
● BSc Mechatronic Engineering

Academic Discipline(s):
● Technology ● Arts
● Interdisciplinary

Research Areas(s):
● Game Design ● Immersive Technologies
● Virtual Reality ● Augmented Reality

Role: FOUNDING LAB Summer School – Student
Based in: Nairobi, Africa
Originally from: Kenya, Africa
Area: Game Development and Extended Reality Design

Patrick Münnich

Vision statement

Dorothy Orina

The new university should be shaped in a way that promotes and facilitates interdisciplinary collaboration between art, technology, and society. Some key actions would be to have a flexible curriculum that allows students to explore multiple disciplines, providing physical and digital spaces to foster interdisciplinary collaborations, encouraging, and actively supporting innovation and entrepreneurship and to have an interdisciplinary faculty with members who have expertise and experience in interdisciplinary work who would mentor students from experience.

Cristóbal Parra

Education:
● Bachelor in Aesthetics. Pontificia Universidad Católica de Chile. Graduated from Law School (Legal and Social Sciences). Universidad de Concepción

Academic Discipline(s):
● Arts ● Technology

Research Areas(s):
● Aesthetics and Political Studies ● Latin American Art and Decolonial Studies ● Art and Technologies ● Generative and Procedural Art

Role: FOUNDING LAB Summer School – Student
Based in: Santiago, Pontificia Universidad Católica de Chile, South America
Originally from: Chile

Vision statement
Cristóbal Parra

I believe it's worth questioning the logics that education has adopted around the learning structures that model a hierarchical and asymmetrical educational system, and to begin thinking about educational processes from the interconnection between various disciplines, under critical perspectives and with a creative view, especially regarding the technological phenomena that are inserted into everyday life and in the new university. The introduction of technological devices not only shape individual ideas and beliefs, but also collective thoughts and perceptions regarding social, political, and cultural phenomena that permeate the academic and university environment. It is in this context that the role of art becomes fundamental in raising awareness about the use of these technologies and their objectives, to reflect on their production, distribution, and consumption, as well as on how they are adopted by developing countries that do not participate in the design of these technologies. The implementation of experimental techniques, diverse creative processes, and dissident forms of thinking, become necessary when constructing multicultural and inclusive forms of academia.

Lea Luka Sikau

Education:
● PhD in Music, University of Cambridge
● MA in Cultural Management, University of Music and Performing Arts Munich
● BA in Media and Cultural Sciences, Heinrich Heine University Düsseldorf

Academic Discipline(s):
● Humanities ● Arts
● Technology ● Interdisciplinary

Research Areas(s):
● Multi-species Metabolizing ● Rehearsal Processes ● Artistic Research
● Process Ontology

Fall Term Project:
Stuff Change & After Swallowing ↗ page 236

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Cambridge, United Kingdom, Europe
Originally from: Germany
Area: Natural Sciences, Mathematics and Data Science, Humanities, Applied Arts

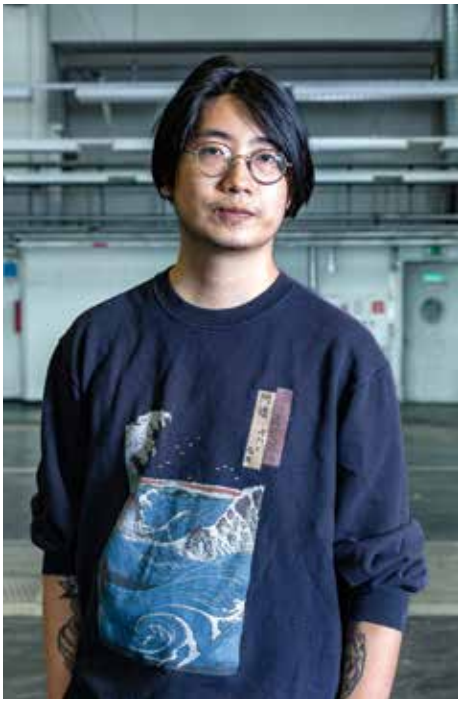
Vision statement
Lea Luka Sikau

How should the pioneering university be shaped? Through practice-orientation, art and science approaches, agile adaptability to transformations in society and in close collaboration with its "glocal" environment.

Patrick Münnich

Chonglian Yu

Role: FOUNDING LAB
Summer School—Student
Based in: University of Music and Performing Arts, Graz, Austria, Europe
Originally from: China, Asia
Area: Applied Arts



Vision statement

Chonglian Yu

The curriculum of a pioneering university could be structured around a theme-based and practical research approach, as the traditional boundaries between the fields of art, technology, and society become increasingly blurred in interdisciplinary collaborations. The deconstruction of these barriers and the resulting dissolution of departmental identities also promotes a dynamic, peer-to-peer learning environment. This environment, in turn, shapes individuals by guiding them towards a specific topic of interest, rather than confining them within predetermined knowledge fields.

Brain-Computer-Interfaces:

Connecting Brains and Computers

A Brain-Computer-Interface, or BCI, measures brain signals and translates them into digital commands that can control computers, devices, or robots.

When neural activities and machine learning are combined, it expands our possibilities in a fascinating way—but at the same time, frightening surveillance and control scenarios become conceivable. Our thoughts and emotions could be revealed, analyzed, and possibly manipulated through this technology.

Together with high-tech fashion designer Anouk Wipprecht and Christoph Guger, CEO of g.tec medical engineering, the FOUNDING LAB students explored the potentials of BCIs. They experimented mainly with ways to express thoughts and feelings that are difficult to put into words. They also researched how cognitive patterns could be analyzed through machine learning—and whether this could lead to a kind of technological omniscience in the future.

Chantal Pisarzowski, Patrick Münnich

Luisa do Amaral

Education:
● BArch (2012-2018), UFU – Federal University of Uberlandia, Uberlandia, Brazil
● MSc (2022-2024), KAIST – Korea Advanced Institute of Science and Technology, Daejeon, Republic of Korea

Academic Discipline(s):
● Technology ● Interdisciplinary
● Humanities ● Social Sciences

Research Areas(s):
● Cultural Sociology ● Relational Sociology
● Science and Technology Studies
● Sociology of Knowledge

Fall Term Projects:
The Sketches for Self-Analysis ↗ page 240
Anamnesis ↗ page 241
Unknowable Uncertainty ↗ page 244

Role: FOUNDING LAB
Summer School & Fall Term – Student
Based in: Daejeon, South Korea, Asia
Originally from: Brazil, South America

Vision statement
Luisa do Amaral

To the extent that academia isn't the utopian dream of free knowledge, but an institution with structures that ensure the sustainability and feasibility of its activities, interdisciplinary efforts will not be as fruitful if they are approached as chimerical feats that should be achieved/achievable without the structure that sustains the production of academic knowledge. Even today, with all the change that we have experienced, collaborations still fall through due to lack of institutional support. We need formalities, funds, guidelines, metrics, and people willing to kickstart these where there is none, so that, in the coming future, the next generations of scholars will have something to stand on.

Patrick Münnich

Oguljahan Amanmuradova

Role: FOUNDING LAB
Summer School— Student
Originally from: Turkmenistan, Asia
Currently working in: UX Research

Vision statement
Oguljahan Amanmuradova

Consistency is key to driving meaningful change. While a bold vision is important, change cannot happen in isolation. Collaboration and community building are required to shape ideas, gather resources, and take collective action. Most importantly, empathy is key to understanding different perspectives, finding common ground, and crafting solutions that serve the needs and concerns of all. Sustainable change takes time and rarely goes smoothly. So being consistent in what you are doing, or simply who you are, what you are representing, being consistent in collaboration and empathy, this is the most important yet challenging part of driving change. At the individual level, everyone has a role to play through the work they do, the voices they amplify, and the communities they build. Together, we can develop a vision for progress, open up dialogues, and drive real change by staying committed, by putting human needs at the center of technology's future. I hope the Founding Lab program will unite and empower students to be leaders driving such change.

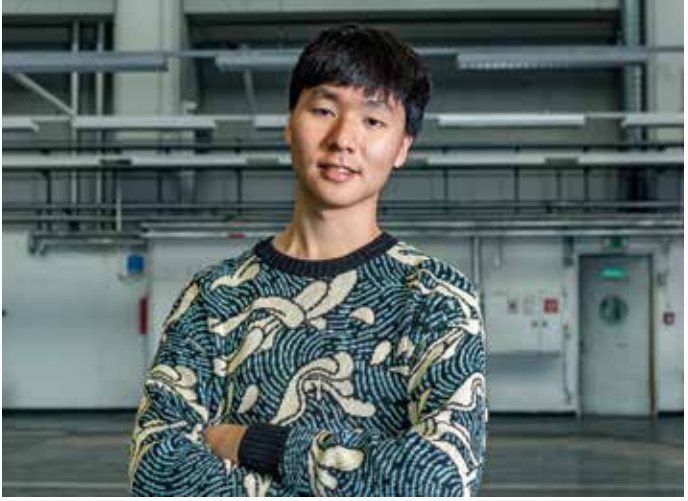
Jeanyoon Choi

Education:
● PhD, Industrial Design, KAIST (Currently Attending) ● MA, Information Experience Design, Royal College of Art ● BS, Industrial Engineering, Seoul National University

Academic Discipline(s):
● Technology

Research Areas(s):
● Inter-Device Interaction ● Multi-Device Web Artwork ● Augmented Space ● Ambient Computing

Role: FOUNDING LAB
Summer School—Student
Based in: London, United Kingdom, Europe
Originally from: South Korea, Asia



Vision statement
Jeanyoon Choi

The new university should be more of a place of open discussion than a place for lecturing.

Deepti Dutt

Role: FOUNDING LAB
Summer School—Student
Based in: Goldsmiths University of London, United Kingdom, Europe
Originally from: India, Asia
Area: Natural Sciences, Mathematics and Data Science, Applied Arts

Patrick Münnich

Vision statement
Deepti Dutt

A pioneering university should consider the following arguments:

① Cultivating self-awareness:
To contribute to a stronger society, it is crucial for individuals and institutions to prioritize self-awareness. As we navigate the rapidly evolving technological landscape, the significance of humanities subjects becomes more pronounced than ever. By developing a deeper understanding of ourselves and our values, we can make more informed decisions about the future. As Yuval Noah Harari suggests, if we fail to harness our power to engineer life with a clear understanding of its implications, market forces may shape our future in ways that do not prioritize human well-being. By integrating the humanities into the education system, we can strike a balance between economic growth and human development, ensuring a future that serves the broader needs of society.

② Empathy as a guiding principle:
Art and technology can contribute to society by embodying empathy and compassion. By amplifying the voices of human growth-centered vision and challenging existing power structures, art and technology can inspire social change. The pioneering university should encourage interdisciplinary collaborations that foster empathy and a sense of social responsibility. By emphasizing the importance of ethical considerations, it helps participants not only with skills in their respective fields but also conscious of the impact their work has on society at large.

③ Transparency in knowledge and decision-making:
A key principle for the new university should be transparency. This applies not only to the knowledge that is shared within the academic community but also to the decision-making processes that shape the institution and its programs. Transparent narratives and open access to information enable critical thinking and empower individuals to make informed choices. By ensuring that the decision-making process is inclusive and participatory, the university can provide a platform for diverse perspectives and ideas to thrive. This approach allows individuals to develop their own well-thought-out perspectives, avoiding preconceived notions and fostering independent thinking. If we are to urge the future development of Artificial Intelligence to be more transparent with their data processes, we could lead by example through the deliverance of the same at the intersection of art, technology, and society.

Lía Esteban

Education:
● Bachelor degree in Fine Arts in the University of Salamanca
● Master's degree in Contemporary Art History and Visual Culture in the Autonomous University of Madrid x Reina Sofia Museum
● Master's degree in Digital Letters and Electronic Textualities in the Complutense University of Madrid

Academic Discipline(s):
● Humanities ● Arts

Research Areas(s):
● Digital Museology Development ● Museum Studies ● Contemporary Art Management ● Digital Humanities Research

Role: FOUNDING LAB Summer School—Student
Based in: Madrid, Spain, Europe
Originally from: Spain

Vision statement

Lía Esteban

I believe that one of the problems of university education today, especially in the Spanish case, which I know more in depth, is the segmentation of its studies and its students. I believe that the university should work on sociability and promote interdisciplinary relations, not only in research and development projects, but in all academic fields. The lack of knowledge about other areas of study limits us when it comes to strengthening the interdisciplinary teams, limiting in turn the needs and quality of the work.

Anna Grelik

Role: FOUNDING LAB Summer School—Student

Based in: Bochum, Germany, Europe

Originally from: Germany

Education:

● Anna Grelik is a doctoral candidate at the DFG Research Training Group “The Documentary—Excess and Withdrawal” at the Ruhr University Bochum.

● She previously studied art history and German language and literature at Heinrich Heine University Düsseldorf (Master of Arts).

Academic Discipline(s):

● Humanities ● Arts ● Interdisciplinary

Research Areas(s):

● As an art historian, her research interests include art and artificial intelligence, theories of contemporary art, art and technology, and digital image cultures.

● In her dissertation project, she is investigating the artistic infrastructures and documentary practices in artistic projects with AI.

Patrick Münnich

Vision statement

Anna Grelik

The new university should no longer be divided into institutes and faculties. While there will still be degree programs that teach specific skills (such as medicine, law, etc.), a project-based approach (artistic research) is preferable when it comes to the interactions between technology, art, and society. In this regard, the university can serve as an intellectual space by opening to collaborations with technology centers, museums, companies, and studios.

Ghazal Hosseini

Education:
● Maser of Art, Interface Cultures, University of Arts Linz
● Bachelor of Science, Information Technology Engineering, Shiraz University of Technology

Academic Discipline(s):
● Arts ● Technology
● Interdisciplinary

Research Areas(s):
● Computer science ● Interactive Art
● Natural Science ● Creative Computing

Role: FOUNDING LAB Summer School—Student
Based in: Linz, Austria, Europe
Originally from: Iran, Asia

Vision statement

Ghazal Hosseini

Emphasizing flexible and integrated programs, fostering a culture of innovation, and creating collaborative spaces will enable the seamless integration of diverse disciplines. By nurturing a supportive environment for cross-disciplinary research, projects, and initiatives, the new university can drive meaningful change and advancements in the academic field. One crucial aspect of shaping the University is developing flexible and integrated academic programs. These programs should encourage students to explore diverse areas of study, allowing them to combine art, technology, and societal perspectives in innovative ways. By offering interdisciplinary majors and minors, students can gain a comprehensive understanding of the interconnectedness of these fields and develop unique skill sets that bridge different domains.

Puneet Jain

Education:
● Individualized PhD (Specialization: Human-Computer Interaction) from Concordia University, Montreal, Canada (2021–present)
● Masters (by Research) in Computation and Data Sciences from Indian Institute of Science, Bengaluru, India (2014–2016)

Academic Discipline(s):
● Humanities ● Arts
● Technology ● Interdisciplinary
● Disability Studies

Research Areas(s):
● Human Computer Interaction ● Assistive Technology ● Extended Reality
● Disability Studies

Fall Term Project:
Crip Sensorama ↗ page 198

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Montréal, Canada, North America
Originally from: India, Asia

Vision statement
Puneet Jain
I will borrow disabled American Artist Johanna Hedva's proclamation here where she advocates: "The next revolution should be enacted through care." I guess the synergy that we are looking for when it comes to the new university has to come through care-giving and care-taking, both acting in symbiosis.

Pritha K.

Education:
● Bachelor Of Science (Hons.) in Zoology: Presidency University, Kolkata
● Master of Science Research (Biological Sciences): Jawaharlal Nehru Centre For Advanced Scientific Research, Bangalore
● Master of Science Research (Theoretical Evolutionary Biology and Ecology): Indian Institute of Science, Bangalore

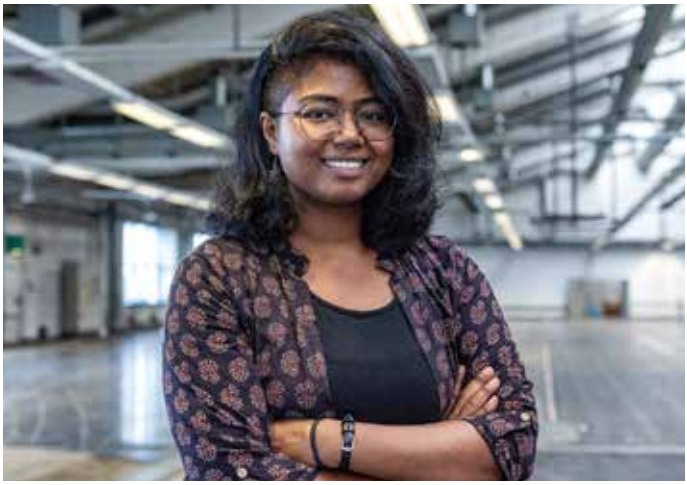
Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: France, Europe
Originally from: India, Asia

Patrick Münnich, Puneet Jain

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● Movement Arts ● Visual arts and filmmaking ● Physics of Pattern Formation and Self-organization ● Evolutionary Biology and Behavioral Sciences

Fall Term Project:
Mosaic of Memories ↗ page 219



Vision statement
Pritha K.

Working towards a more inclusive research space while pushing the frontiers of digital transformation is what I strive for. Therefore, for me, implementing practice-based pedagogies across non-traditional interfaces, keeping access and equity at the forefront of the design is likely to be a valuable direction in shaping a pioneering university. I believe that is possible through a transdisciplinary approach focusing on developing insights and thinking practices to asking informed questions and researching tools and modalities to address those questions without being restricted to specific concepts of disciplines. Helping students create transferable insight through research-based knowledge sharing and creative thinking—not information collection—should be one key aspect of consideration.

Sonia Litwin

Education:
● Master of Engineering in Biomedical Engineering

Academic Discipline(s):
● Interdisciplinary ● Technology ● Bio-inspired Design

Research Areas(s):
● Interaction between humans and artificial agents in the context of modern society ● Neuroaesthetics research of bio-inspired design ● Application of biophilia in design for well-being ● Bionic design and merging of body and the machine

Fall Term Project:
Urban Oasis ↗ page 246

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Warsaw, Poland, Europe
Originally from: Poland

Vision statement

Sonia Litwin

For the pioneering university, I imagine strategies that stretch the capabilities of the mind. I foresee the opportunities that flex different perspectives by zooming in and zooming out. This can be implemented with “free mind wandering” techniques. When there is a space and freedom for creativity without boundaries. Time for the exchange of thoughts and ideas followed by focused activities forcing narrower thinking around a specific subject. Gamification of the thought process and being challenged to step out of one’s comfort zone.

Pinyao Liu

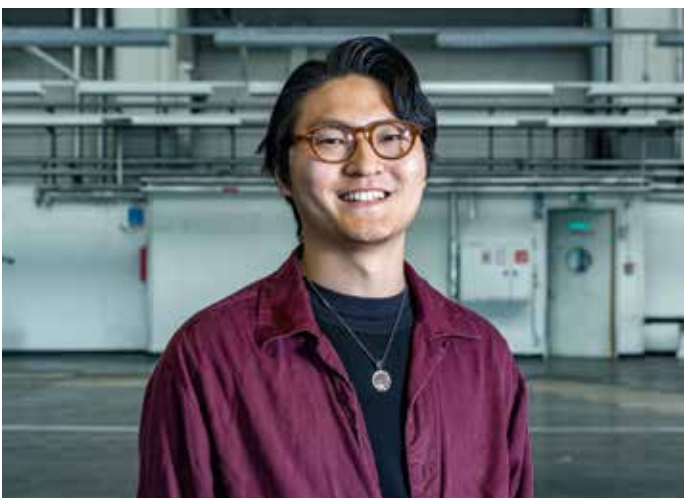
Education:
● MSc Interactive Arts and Technology, Simon Fraser University

Academic Discipline(s):
● Human Computer Interaction

Research Areas(s):
● Mixed Reality ● Dream Technology
● altered states of consciousness

Fall Term Project:
Virtual Dream Reliving ↗ page 250

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Mixed Reality Research and Development, Vancouver, Canada, North America
Originally from: China, Asia



Patrick Münnich

Vision statement

Pinyao Liu

The pioneering university should be inclusive, welcoming artists, engineers, and scientists to gather and exchange knowledge; the university hierarchy should be flat, where everyone is seen equal and made sure to contribute; the university should be bold, where people dare to challenge norms.

Chantal Pisarzowski

Education:
● Bachelor of Arts—University of Applied Sciences in Berlin

Academic Discipline(s):
● Arts ● Technology

Research Areas(s):
● New Media ● Art and Technology
● Interactive Design
● Artificial Intelligence

Role: FOUNDING LAB
Summer School—Student
Based in: Berlin, Germany, Europe

Vision statement

Chantal Pisarzowski

What I expect from a new university is a flexible and adaptable curriculum, to establish supported interdisciplinary research centers at universities, practical application of knowledge through collaboration with external companies/institutions to implement real projects, diversity and inclusion—promoting individuals from different backgrounds, welcoming all age groups—lifelong learning and input from people of different age groups is important for a comprehensive understanding of a subject matter.

Karmele Ustarroz

Education:
● Master in Brain and Cognition, UPF

Academic Discipline(s):
● Interdisciplinary

Research Areas(s):
● Philosophy ● Physics ● Photography
● Neuroscience

Role: FOUNDING LAB Summer School—Student
Based in: Universidad Nacional de Educación a Distancia, Madrid, Spain, Europe
Originally from: Spain

Vision statement
Karmele Ustarroz

The new university should offer flexible programs that encourage students to explore multiple disciplines, allowing them to combine art, technology, and society in innovative ways. This could involve creating interdisciplinary majors, minors, or certificate programs that bridge these fields. The curriculum should be designed to integrate art, technology, and societal perspectives across disciplines. For example, courses could explore the intersection of art and technology, the social impact of technological advancements, or the ethical considerations of integrating art and technology in society. Recognizing the rapid pace of change in the art, technology, and societal landscapes, the university should offer opportunities for lifelong learning and professional development. This can include continuing education programs, online courses, and resources that enable individuals to stay updated and adapt to evolving interdisciplinary trends. By incorporating these elements, the university can become a vibrant ecosystem that fosters interdisciplinary collaboration between art, technology, and society, nurturing the next generation of thinkers, innovators, and problem solvers.

Patrick Münnich

Claudix Vanesix Figueroa Muro

Education:
● MA Media Arts Cultures, Erasmus Mundus Joint Master's Degree: University for Continuing Education Krems, Austria; Aalborg University, Denmark; University of Lodz, Poland; Lasalle College of the Arts, Singapore.

Academic Discipline(s):
● Arts

Research Areas(s):
● Performance Art ● Extended Realities ● Artificial Intelligence ● Decolonial Feminism

Fall Term Project:
Songs for NPCs ↗ page 226

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Krems, Austria, Europe
Originally from: Peru, South America

Vision statement
Claudix Vanesix Figueroa Muro

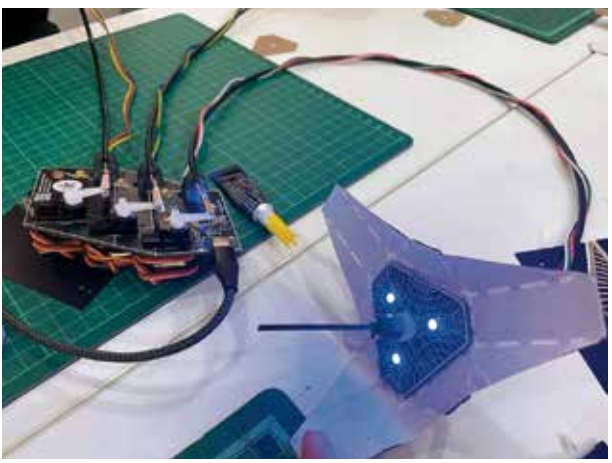
The new university should implement decolonial and antiracist perspectives.

Future Materials & New Design Paradigms

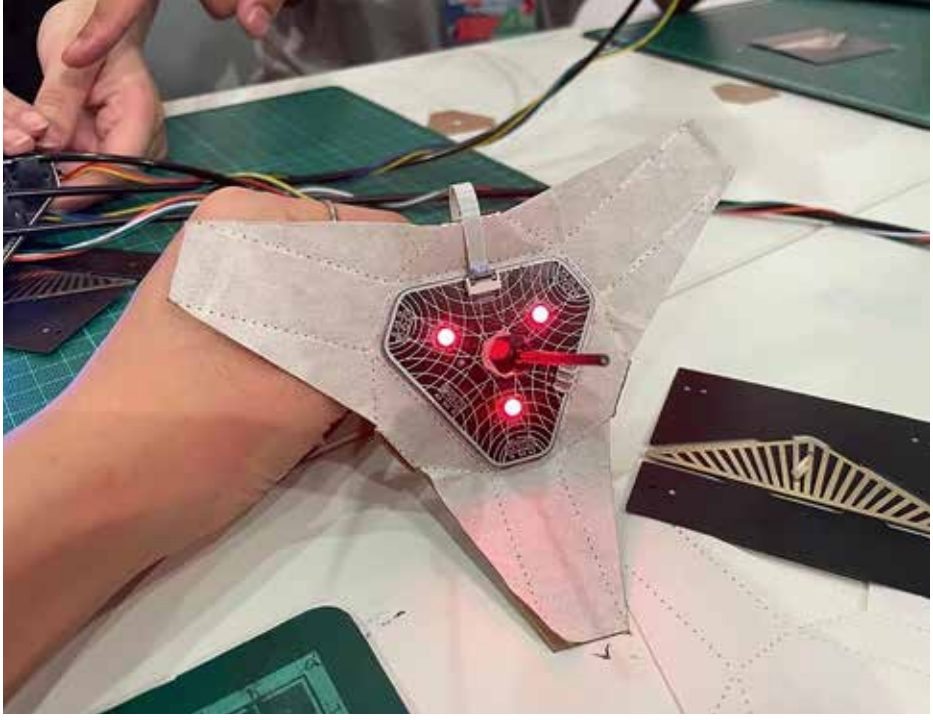
Folding the Future

Ancient and contemporary: Origami, combined with new technologies and materials, opens up seemingly endless possibilities—from foldable furniture to solar panels for spacecraft. The FOUNDING LAB students explored the simple principles of traditional Japanese folding techniques and merged them with robotics. Guided by Matthew Gardiner, a researcher at Ars Electronica Futurelab and expert in *Oribotics,* a synthesis of origami and robotics, they created a bouquet of flowers whose petals unfold when enough light is present.

In addition to technical details, the students examined the mutual relationship between humans, machines, and nature. Furthermore, they discussed whether concepts aiming for constant change and flexible actions also require a new understanding of time.



Miquel Alexandre , Miyu Horiuchi



Paul Kweku Akrofie

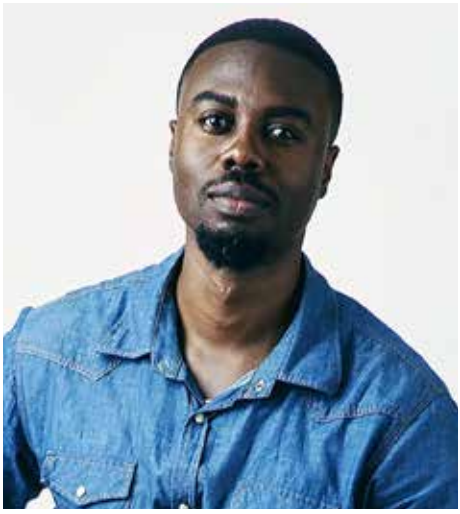
Education:
● BSc Information Technology, Methodist University

Academic Discipline(s):
● Technology ● Arts

Research Areas(s):
● Creative and Cultural Industries ● Emerging Technologies ● Entrepreneurship

Fall Term Project:
Shared Futures ↗ page 222

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: Arts Consultation, Accra, Ghana, Africa
Originally from: Ghana



Vision statement
Paul Kweku Akrofie

I believe that to foster interdisciplinary collaboration between art, technology, and society, the new university needs to be an environment that strongly encourages and creates spaces for integration, unlocking new possibilities for innovation. From my experience, one way to do this could be through a curriculum that promotes cross-disciplinary learning and collaboration. Joint programs and courses that bring together students and faculty from different disciplines can facilitate holistic learning experiences.

As a lecturer and through my work in the creative economy program at the British Council, I've seen the transformative power of interdisciplinary collaboration on creative entrepreneurs. In our CESP program, we designed a workshop curriculum that connected creative entrepreneurs with professionals in law and technology, fostering a deeper understanding of copyright issues and technology's role in their industries. This project had a big impact on the participants who left with a better understanding as well as new networks for support. Also in Africa, where access to education can be challenging, "on-demand learning" plays a vital role. Online platforms, mobile learning, and open educational resources democratize education and empower individuals from diverse backgrounds. By incorporating "on-demand learning" into education, it bridges gaps and unlocks untapped potential. To encourage organic intersections and collaborations, physical spaces within universities should be designed to encourage interdisciplinary exchange and touch points with the community. Maker spaces, innovation labs, and art studios provide the necessary tools and resources to explore the intersections of art and technology.

These spaces can convene partnerships with industry professionals and cultural organizations, creating strong connections that enable students to apply their interdisciplinary knowledge and skills in real-world settings. They can encourage collaborative initiatives, projects for students to address societal challenges with creative and technological solutions through innovation funds and competitive events that partner students with community leaders and change makers. Also, creating a culture of inclusivity and diversity is essential. Embracing diverse perspectives leads to richer interdisciplinary collaboration. Platforms for dialogue and cultural exchange promote understanding and open new avenues for exploration.

Patrick Münnich, Paul Akrofie

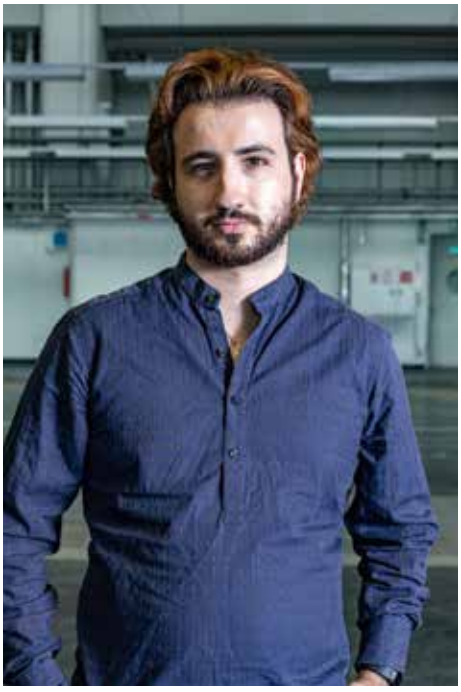
Miquel Alexandre

Education:
● Bachelor in Fine Arts / Master in Visual and Multimedia Arts at Polytechnic University of Valencia ● Erasmus at University of Arts Linz (Bachelor studies, Time-based and Interactive Media Arts)

Academic Discipline(s):
● Technology ● Arts ● Interdisciplinary ● Humanities

Research Areas(s):
● The future development of Social networks ● Utopian design ● Linguistics ● Human-machine-other than human interaction

Role: FOUNDING LAB Summer School—Student
Based in: Valencia, Spain, Europe
Originally from: Spain



Vision statement
Miquel Alexandre

Taking the question of envisioning a pioneering university quite literally, I would say that it should be shaped like a mesh instead of the traditional branch division of knowledge. The way to implement it would be to give the students the freedom to attend a variety of courses according to their interests during their stay, rather than solely focusing on specialization within a single discipline. There should also be physical and virtual spaces that promote interaction between departments, such as open-plan collaborative areas, shared studios, innovation hubs, online collaboration tools, virtual reality environments, and social networking platforms. Furthermore, these new collaborative groups should work together with industry and community organizations, addressing complex societal issues to develop solutions that are ethically responsible and culturally sensitive.

Habeel Alam

Education:
● PhD Electrical Engineering (Currently enrolled) from Lahore University of Management Sciences (LUMS)
● MS (Electrical Engineering) from Lahore University of Management Sciences (LUMS)

Academic Discipline(s):
● Technology ● Interdisciplinary

Research Areas(s):
● Photovoltaics (solar cells) ● Renewable Energy ● Climate change mitigation ● Agrivoltaics

Role: FOUNDING LAB Summer School—Student
Based in: Lahore, Pakistan, Asia
Originally from: Pakistan

Vision statement
Habeel Alam
The following key principles should be considered to implement visions for changes in academic fields effectively:

① **Interdisciplinary Programs:**
The new university should establish and promote interdisciplinary programs that combine art, technology, and social sciences faculties. Students and researchers can explore new perspectives and innovative solutions to address complex challenges by encouraging cross-disciplinary collaborations.

② **Collaborative Spaces:**
The collaboration and interaction between students and faculty from diverse disciplines should be encouraged by the establishment of spaces (both physical and virtual). These spaces can serve as centers for creativity, invention, and knowledge sharing, promoting a culture of innovation.

③ **Research Initiatives:**
Different research initiatives focusing on the union of art, technology, and society should be facilitated by the university. The university can drive impactful solutions addressing real-world problems through investment in multidisciplinary projects.

④ **Emphasize Experiential Learning:**
Upgrading the curriculum through the integration of experiential learning can provide students with vital exposure to the intersection of art, technology, and society. The students' understanding and preparedness for global challenges can be enhanced by projects, internships, or collaboration with external partners.

⑤ **Inclusive and Diverse Communities:**
Generating an inclusive environment which welcomes individuals from diverse cultures, backgrounds, and disciplines nurtures creativity and improves the exchange of ideas. The university should actively pursue the promotion of diversity, as well as ensuring equitable opportunities for all.

Patrick Münnich

⑥ Technology:
The university should adopt cutting-edge technologies to improve the learning experience and research capabilities. Machine learning, artificial intelligence, and other emerging tools should be utilized for collaboration across disciplines.

⑦ Critical Thinking:
It should encourage students and researchers to think critically and reflect on their work's ethical, social, and cultural implications as it will foster innovation and empower future leaders to make informed decisions. The new university can build an inspiring and forward-looking academic environment through these principles and strategies, by harnessing the power of interdisciplinarity in collaboration between art, technology as well as society. It will equip the graduates with relevant skills and attitude to address global challenges and steer positive change.

Kevin Blackistone

Education:
- MA, Interface Cultures, University of Arts Linz
- BA, Intermedia and Digital Art, University of Maryland Baltimore County

Academic Discipline(s):
● Arts ● Interdisciplinary ● Technology

Research Areas(s):
● Reactivity ● Multisensorial technology ● Bioinformatics ● Research

Role: FOUNDING LAB Summer School—Student
Based in: Linz, Austria, Europe
Originally from: United States of America

Vision statement
Kevin Blackistone

Our human societies are based on common rituals of interpersonal interaction. It is within these common and repetitious structures that we both find the elements of mutualistic coherence and compassion. It is also within the comprehension of how these societal structures influence us on the unconscious level that we might realize what elements need to shift in order to build new means of interpersonal understanding. While it might be common to regard things such as motivation and personal drive as the principal agents of change, I believe they must exist within a framework of how the human organism and it's long / intergenerationally developed societal networks form and reform in order to best understand how to meaningfully enact new rituals and lasting change.

Chiao-Chi Chou

Education:
● PhD Candidate/National Tsing Hua University

Academic Discipline(s):
● Technology ● Arts ● Interdisciplinary ● Humanities

Research Areas(s):
● Environmental biology
● Plant-environment signaling
● Interspecies communication
● BioArt

Fall Term Project:
Streams in the Veins ↗ page 232

Role: FOUNDING LAB
Summer School & Fall Term—Student
Based in: National Tsing Hua University, Hsinchu City, Taiwan, Asia
Originally from: Taiwan

Miyu Horiuchi

Education:
● UPenn Masters

Academic Discipline(s):
● Technology ● Interdisciplinary
● Design ● Engineering
● Applied Arts

Research Areas(s):
● Design and Emerging Tech
● Entrepreneurship ● Experience Design
● Product Management

Role: FOUNDING LAB
Summer School—Student
Based in: University of Pennsylvania, United States of America
Originally from: Japan, Asia
Area: Engineering, Applied Arts

Patrick Münnich

Vision statement

Miyu Horiuchi

One way of shaping the new university would be to make the curriculum more flexible and create more opportunities for students to explore different fields.

Sutanuka Jashu

Education:
● Masters in Architecture, Confluence Institute, Paris ● Bachelor of Arts in Animation and Visual Effects , IGNOU, India
● Diploma in Fine Arts , India

Academic Discipline(s):
● Natural Sciences ● Mathematics and Data Science ● Humanities
● Interdisciplinary

Research Areas(s):
● Media Technology ● Art
● Architecture Design
● Material innovation

Role: FOUNDING LAB Summer School—Student
Based in: Paris, France, Europe
Originally from: India, Asia

Vision statement

Sutanuka Jashu

In my mind, the new university is like a game-changer. It's all about breaking the barriers between art, technology, and society. A place where you can experience different subjects, explore new ideas, and collaborate with like-minded people. It's about real-life experiences, solving actual problems, and making a difference in the world.

Augustas Lapinskas

Education:

● 4+1 BA/MA Architecture and Urban Planning program at Vilnius Tech University. Alumnus of University of Minho, Braga, Portugal, Estonian Academy of Arts, and California Polytechnic State University senior architectural education programs

Academic Discipline(s):

● Architecture ● Life Sciences ● Applied Arts

Research Areas(s):

● Urban Microbiome And Soil Regeneration ● Analytical Architecture ● Spatial Activism ● Participatory Urban Design Practices

Role: FOUNDING LAB Summer School—Student

Based in: Vilnius, Lithuania, Europe

Originally from: Lithuania

Vision statement

Augustas Lapinskas

Every university, as an academic and cultural institution, should organize an annual essay competition for members of the institution (students, faculty, administration) to define the institution in comparison to a vocational school or professional college. I believe that most interesting observations would be made.

Patrick Münnich

Elie Lomami

Role: FOUNDING LAB Summer School—Student
Based in: University of Mons, Belgium, Europe
Originally from: Belgium
Area: Engineering

Vision statement

Elie Lomami

When I think of great leaders, they share seemingly obvious traits; they are beacons of hope and outstanding sources of confidence that makes it feel natural to follow them. They radiate motivation, perseverance, optimism, and charisma. Equally, they had to both convince others that the status quo wasn't fine, and align a significant number of people to one common direction towards progress. However, I do think there are some underrated factors in driving change.

In my opinion, though it is important to have the clearest objective possible, things won't always run smoothly. No one got it right on the first try. Therefore, there has to be a healthy balance between pushing forward and being open to reassessment/feedback. Another underrated key factor is having sufficient strong bonds. Having the right entourage has averted so many premature downfalls. Emotional support isn't addressed enough. It is important to lift each other up and rise together.

Eko Saputra

Education:
● B.Comp. in Information Technology at the University of Paramadina, Jakarta, Indonesia ● MA in Fashion Studies at the University of Bologna, Italy ● PhD in Historical Studies at the University of Teramo, Italy

Academic Discipline(s):
● Humanities ● Arts ● Technology ● Interdisciplinary

Research Areas(s):
● Visual Arts ● Museum Practice ● Cultural Heritage ● Digital Humanities

Role: FOUNDING LAB Summer School—Student
Based in: Teramo, Italy, Europe
Originally from: Indonesia, Asia

Vision statement
Eko Saputra

The university should be a dynamic center for diversity, encouraging an inclusive atmosphere that promotes conversation across all disciplines. The institution ought to advocate multidisciplinary collaborations where students can co-create while gaining knowledge by knocking up traditional academic boundaries. Furthermore, the institution could employ a balanced approach while embracing the potential of technology, concentrating on its wider social implications. Classes such as these need to be in addition to involve discussions of both the political and ethical implications of our current digital environment. In conclusion, the university is a place that is multicultural in nature, has a welcoming atmosphere that encourages interdisciplinary discussion, critically examines the effects of technology on society, and emphasizes the fundamental importance of the humanities in the digital age.

Patrick Münnich

Mrinalini Singha

Education:
● MS Art, Culture and Technology at MIT (Massachusetts Institute of Technology)
● BDes Film and Visual Communication at NID (National Institute of Design, Ahmedabad)

Academic Discipline(s):
● Technology ● Arts ● Interdisciplinary ● Natural Sciences ● Mathematics and Data Science ● Humanities ● Applied Arts

Research Areas(s):
● Counter-Mapping Hegemonic Narratives ● Tangible Archives & Interfaces ● Geo-Politics Of Media Artifacts and Computation ● Ethics Of AI and Misinformation

Role: FOUNDING LAB Summer School—Student
Based in: Massachusetts, United States of America
Originally from: India, Asia

Vision statement

Mrinalini Singha

The Krebs Cycle of Creativity by Neri Oxman compellingly establishes "a tentative, yet holistic, cartography of the interrelation between these domains [of Art, Design, Technology and Science], where one realm can incite (r)evolution inside another; and where a single individual or project can reside in multiple dominions." This diagram, that flows both clockwise and anti-clockwise from one domain to another is a great framework for how such synergetic interdisciplinarity can take place. I believe that the University should encourage students to take courses in a range of domains and apply varying epistemic lenses to their work. That said, thank you for this opportunity to be a part of the Founding Lab. I look forward to continuing this discussion!

Emmanuel Soumo

Role: FOUNDING LAB Summer School—Student
Based in: University of Lincoln, Lincoln, United Kingdom, Europe
Originally from: Cameroon, Africa
Area: Natural Sciences, Mathematics and Data Science

Vision statement

Emmanuel Soumo

Environmental, health, and highly complex socio-political crises are present throughout the world. The pioneering university should be a place where all professors and researchers participate and collaborate to bring together scientists from numerous disciplines in a way that enables them to understand the intricate causes and effects of a specific problem. This will enable the new university to transcend and operate outside the boundaries and cultures of any discipline to capture new realities, mutually inform one another's work, and address the multilevel determinants of serious problems and all their interactions.

Sara Stefani Plavsic

Role: FOUNDING LAB
Summer School—Student
Based in: Johannes Kepler University, Linz, Austria
Originally from: Austria
Area: Natural Sciences, Mathematics and Data Science

Vision statement
Sara Stefani Plavsic

Here is an idea for the new university: What about establishing interdisciplinary research centers that encourage collaboration among experts from diverse fields, including those with interdisciplinary backgrounds? Moreover, community involvement could ensure that the research addresses real-world needs.

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Summer
School

Closing Ceremony

Patrick Münnich

IT:U

x

Ars Electronica

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I Term

IT:U
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LAB

Fall Term

Anna Oelsch
Maria Pfeifer

After the FOUNDING LAB Summer School and Forum, where 75 Students and 21 Fellows from around the world and across more than 100 disciplines outlined their future scenarios for the new university, the first experimental Fall Term at IT:U began.

The FOUNDING LAB Fall Term with 25 Students and 21 Fellows served as a prototype for testing the feasibility and sustainability of their visions with a focus on interdisciplinary and project-based work, incorporating scientific methods as well as artistic thinking, and thus creating an environment that fosters trans-cultural and critical engagement. The results were presented to the public at a final event end of January, 2024.

The Making of

After an Open Call to find the Fellows that would bring the "Fall Term Chapters" to life with their individual expertise, the joint concept was then realized from October 2023 to January 2024—supported by the I:TU Founding Convention and staff who facilitated the development and implementation of this project. The team was responsible for the overall planning of the whole semester program, supporting the Fellows in the design and realization process of the Fall Term Chapter program, building an open membrane to Ars Electronica projects, experience, and network. Team members also supported and mentored the students in the realization of their projects, fermented the FOUNDING LAB experiences into meaningful learning outcomes, and eventually brought together the different project threads in a final public FOUNDING LAB Event in January 2024.

While the FOUNDING LAB Summer School and Forum were designed to be fueled by creative collisions with the Ars Electronica Festival contents and protagonists, the goal of the FOUNDING LAB Fall Term was to explore the potentials and limitations of new forms of collective action and to create learning environments for all its participants—team, students and Fellows alike—focusing not primarily on knowledge transfer but on creating a space where we can all ask the right questions to learn from each other. The emphasis was on prototyping a curriculum concept that takes up the central themes of Ars Electronica, especially those of the Ars Electronica Futurelab:
▪ Interdisciplinary project work between art and application ▪ Digital transformation facets and its impact on society ▪ Art & Science Research that dissolves creative boundaries and discipline-based thinking ▪ International collaboration on evergreen topics like Artificial Intelligence, (Virtual) Realities, code, robotics ▪ Societal and political discourse surrounding these developments

Here the researchers and artists from the Ars Electronica Futurelab not only contributed with their personal experience from their daily work in interdisciplinary R&D and artistic exploration but also offered their open minds for the content development and topic discourse with Fellows and students.

The Program

Led by Ars Electronica's Festival/Prix/Exhibitions division, a joint team from Ars Electronica Futurelab, Ars Electronica's artistic R&D department with a long history in experimental educational projects, and staff from the FOUNDING LAB Summer School, shaped, curated, and directed the FOUNDING LAB Fall Term.

Divided into six thematic blocks—the **Fall Term Chapters**—the FOUNDING LAB Fall Term addressed core aspects of digital transformation:

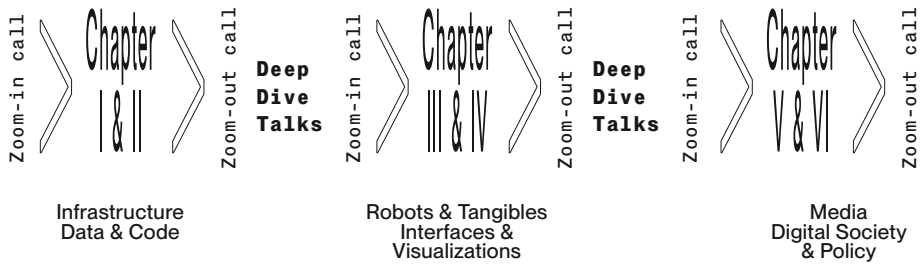
Chapter I: Birth, Life and Death of Infrastructure
Chapter II: Data & Code
Chapter III: Robots, Machines and Tangibles
Chapter IV: Interfaces & Visualizations
Chapter V: Media
Chapter VI: Digital Society & Policy

Together with the Ars Electronica Futurelab Catalysts, the unconventional mix of Fellows from all over the world opened entirely new perspectives for students, creating an international dialogue far beyond single fields of expertise.

In their eclectic composition, the **Fall Term Chapters** were conceptualized as a learning buffet for skills, mindsets, methodologies, and practical exercises for the individual semester projects of the students. The didactic formats drew from the experiences of the Fellows as well as concepts and strategies from various academic institutes, universities, and other learning contexts. Experimental workshop settings and excursions to local industry partners invited students to explore different facets of their research topics. Additionally, guiding students toward scholarly work, exploring research methods, and experimenting with artistic approaches were constants throughout the semester. The Art Thinking approach, developed at the Ars Electronica Futurelab, was used to provide students with an innovative framework for discursive engagement and critical reflection.

Over the course of four months, the students worked on individual semester projects that united various disciplines. This process was designed and continuously supported by an experienced facilitation team. In addition to individual guidance by Fellows on-site in Linz and through online mentoring sessions, Deep Dive Talks by renowned experts also offered insights into their respective fields.

The whole process was accompanied by an active feedback and evaluation process, and the results are also found in the contents of this book. The close communication between students and faculty made it possible to accommodate and challenge the individuals within this project-based, interdisciplinary framework, with an additional focus on the enriching transcultural mediation aspects of this constellation. It has been shown that breaking geographical and disciplinary boundaries, finding mutual respect for diverse skill sets, and collectively developing new approaches to complex and everyday relevant problems were the skills needed for successful interdisciplinary creative processes.



Anna Oelsch is a senior researcher at Ars Electronica Futurelab. Within the FOUNDING LAB project, she was the Forum & Fall Term Lead, leveraging her skills in project management, program concept development, art thinking, and mentorship. ↗ page 286

Maria Pfeifer, Key Researcher at Ars Electronica Futurelab, supported the overall conception of the FOUNDING LAB Fall Term and Forum program, as well as student feedback and program assessment, with a special emphasis on Future Skills. ↗ page 287

Patrick Münnich

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Fall
Term

Chapters & Fellows

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Fall Term

Chapter I

Birth, Life and Death of Infrastructure. Heavy Lift—the Infrastructure to Run the Code.

October 4 - 7, 2023

In the first chapter of the FOUNDING LAB Fall Term, students led by Fellows Gerhard Grimm, Darsha Hannah Hewitt, and Vladan Joler explored the birth, life, and death of infrastructures. Topics ranged from surveillance architectures and global routing to centralization through technology and the reuse of discarded hardware. Workshops, excursions to the Ars Electronica Center's Deep Space 8K, and creative projects such as the *Dead Battery Disco* enabled a holistic view of technology, space, and sound, and trained critical thinking and creativity in digital reality.

Hosted by Fellows:
- Gerhard Grimm
- Darsha Hannah Hewitt
- Vladan Joler
- Futurelab Catalyst Otto Naderer

Martin Hieslmair, Lars Schulz, Patrick Münnich

Gerhard Grimm

(AT) With a unique and inclusive research perspective, Gerhard Grimm believes that organizational excellence comes from understanding student and customer needs, especially those from diverse backgrounds. A leader in empowering organizations to embrace digital tools and align with customer expectations, he supports students with a profound understanding of the subject matter. Recognizing diverse needs as key to success, Grimm leverages his varied background to deliver sustainable value. Drawing on expertise in digital technology and inclusion, he equips students with skills to create exceptional research for challenges in new fields. Since graduating from Vienna University of Economics and Business, Grimm has worked across different industries in Europe and Australia. His teaching style promotes engagement and inclusivity, laying the groundwork for a vibrant learning environment. Embracing various cultures, he brings this mindset into the classroom, creating a dynamic and inclusive atmosphere for all.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Gartner, Melbourne, Australia
Originally from: Austria, Europe
Area: Humanities, Engineering

● Vision statement
Gerhard Grimm
The University of the Future is a dynamic learning environment emphasizing interdisciplinary studies, lifelong learning, and industry partnerships to meet real-world challenges. Encouraging ethical decision-making and inclusivity of thought, it equips students with the ethical compass, flexibility, and adaptability needed for a fast-changing society.

Darsha Hannah Hewitt

(CA) Darsha Hewitt is an interdisciplinary sound artist whose work critically investigates the materiality of the machines and practices of technology that consumer society throws away. With a media archeological approach, she deconstructs generations of obsolete technology to trace out systems of power, economy, and control inherent throughout technological infrastructures. The effect simultaneously demystifies the confounding inner systems at play within our technology while transforming it into unexpected sonic experiences that raise questions about our technological entanglements and its implications for humans and ecology. Her current work looks into the ecological dimensions of music and sound reproduction technology.

Role: FOUNDING LAB Fall Term—Fellow
Based in: Universität der Künste Berlin, Berlin, Germany, Europe
Originally from: Canada, North America
Area: Humanities, Applied Arts

● Vision statement
Darsha Hannah Hewitt

I think it's quite important for the university of the future to step outside of tradition a little bit. I came up with the following concepts together with a couple of students, namely Kevin and Deepti. On the one hand we need to continue to be collaborative and critical, especially within academia, of the power structures that exist and the power structures that could be and can be. Conscientiousness, the idea of thinking about your own self, the people around you, the environments and the living lives around us and our impact on them. Lastly, we chose celestial, another word beginning with "c." What we mean by celestial is to keep things as work in progress and keep working on things which may not necessarily have the end point in view and choose a dynamic way to get there.

Personal Background

Darsha Hannah Hewitt

As an artist and educator, Darsha Hewitt is enthusiastic about creating models of empowerment in technological environments where scenarios are created that open up to thinking critically about technological infrastructures and their impact on people and ecology. For **Chapter I—"Infrastructure: Heavy Lift—The infrastructure to run the code,"** Darsha's contributions revolved around media archeology and hands-on hardware hacking in a collaborative setting. Her presentation *Media Archeology and Music Materiality* looked at how deconstructing obsolete music technology can inform an understanding of some of the political socio-ecological relations at play within music as a format of media and more broadly within (digital) society. Her hands-on sound electronics workshop had participants reviving dead media as a means to confront digital dematerialization with a lively performative approach. Darsha conveyed that valuable knowledge is embedded within the material and physical constructs of technology and that through hands-on collaborative investigation we can foster new forms of creativity and community.

Darsha has worked as an artistic associate in Media Art and Design at Bauhaus University and has held guest professorships in New Media at Kunsthochschule Kassel and Sound at Karlsruhe University of Art and Design. She is presently guest faculty in Sound Studies and Sonic Arts at Berlin University of the Arts. Alongside academia, her contributions to do-it-yourself technology communities are internationally

Lena Maria Loose, Patrick Münnich

recognized, with her critical hacking workshops and online how-to videos being profiled by technical forums such as the Chaos Computer Congress and *Make: Magazine*. She has set up and consulted on the development of experimental electronics studios at various art universities and institutions including Ada X—Canada's Feminist Media Art / Digital Culture organization. Her pedagogical practice encourages adventurous creativity in support of the artistic visions of students while connecting them to bigger picture questions through deconstructing and asking questions about how we relate to technology. Hewitt's artworks and collaborative/performative workshops are presented internationally, with recent exhibitions at Werkleitz Festival (DE), Ars Electronica (AU), Zagreb Museum of Contemporary Art (HZ), Hong Kong City Hall, Halle 14—Centre for Contemporary Art (DE), MU Artspace (NL), The Museum of Art and Design (NYC), Hartware MedienKunstVerein (DE), Gaitée Lyrique (FR), Deichtorhallen Hall for Contemporary Art (DE), Kampnagel (DE), Modern Art Oxford (UK), Transmediale / CTM Festival Berlin (DE), and WRO Media Art Biennale (PL). She has been awarded numerous commissions, grants, and awards including an International Media Arts Prize from Edith Russ Haus (DE), a Fellowship at the Berlin Centre for Advanced Studies in Arts and Sciences at UdK Berlin and commissions for organizations such as Transmediale, Europe Media Arts Platform, and Atelier Goldstein (DE).

Vladan Joler

(RS) Vladan Joler is a professor at the Art Academy of the University of Novi Sad and founder of the SHARE Foundation, which deals with topics such as the transparency of algorithms, exploitation of the digital workforce, invisibility of infrastructures, and technological black boxes.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Share Foundation, Novi Sad, Serbia, Europe
Originally from: Serbia, Europe
Area: Humanities

● Vision statement
Vladan Joler

In this era of overwhelming access, production, and the continuous flow of information, accompanied by a flood of mass-produced, synthetically generated content, and a crisis of truth and reason, there is an urgent need to rethink the way we learn. This is essential to effectively confront the challenges of both the present and the future. The currently obsolete industrial education system, centered around the rote memorization of knowledge and designed to produce obedient assembly line workers rather than critical thinkers, must be replaced with an entirely different learning paradigm. The university of the future recognizes this pressing need and is responding by initiating an open-ended process to create a new transnational, inclusive, and sustainable learning environment.

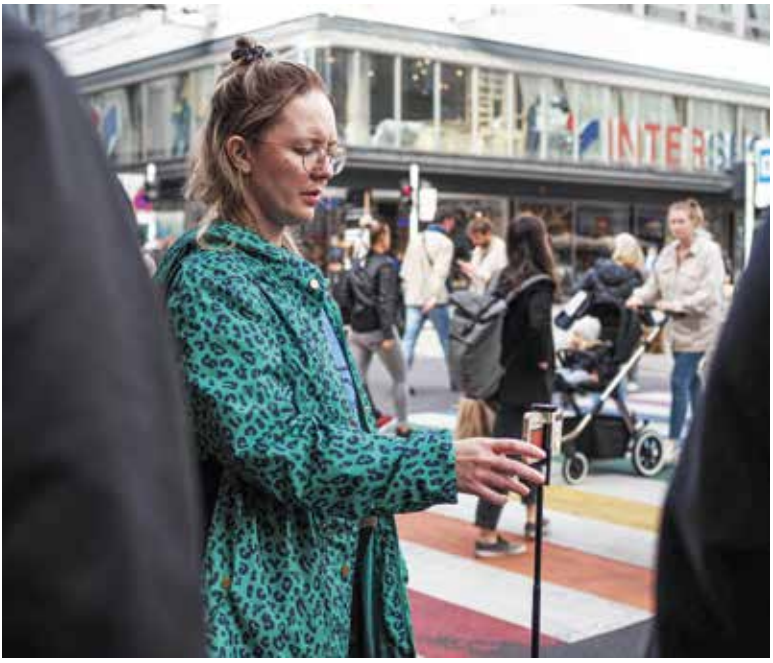
Data & Code. Soft Wars—Data, Code and Models that Run our Lives.

November 8 - 11, 2023

In the second chapter of the FOUNDING LAB Fall Term, **Data & Code**, students went through the entire life cycle of data under the guidance of Fellows Arianna Salazar Miranda, Roland van Dierendonck, and Paolo Cirio. Following the collection of traffic data in Linz, ethical questions about data protection and human involvement were raised. Innovative computer vision models were used to analyze traffic in detail, and in a workshop, the students developed artistic, activist, and political projects to make the entire data process an active experience. Intensive discussions about ethical challenges in the data-driven world has promoted a broad understanding of the responsible use of technology and information.

Hosted by Fellows:

- Arianna Salazar Miranda
- Roland van Dierendonck
- Paolo Cirio
- Futurelab Catalyst Fritz Bachinger



Martin Hieslmair, Paolo Cirio

Paolo Cirio

(IT) Paolo Cirio engages with social, economic, and cultural issues of contemporary society. His interventions and research-based artworks are presented as installations, lectures, artifacts, photos, videos, and public art, both offline and online. Cirio has exhibited in international museums and has won prestigious art awards. His artworks have been covered by hundreds of media outlets worldwide and he regularly gives public lectures and workshops at leading universities.

Role: Founding Lab Fall Term—Fellow
Based in: Freelance Artist, New York City, United States of America, North America
Originally from: Italy, Europe
Area: Applied Arts

● Vision statement
Paolo Cirio
The university of the future probably should be more involved in society to escape the bubble of academia and only writing and discussing among academic people. Leading to a more influential role in society and in policy making as well. Nevertheless, it should be creative and more involved with festivals like Ars Electronica, which makes this a great new opportunity for us.

Personal Perspective

Paolo Cirio

Paolo Cirio investigates and intervenes in social, economic, and cultural issues. His work broaches social areas impacted by technology, media, politics, and economics in order to address human rights, economic inequality, social justice, and democracy through creative journalism and activism promoting new public policies.

Cirio's art embodies the ethics, conflicts, and possibilities concerning the social complexity of global society, using a critical and proactive approach. Employing a range of formats and strategies, including hacking, public interventions, institutional critique, activism, utopia, essay, documentary, and appropriation, Cirio's work fosters public engagement, collective action, and critical thinking.

His art making and writing integrates esthetics and political theory, media ecology, cultural politics, knowledge economy, jurisprudential studies, financial analysis, and technological scrutiny. In particular, Cirio has researched Internet privacy and surveillance, artificial intelligence, climate change, high finance, intellectual property, and militarism.

Aiming at creating and inspiring change, response, and inquiry through art that is engaging, subversive, and informative, Cirio's works are social agents probing into and interacting with subject matters and their corresponding systems.

His works often foster agency, going beyond mere representation. He elicits social innovation through his creative proposals and campaigns for regulations and public policies in the specific fields he examines. Using a journalistic, scientific, and analytical approach, Cirio investigates and exposes data, systems, facts, and documents regarding urgent contemporary issues. The evidence he finds, assembles, and presents is an integral part of his work and forms the basis of his creative regulatory solutions in which he invites everyone to take part in encouraging citizens' agency.

Paolo Cirio's investigation of evidence and sensitive information firstly employs techniques of exposure, appropriation, and recontextualization. Cirio then uses this material with appealing language, visuals, irony, interventions, artifacts, and concepts to engage a wider public in works of art that aim to make contradictions visible, expose mechanisms, and debunk their processes.

Paolo Cirio artworks are also often confrontational actions—they elicit reactions from the subjects of the projects and spark audience participation. The interactions and processes from his interventions generate online art performances. These socially engaged performances involve the public in critical debates on change, driven directly by his artistic concepts and creations, which often involve personal risk and challenge.

His artistic research strives to expand the definition of contemporary art to include unconventional practices, inquiries, and public participation. His esthetic compositions are highly conceptual with layered and interconnected meanings, functions, and agents presented as a complete, closed referential system of interrelated ideas and actions.

Artworks

Paolo Cirio presents his research and intervention-based works through installations, photography, and public art both offline and online.

Cirio's art installations translate the gathering, processing, and dissemination of sensitive information into visual forms for exhibition settings. Within these displays, Cirio's work shows and documents multilayered concepts, public art interventions, or ethereal time-based online performances. With prints, videos, and custom artifacts, the installations crystallize ideas, reactions, and contexts of the works taken from their original setting and transformed into a formal mode of presentation.

Cirio's art renders critiques of information systems into artifacts to visually illustrate and document social structures and aesthetic relations integrated in his work. Cirio's installations combine images, photographs, diagrams, texts, documents, artifacts, and videos to engage the audience in experiencing and discovering the subjects, outcomes of the work, and the significance of his interventions and concepts.

Patrick Münnich

Roland van Dierendonck

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Hogeschool Rotterdam, Rotterdam, Netherlands, Europe
Originally from: Netherlands, Europe
Area: Natural Sciences, Mathematics and Data Science, Humanities, Applied Arts

(NL) Roland van Dierendonck specializes in the interface between technology and society. He is senior researcher in the Responsible Applied Artificial InTelligence (RAAIT) project at Rotterdam University of Applied Sciences. There, he studies and tests methods for co-creation and co-design of responsible AI in living labs with learning communities, including stakeholders from industry, research, policy, and society at large. His current interests include observational studies, Responsible Applied AI toolkits, and the role of art and design in the co-creation of ethical AI. Roland has a background in interdisciplinary sciences, media technology, and bio-digital interaction research, and is pursuing a practice-based PhD at the Culture and Creativity Research Institute of Sheffield Hallam University, where he is making haptic and time-based tools, methods, and artworks to interact with microbe movement and microbiome data in novel ways. Roland has led the BioHack Academy at Waag and has taught courses and workshops at multiple universities and art academies. He has contributed to, and written, multiple research articles and book chapters. His work has been exhibited internationally; his latest exhibitions include Caring Futures in Stavanger and Conversations in Practic/se at Yorkshire Art Space, Sheffield.

Roland van Dierendonck
● Vision statement
The university of the future is a lively playground, equal parts about play and imagination, as it is about criticality and speaking truth to power; creating, simulating, and testing alternative future paths, with a practice-based approach bringing research out of the abstract and theoretical and into the real world. Taking an ethics-first approach means that data scientists become aware of their socio-political positioning and influence, while future politicians finally become more knowledgeable about tech, so that innovation can become responsible.

Arianna Salazar-Miranda

(CR) is a postdoctoral fellow at MIT's Senseable City Lab and the Mansueto Institute at the University of Chicago. In 2024 she will transition to a faculty position in urban planning and data science at Yale University. Arianna earned her PhD in Computational Urban Science and a Master's in Urban Planning from MIT. Additionally, she holds a Licentiate in Architecture from Veritas University, Costa Rica. Her professional trajectory includes roles in both the private sector and academia, with positions at Microsoft Research and the Federal Reserve Bank of Richmond. Arianna's research integrates design, technology, and data to understand issues related to urban sustainability. Her contributions have been spotlighted by CNN, *The Guardian,* and the World Economic Forum, and have been published in leading journals spanning various disciplines.

Role: FOUNDING LAB Fall Term—Fellow
Based in: MIT Senseable City Lab, Massachusetts, United States of America
Originally from: Costa Rica, North America
Area: Natural Sciences, Mathematics and Data Science

● Vision statement
Arianna Salazar Miranda
The university of the future is all about a transformative educational model that can integrate hands-on practice but also community engagement, so talk to local stakeholder organizations to tackle the big societal problems, right, so think about climate change, think about segregation, all these problems that we face in our daily lives.

Personal Perspective

Arianna Salazar-Miranda

I bring an interdisciplinary perspective to the field of urban science. My goal is to envision more sustainable urban environments by integrating design, emerging technologies, and data. I employ computational and quantitative methods, along with new data sources, to study the interaction between planning policies, the built environment, human behavior, and sustainability. Some of my recent projects include investigating the social and environmental implications of suburban development using the garden city model, analyzing the effects of redlining on contemporary environmental risks in vulnerable communities, and quantifying the impacts of adopting the 15-minute city model using GPS data.

I actively collaborate with cities and communities to develop digital tools that support their sustainability efforts. Notable projects include creating a framework to measure real-time transportation modes from images and mapping one of Brazil's largest informal settlements using LiDAR data.

Patrick Münnich, Martin Hieslmair, tom mesic

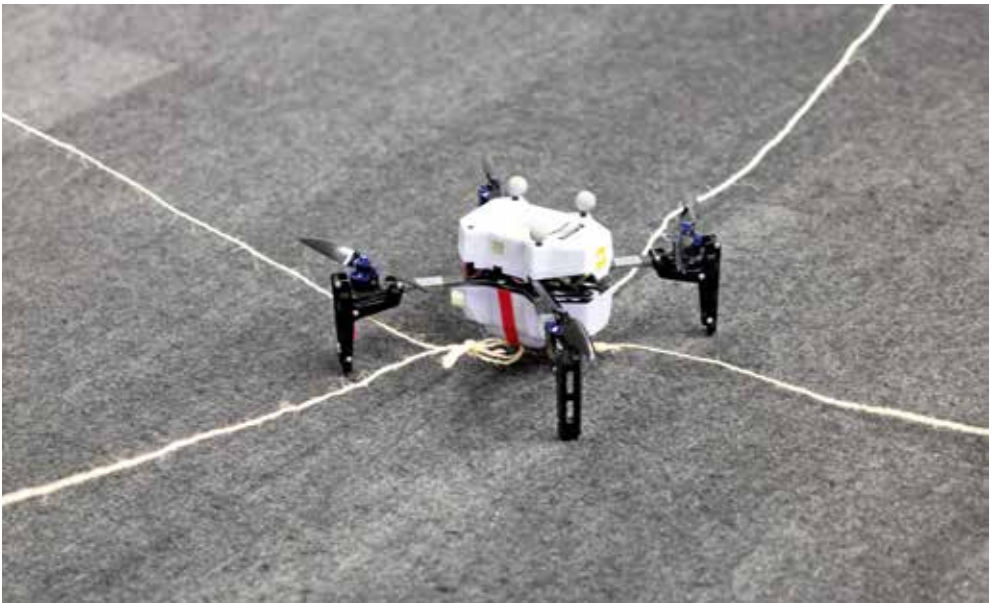
Robots, Machines and Tangibles. Moral Machines—Living with Robots that Care and Scare.

November 22 - 25, 2023

The third chapter of the FOUNDING LAB Fall Term, **Robots, Machines and Tangibles**, explored the relationship between humans and machines. Led by Fellows Edwina Portocarrero, Nan Zhao, and RAY LC, the chapter explored the evolution of machines, their current role, and future perspectives. Students were encouraged to imagine themselves as futuristic machines and were immersed in the research of Ars Electronica Futurelab, including swarm robotics and innovative projects such as Space Ink. Through workshops on human-robot interaction and a visit to a metal goods factory, students experienced different dimensions of machines. Finally, in the Drone Design Challenge, they designed creative performances that illustrate the relationship between humans and machines in an intelligent, profound, and impressively versatile future.

Hosted by Fellows:

- Edwina Portocarrero
- Nan Zhao
- RAY LC
- Futurelab Catalyst Peter Holzkorn



RAY LC

(US) creates speculative narratives in diverse media about the way humans adapt to technologies. Their practice creates interaction and narrative environments for building bonds between humans and machines. They translate perspectives from their own research in neuroscience and human-computer interaction into their artistic practice, with exhibitions at BankArt, New York Hall of Science, Ars Electronica Linz, Saari Residency, New Museum, NeurIPS, Angewandte Festival, Osage Gallery, Elektron Tallinn, Elektra Montreal, Videotage, Goethe Institute, Hong Kong Arts Centre, Science Gallery Detroit, IEEE VISAP, SIGGRAPH Asia, and Kyoto Design Lab. They founded the Studio for Narrative Spaces.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: City University of Hong Kong, Hong Kong, China, Asia
Originally from: United States of America
Area: Natural Sciences, Mathematics and Data Science, Medicine and Health, Humanities

Patrick Münnich, tom mesic, RAY LC

● Vision statement

RAY LC

The gold standard for education is for the emergence of self-motivated, collaborative learning that is tailored to the students, so that they can be intrinsically motivated to study what is most relevant for their lives. The university of the future adapts technologies and systems for realizing shared learning, so that anyone with or without means or advantages can learn for the sake of their own cultural and personal empowerment.

Personal Perspective

RAY LC

As a researcher and artist in the area of human-machine dance, I brought in perspectives of performance of action-oriented outcomes for the chapter, which unites with our team for using a GenAI workshop, a factory visit, and a drone-human performance to accomplish our ends. My artistic practice with remote performances and envisioning machines from their own post-human perspectives formed a basis for students to think beyond themselves, and we incorporated this "what if I were machine" perspective all the way from the workshop to the visit to the performance. In turn we gathered from the students' creative outcomes that enable feedback regarding how to teach from an action-behavior-outcome perspective.

Technology is scary, especially when it's new and appears to do previously impossible things. Give us time. In time, we will begin to understand not just the way the technology works but, more importantly, the way we interpret and perceive the technology. Human-computer interaction and psychology research will ultimately provide us with a map that shows us how to interact with technology, and hence understand what limits we need to put on them. However, we need to be open-minded to the answers they give us. We cannot direct the research according to what we think is economically feasible, but rather we must let the research emerge based on our interactions and our needs for an empowering future.

Edwina Portocarrero

(MX) is a researcher, designer and educator working at the intersection of art, culture, technology, and social good. She was Associate Director of Design Research at Frog Design and co-founded Super Market, a design and creative technology production and consulting agency. Edwina obtained her Master's and PhD at the MIT Media Lab where she specialized in the design of tools for creative apperception that harness diversity in levels and vehicles of thought by leveraging ubiquitous computing, network technologies, and sensor networks, with the social, esthetic, and symbolic qualities of the built environment.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Tsinglan School, Shenzhen, China, Asia
Originally from: Mexico
Area: Natural Sciences, Mathematics and Data Science

● Vision statement
Edwina Portocarrero

It is difficult to say something new about the university of the future, but I think it is important to pay attention to the different levels of thought. Not only to those happening at a conscious level but also thoughts that happen when we least expect them sto, as well as different levels of thought and diversity of thoughts are important. Additionally, I hope that whatever digital systems we encounter will enhance physical connectivity.

Personal Perspective

Edwina Portocarrero

My research group at the Media Lab shared a floor with the Personal Robots group, led by Cynthia Breazeal. It was a large open space, filled with projectors, holographic systems, and robots. Robots that looked like what you imagine a robot would look like, with their sleek and shiny humanoid faces, torso, and long arms rolling around on wheels, robots that could have been characters from a Disney movie, robots that looked like Pixar's lamp, robots that were indistinguishable from teddy bears, and robots that reminded me of the bad nurse, Louise Fletcher, in *One Flew Over the Cuckoo's Nest.* The robots were mostly "asleep," and their presence during the many long nights spent in that space went from straightout creepy to comforting Sleeping Beauties. For better or worse, you never felt alone. The trove of them coming alive at night was one shared among all of us who worked in that space, and the occasion of their animation would prompt us to come out from our holes to behold.

But what do I know about robots? Nothing, really. I have never designed or programmed one, I have never worked with one or owned one. I broom my place and am as amazed when videos of robots that have much better control of their body than I do come around. I merely shared space with a bunch of electronic puppets that haunted and comforted years of my life all the same. But is it not that, what the experience of your regular consumer might be like in years to come? I guess the difference is that mine was much tamer, like an '80s movie where cell phones are not yet a thing, in this case, surveillance and artificial intelligence. Yet the objects are there, and a robot is still a robot is still a robot. Their presence is unlike anything or anyone, and the effect that has on one's day-to-day is an experience.

As for machines and tangibles, it was a challenge to even start thinking. So wide it was easier to start thinking about what is not. What per-

Patrick Münnich

spective did I bring to my chapter Machines, Tangibles, and Robots? My mind went to some of the times I cherished the most—the late-night gossip sessions had while cracking a bottle in someone's office, debating the work of our colleagues: Really? Robots with rights? Are kids being fooled, and does it matter? Is elderly care, when performed by a machine, actually care? Inadvertently at times and purposefully at others, I would be channeling or thinking through what I learned from my advisors at the time, Sherry Turkle and Edith Ackerman. Sherry holding up the proverbial mirror, Edith unveiling the net in which the particular and the general dance are dances of equal value, assimilation, accommodation, and the balancing act we are caught performing between them both. All in relation to, always in relation to.

I tried to be the water cooler in this chapter, to bring with me a piece of everyone I learned from, to expose and prompt, to set the stage. Sadly, I got Covid and could not be there in person during the second part. To the good fortune of my sore throat, and thanks to the fact that my virtual presence enabled the use of slides, I uttered perhaps less than what I have written here. The stage was the students, and the conversation jumped from one to the other like water drops in hot oil. I hope we have food for thought for years to come.

Nan Zhao

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Tulip Interfaces, Somerville, United States of America
Originally from: Germany, Europe
Area: Natural Sciences, Mathematics and Data Science, Machine Learning, Applied Arts

(DE) (PhD) is a machine learning scientist and media artist. As a machine learning scientist Nan Zhao leads the ML team at the MIT spinoff company Tulip Interfaces, where she develops technology for manufacturing. Prior to joining Tulip Interfaces, she co-founded the Smart City company Soofa. In her artistic explorations, Nan creates interactive multimedia experiences that often deal with questions about the human experience of nature and the nature of human perception. For Nan, technology is an opportunity to expand the human sensory network and to interact with our surroundings, buildings, and machines in new ways. She started her educational journey as an electrical engineer at RWTH Aachen University, where she graduated with honors. Driven by her curiosity for combining diverse fields of studies, engineering, science, design, and art, she earned her doctorate at the interdisciplinary MIT Media Lab. During her graduate research and later as a Research Scientist, she worked on smart building technology for improving energy efficiency and wellbeing.

● Vision statement
Nan Zhao

Much of my research has dealt with adaptive and responsive environments. My vision for the university is to also be adaptive and listen to the needs of students. It should also equip students with the tools to grow their impact in the world and encourage them to contribute back to the network and society that they built.

Personal Perspective

Nan Zhao

From a young age I have been fascinated with physics and math. I am drawn to the beauty of using mathematics and algorithms to describe complex phenomena and to perform actions that seem magical. My professional path started with higher education in the field of electrical engineering and information technology. The education in engineering gave me the tools to approach HOW to solve a problem and set me on a path to discover more about WHAT problems I want to solve and WHY they are important.

Pursuing my PhD and working as a Research Scientist at the MIT Media Lab, where research is not restricted to fixed academic disciplines, has deeply influenced my thinking and professional experience, which combines entrepreneurship, art, and research. When it comes to developing novel technology, one cannot be restricted to a single professional field. Famously, the American inventor Thomas Edison employed an interdisciplinary team that included experts in the area of glassblowing, clockmaking, and mathematics to develop the light bulb. It can be very fruitful, but it is not necessarily easy to work in an interdisciplinary research setting.

As a FOUNDING LAB Fellow, I brought my perspectives as a female startup founder, as a creative, and as a machine learning scientist to the students and to the discussion about the university of the future. Together with the other Fellows, Edwina Portocarrero, Ray LC, and Ars Electronica's Peter Holzkorn, we created a program for Chapter III of the FOUNDING LAB Fall Term that beautifully fuses all the different aspects of my professional experience in the context of machines and robotics. The program included looking at "machines today" through the lens of a business, thinking about "machines of the future" with exposure to academic research, and exploring the boundaries and relationships between human and machine through art.

My vision for the university is that it will equip students with the tools to answer WHY, WHAT, and HOW to address the issues of our time. I hope it will become a nurturing playground where ideas and talents flourish. This vision guided me through the design of Chapter III, where we created a balance of inspirations, discussions, hands-on activities, technical content, and reflections. It was important to me to enable the students to effectively develop their interests and skills by giving them a tangible challenge and a playful, collaborative, and agile learning environment.

Fall Term

Chapter IV

Interfaces & Visualizations. Intangible Worlds—The Reality of the Virtual.

November 26 - 29, 2023

In the fourth chapter of the FOUNDING LAB Fall Term, **Interfaces & Visualizations**, Fellows Dietmar Offenhuber, Jiabao Li, and Barbara Lippe addressed the interfaces between social dynamics and the representation of data in physical and virtual worlds. They questioned conventional notions of reality by changing perspectives and putting themselves in the shoes of other life forms such as animals. In an Animal Studies and Design workshop, they practiced co-creation, reflected on animal observations, and implemented these in multimedia performances. The students developed scenarios in which non-human realities interact, collide, or overlap, and finally presented interactive performances from an animal perspective with alternative forms of expression. The aim was to enrich the perception of the world through different perspectives and to promote a deeper understanding in an interconnected world.

Hosted by Fellows:

- Dietmar Offenhuber
- Jiabao Li
- Barbara Lippe
- Futurelab Catalyst Peter Freudling
- Futurelab Catalyst Peter Holzkorn

tom mesic

Jiabao Li

(CN) Jiabao Li creates works addressing climate change, interspecies co-creation, humane technology, and perceptions. Her mediums include wearables, robots, augmented reality, virtual reality, performances, scientific experiments, and installations. In Jiabao's TED Talk, she uncovered how technology mediates the way we perceive reality. Jiabao is a Tenure Track Assistant Professor at The University of Texas at Austin. Her lab explores the intersection of art, design, technology, and biology. She graduated from Harvard GSD with Distinction and a thesis award. Jiabao is the recipient of numerous awards, including Forbes China 30 Under 30, iF Design Award, Falling Walls, NEA, STARTS Prize, Fast Company, Core77, IDSA, A' Design Award, Webby Award, and Cannes World Film Festival Best VR short Award. Her work has been exhibited internationally, at Venice Architecture Biennale, MoMA, Ars Electronica, Today Art Museum Biennial, SIGGRAPH, Milan and Dubai Design Week, Ming Contemporary Museum, ISEA, Anchorage Museum, OCAT Contemporary Art Terminal, CHI, Museum of Design, and Alaska State Museum. Her work has been featured on Fast Company, Art Forum, Business Insider, Bloomberg, Yahoo, South China Morning Post, TechCrunch, Domus, Yanko Design, Harvard Political Review, The National, and Leonardo.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: University of Texas at Austin, United States of America
Originally from: China, Asia
Area: Applied Arts

● Vision statement
Jiabao Li
Embracing interdisciplinary learning and transcending boundaries, the new university pioneers a harmonious bond with nature, nurturing curiosity, play, and lifelong experimentation to drive sustainable and equitable futures for all.

Personal Perspective

Jiabao Li

As an interdisciplinary innovator and artist, my journey has been driven by a fascination with the intersection of technology, design, and the natural world. In my TED talk "Art that reveals how technology frames reality," I unveiled the inherent bias of digital media and how technology mediates the way we perceive reality. Designs are used to exploit our unconscious biases. Algorithms favor content that reaffirms our opinions so that we stick to the platform, and every corner of our field of view can be colonized to sell ads. I created a series of perceptual machines called *TransVision* to expose this deception and web plugins to train our perception.

My perspective is profoundly influenced by the concept of varied realities. I believe that our experience of reality is shaped by our Umwelt, our biases, and the digital environments we engage with, a theme we explored in Chapter IV of the FOUNDING LAB program. This chapter delves into digital worlds and their diverse inhabitants, ranging from humans and animals to inanimate objects and perhaps even extraterrestrial beings. Data molds our perception of the world, while interfaces dictate our engagement with it. Our understanding of the world is shaped more by interaction than mere observation. Technological interfaces act as extensions of our physical selves, altering our interactions with our surroundings. These interfaces are built upon various presumptions regarding physical abilities, cultural norms, and cognitive patterns. The chapter probes the influence of digital construction on our experience and perception of these varied realities.

In my four years at Apple, a significant portion of my efforts was dedicated to the Apple Vision Pro, a testament to the evolution of spatial computing and mixed reality technologies. This venture into the realm of augmented realities blurred the lines between the digital and the physical. While designing seamless interactions, my work also raised critical questions about the intent and consequences of these technologies. Why were they created, and what paths are they leading us down? My focus extended to the effects on human physiology, psychology, and the potential for digital deception.

As the founder and director of the Ecocentric Future Lab (www.ecocentricfuture.com) at the University of Texas at Austin, I am leading the charge toward a new paradigm that shifts our perspective from human-centered, EGO-centric, and profit-driven post-industrialist thinking to a multi-species, ECO-centric worldview. In the face of the Anthropocene's devastating effects, our mission is to fundamentally transform the way we perceive nature and rethink the hierarchies of intelligence, fostering a more harmonious relationship with our environment and other forms of life. My work embraces the vast array of intelligences beyond our own. Squid Map re-examines human-made maps from a squid's perspective. Mouse Coach gives control of our health into the hands of a mouse. To forge meaningful collaborations, we must go beyond passive observation and deeply understand the intelligence, behavior, and agency of other species. We need to respect, learn, connect, share the Umwelt, and embody each other's experiences.

In the realm of healthcare, I am passionate about democratizing access to medical data and empowering individuals to take charge of their health. I co-founded two startups. *Endless Health* (www.endless.health) helps individuals identify their risk levels in heart health and metabolic health via accessible testing, live coaching, and easy progress tracking, empowering them to take preventive measures and maintain good cardiovascular health. *Snapi Health* (www.snapihealth.com) detects nutrient deficiencies in babies through the analysis of variations in the infant's microbiome and provides valuable insights for parents to make informed decisions. I explore understudied specimens such as menstruation, where we've identified unique proteins in menstrual blood that could revolutionize healthcare. This research not only challenges existing medical paradigms but also raises critical questions about body politics and the future of personal health autonomy.

My chapter in the FOUNDING LAB program is an amalgamation of these experiences and insights. It reflects my commitment to exploring the boundaries of technology, design, and nature, and my dedication to fostering a future where human and non-human entities coexist in harmony and mutual understanding.

Barbara Lippe

(A T) is a metaverse pioneer having art-directed one of the first 3D online societies made in Europe in the early 2000s. She created avatars and virtual beings in Tokyo before turning into various characters herself as a professional actress in London. As Head of Curation for Europe's leading video game industry and VR conferences, she summoned her extensive network to inspire and motivate. In 2014 she founded an award-winning XR production studio experimenting with drama and story worlds in VR before co-founding Holodeck VR to develop large, freely walkable multiuser VR environments. She holds a PhD in game studies and gives lectures around the globe.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Austria, Europe
Originally from: Austria, Europe
Area: Applied Arts

Patrick Münnich

● Vision statement

Barbara Lippe

The University of the Future is the university of the heart. It is an important building block towards the global awakening of our species.

Its purpose: to stop this planet from dying. The method: through play, arts, and a holistic, inclusive mindset to educate the hearts first, so the power of technology is ensured to be in the right hands later.

Dietmar Offenhuber

Role: FOUNDING LAB Fall Term—Fellow

Based in: Northeastern University, Department of Art + Design, Boston, United States of America,

Originally from: Austria, Europe

Area: Information Design, Urban Affairs

(AT) is Professor and Chair of Art + Design at Northeastern University in the areas of information design and urban affairs. He holds an MS and a PhD in from MIT (Medialab & Urban Planning). His research focuses on the relationship between data and design in the social context. Dietmar is the author of the award-winning monograph *Waste is Information* (MIT Press) and has published books on urban data and accountability technologies. His new book *Autographic Design—the Matter of Data in a Self-inscribing World* examines material visualization practices and the production of evidence.

● Vision statement

Dietmar Offenhuber

A new university should not be driven by any new shiny topic, but by the commitment to a radical approach to research and learning attuned to the interconnected and multifaceted nature of today's challenges. It is less about being interdisciplinary, more about creating an intensively collaborative environment that brings different cultures of knowledge, perspectives, and positionalities together.

Media. Fake, Re-check, Double Check—A New Civic Media Contract in the Age of AI.

January 17 - 20, 2024

In chapter V of the FOUNDING LAB Fall Term, **Media**, students examined the incentives, tactics, and mechanisms of online news construction and dissemination. Topics covered included the distortion of truth for clicks, identity, and audience influence, and the limits of fact-checking and AI synthesis. In a speculative future environment, students created 30-second videos about their projects at four stations under the guidance of the four Fellows, Ziv Green Epstein, Sarah Kriesche, David McDonald, and Umlilo Siya. The stations focused on identity and micro-targeting, the science of disinformation, the use of AI and language translation to manipulate truth, and the art of storytelling. The result are 96 videos combined into a single video montage in a joint synthesis session and presented at the Ars Electronica Center's Deep Space 8K.

Hosted by Fellows:
- Sarah Kriesche
- David McDonald
- Umlilo Siya
- Ziv Green Epstein
- Futurelab Catalyst Nico Naveau
- Futurelab Catalyst Denise Hirtenfelder

Sarah Kriesche

(AT) works as a journalist for the Austrian public radio station Ö1, covering the progress of IT in industry, economy, research, and politics. Highlights of her professional career include her work on the ORF radio program *Nachbar in Not (Neighbor in Need,* which reported current events in Southeastern Europe in 1999 in six languages (on short and medium wave). For her radio series *Vielfalt in Wien* (portraits of Viennese individuals who also have cultural roots in other countries, showcasing how this cultural togetherness enriches the city and its quality of life), she received the *Prälat Leopold Ungar Anerkennungspreis*. Her feature *Zeitreise Überwachung* (covering the history of surveillance in Austria) won the Hamburg *Surveillance Studies Prize* in 2017. Currently, in the science department of Ö1, her focus is on technical innovations and their impact on society.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Ö1 – ORF, Austrian Broadcasting Corporation, Vienna, Austria, Europe
Originally from: Austria, Europe
Area: Science and Technology and their impact on society

● Vision statement
Sarah Kriesche
The University of the Future blurs the lines of traditional disciplines through digitalization, leveraging technology like data analysis and AI to enrich various fields. Guided by principles of ethics and transparency, it aims to address global challenges in a dynamic, interconnected educational landscape.

Patrick Münnich, Denise Hirtenfelder

David Michael McDonald

Role: FOUNDING LAB Fall Term—Fellow
Based in: Australian Broadcasting Corporation, Sydney, Australia
Originally from: Australia
Area: Applied Arts

(AU) is a creative sound designer at the Australian Broadcasting Corporation (ABC) in Sydney, Australia. He has worked as a producer and a composer and musician on a wide variety of programs and projects across content platforms including terrestrial and digital radio stations, podcasts, TV, and apps. Recently, David has been working with Microsoft on the ABC's machine-learning generated synthetic voice and using LLMs to generate aural weather reports for radio. He is passionate about the power of audio in all forms to tell stories and communicate emotion and relishes the opportunity to experiment and collaborate with artists on new ways to envisage the future.

● Vision statement
David Michael McDonald
The University of the Future will be unapologetically experimental, intellectually dangerous, and fundamentally exciting. It will cross-pollinate between fields and disciplines and grow strange and exciting hybrids that will bloom into research and real things that no one has dared to imagine before.

Personal Perspective

David Michael McDonald

Hi I'm David, I'm a Creative Sound designer for the Australian Broadcasting Corporation (ABC), which is Australia's Public Broadcaster (like the BBC in the UK or the CBC in Canada). We operate 68 radio stations and seven TV stations and a slew of on-demand media services/apps. I work for our internal creative agency (ABC MADE) looking after all the work that ABC has to do. It is enough to keep any agency busy so we built our own and there I try to make all the ABC's stations, shows, and products sound their very best.

I've been working with our innovation lab over the last few years using AI virtual voice techniques to bring more of our news and entertainment to people in different ways. And recently we've been working on a weather report system that will take live weather data from the government-run Bureau of Meteorology and generate up-to-the-minute personalized reports in radio programs for anyone listening anywhere in Australia.

Outside of my work for the ABC I've been involved with many fun creative tech projects like *Jafflechutes* (the world's first pop-up-float-down sandwich delivery service),

Patrick Münnich, ABC, Jafflechutes, Snackade, Father Bob Sings for a Million

Snackade (the snack dispensing arcade game),

or fundraising for the homeless by using lots of tricky edits to help a 78-year-old Catholic priest cut a record of hip hop and pop music covers.

This coming year I'll be particularly focused on how AI will impact the numerous big elections happening around the world. And I'm very excited to start work on an exciting project sonifying spectator sport for vision impaired people.

It's been an honor and a pleasure to have been a IT:U x Ars Electronica FOUNDING LAB Fellow. As part of the Media Chapter, we've thought deeply about how meaning and truth is generated in a post AI age and how things will continue to change rapidly for the foreseeable future. In discussion with the other fellows (coming from an even wider set of backgrounds) I've come to feel how vital it is that all of us in society approach this changing world with imagination and new ideas. We must find new inspiration and new energy to answer new questions, looking for solutions either from our own disciples or from others, to find solutions to very new problems.

Umlilo Siya

(ZA) Intergalactic shape-shifting kwaai diva Umlilo is an innovative genre and gender-bending multi-disciplinary artist in music, fashion, 3D animation, VR, visual art, and performance. She is the founder of Future Kwaai Records and co-founder of LeGrand Queer Arts Festival and the fashion label Kwaai Boutique. Her work is rooted in the Black and queer experience and tries to foster conversation and exchange with local and international communities and artists. She has collaborated with and facilitated cultural exchange projects and residencies all over the world including Brazil, USA, Switzerland, and Germany.

Role: FOUNDING LAB Fall Term—Fellow
Based in: Freelance Artist, Johannesburg, South Africa, Africa
Originally from: South Africa, Africa
Area: Humanities, Applied Arts

● Vision statement
Umlilo Siya
The University of the Future can be a global beacon that celebrates diversity and inclusion, actively engaging in the process of decolonization. This institution will prioritize innovation, encouraging boundary-pushing imagination while fostering a sense-making culture. Grounded in community values, the university will strive for excellence, shaping a space where individuals from various backgrounds contribute to a holistic and enriching learning environment.

Ziv Green Epstein

(US) Ziv Epstein is a computer scientist and designer, currently based at Stanford University. He seeks to bring a (more-than-)human-centered approach to the design of sociotechnical systems. In particular, he focuses on translating insights from design and the social sciences into the development of generative AI and social media platforms. His work has appeared in journals like *Nature, Science* and *PNAS*, as well as top-tier computer science proceedings like CHI and CSCW. He is also a practicing multimedia artist whose work has been featured in Ars Electronica, the MIT Museum, and Burning Man.

Role: FOUNDING LAB Fall Term—Fellow
Based in: Stanford University, Stanford, United States of America
Originally from: United States of America
Area: Natural Sciences, Mathematics and Data Science

● Vision statement
Ziv Green Epstein
The University of the Future is a place-based, practice-oriented, human-centered crucible for fostering the creativity that enables innovation and transformation. By supporting both technological makerism but also critique, ethics, and the arts, the University will be a hub connecting schools, departments, and cultures across all of Europe and beyond.

A Grid-based Curriculum Framework for a University of the Futures

Proposed by Ziv Green Epstein at IT:U x Ars Electronica FOUNDING LAB Forum

In this design brief, we introduce the core elements of a grid-based framework for a new university tasked with equipping its students with skills to navigate a rapidly-changing and precarious world. The framework offers a project-based, multidisciplinary pedagogy engaging stakeholders across society while providing depth in core areas of study. We introduce the curricular pillars, the stakeholder engagement model, the course and degree structure which connects those two, and conclude with several prototypical student journeys through the program.

Introduction

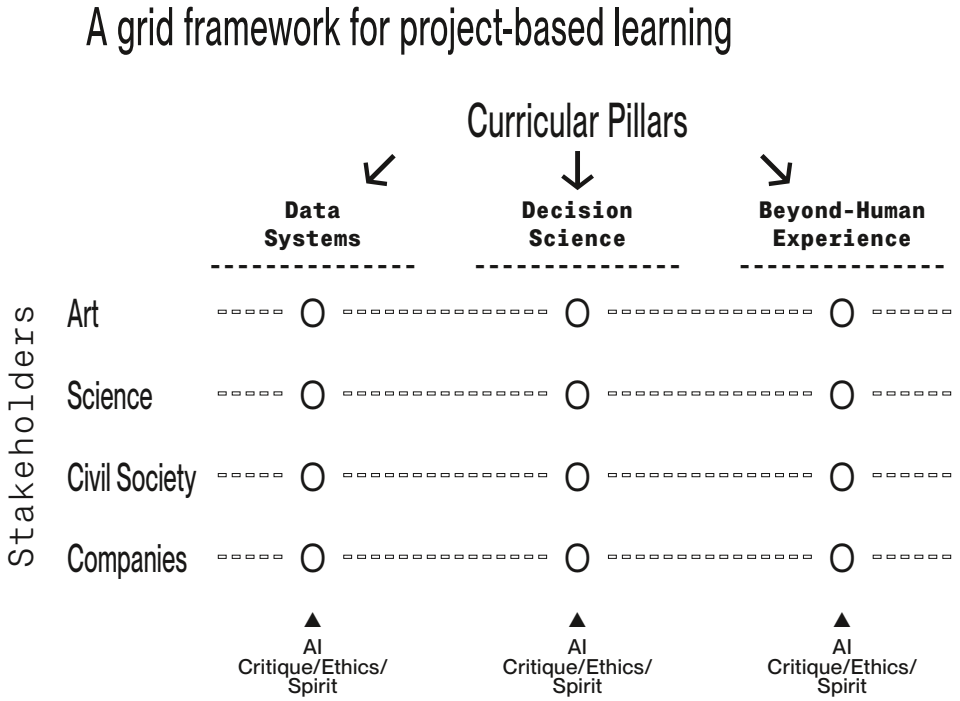
Welcome to the University of the Futures. The world has become more precarious, uncertain, and complex with the societal impacts of generative AI, the widespread erosion of trust in institutions, and the ongoing climate crises. Yet at the same time, new modes of collective action and creative problem-solving have sparked a constellation of hopeful north stars for institutional reform and ecological renewal. This university has provided students with the skills in making and in critical thinking in order to survive and thrive across these many plural futures. Here, students wrestle with the thorniest complex

Patrick Münnich

problems of their time across civil society and industry, fostering out-of-the-box thinking that has a real world impact.

How does this work? What's the structure for this university? In this design brief, we introduce a grid framework for project-based learning. In particular, we highlight the stakeholder engagement model that solicits multi-faceted projects for students to work on, as well as the curricular pillars scaffolded by existing disciplines. We discuss how these intersect at the unit of a term course, and several threads that crisscross this grid structure. Finally, we conclude with several prototypical student journeys to demonstrate how the grid accommodates varied experiences of a diverse student population.

This is a living document that highlights a speculative proof of concept developed by the FOUNDING LAB Fellows at Ars Electronica. Much remains to explore.



Curricular pillars

A university that does not draw on the rich intellectual traditions woven by various academic disciplines is throwing out the baby with the bath water. The curricular pillars of the university of the future are grounded in disciplinary scholarly traditions to not only enable high-impact publication and knowledge production but also to foster recruitment and partnership from other universities with more traditional departmental structures. However, the unique crisscrossing grid framework removes the walls between disciplines and allows for fluid interdisciplinary collaboration.

The three curricular pillars are:

- **Data Systems**—this technical pillar comprises computer science and related topics of electrical engineering. Students learn about data structures, algorithms (complexity and design), databases, linear algebra and probability, web development and data mining.

- **Decision Science**—this social science pillar comprises psychology, behavioral economics, and computational social science. Students learn about behavioral modeling, survey design, construct validity, judgment and decision making, cognitive heuristics and biases, and collective intelligence.

- **Beyond-human Experience**—this qualitative pillar comprises design. Students learn about user experience and user interface design, complex systems thinking, tools for organizing and collective action, leadership, impact analysis, multi-species design, and policy.

Critical to each pillar are two foundational layers: AI and critique/ethics/spirit (CES). AI refers to the use and practice of generative and predictive AI technologies, which have increasingly become integrated in and crucial to many aspects of society. CES refers to critical interrogation of harms, biases, and externalities related to the pillar, as well as the potentials for liberation and emancipating alternatives, and is rooted in the humanities such as science and technology studies (STS) and history. How AI and CES are taught varies from pillar to pillar, but because they are required for each, they are both a mandatory part of the entire curriculum.

Stakeholder engagement model

Leveraging a unique network of connections and relations across society, this university has a unique stakeholder engagement model that sources projects for student participation. These varied stakeholders submit project proposals that, if accepted, become partnership models that constitute the courses. The four stakeholder groups are: 1) art 2) science 3) civil society and 4) companies. Each is described in more detail below.

- **Art**—tapping into the network of world-class artists from Ars Electronica, artists can apply to have students develop their artistic practice.

- **Science**—attracting world-class professors from across the world, the university accepts proposals from researchers engaged in scientific inquiry. This ranges from physics, chemistry, biology, medical engineering, psychology, political science, computer science, and climate science.

- **Civil Society**—fostering connections with local organizations, initiatives, and administrations, the university accepts proposals that are interested in advancing civil society. This has an emphasis on transportation, mobility, and urban planning but also can include public sector organizations, nonprofits, and cultural institutions.

- **Companies**—seeking to understand how their business logics will be disrupted by precarious times, companies can partner with the university for consultation and innovation. Rather than outsourcing the development and production of their product, this is designed for companies interested in "futurecasting," seeing what the future may have in store for their context and how they must adapt their products and policies.

To engage the university, a stakeholder puts forward a proposal for three modules that align with the three curricular pillars of the university: I) data systems, II) decision science and III) beyond-human experience. They also articulate the societal benefit of their project.

The university has a unique funding structure. If a stakeholder proposal is accepted, that stakeholder also pays. The cost of acceptance is tiered so that companies pay the most (and are capped), civil society organizations like cities and scientific ventures pay less, and artists pay little or nothing. In return for their investment, stakeholders have access to the intellectual property generated from the coursework, a recruitment pipeline, and access to an exclusive twice-a-year event for networking and sharing.

Proposals are selected based on two criteria: their connection to the curricular pillars and their societal benefit. Companies can pay larger sums (which in turn can subsidize other stakeholder projects) and therefore justify that as a societal benefit, but the number of company projects is capped at 30% and only companies whose values align with the university are allowed to participate. The committee for project selection is composed of faculty, students, and a few selected external experts.

Course and degree structure

There is a single major degree in this program, but each student can choose one of seven approaches as a specialization, which correspond to the three pillars plus the four stakeholders. For example, a student might specialize in the pillar of data systems, or they might focus on the horizontal stakeholder of the companies (see the Student journeys below).

The two-year master program comprises four terms (spring and fall), and in each term students take two classes. Of these eight courses, six must be relevant to the student's chosen specialization (depth requirement) and two must explicitly deviate from their chosen specialization (breadth requirement).

At the start of the term, students select a point on the grid (e.g. data systems for art), which constitutes a course. The 16-week term is constructed as follows. It includes once or twice a week lectures on the pillar. These larger lectures can be grouped with other students in points engaging other stakeholders via the same pillar. It also includes once or twice a week studio recitations focusing on that gridpoint where students translate the lessons from the recitation to their project. Projects at a given gridpoint are shopped by students in the second week of the term.

In order to ensure cross-pollination across pillars for a given project, twice a term (week 7 and 16) students working on the same project but across pillars (e.g. data systems for art, decision science for art, and beyond-human experience for art, all working on an accepted proposal for a particular potentially Ars Electronica-related project) convene to share their term work and engage in critical reflection.

Student Journeys

Joan wanted a traditional, accredited computer science education that taught her to code. Her concentration was Data Systems and during her master's degree, she worked on developing the backend system for an artistic project that mines Twitter for political content (data systems for art). She also developed a predictive model for drug discovery, working in a project in collaboration with researchers at John Hopkins University (data systems for science). She built a network visualization interface on all the trains in Linz, highlighting routes that are underserved, in collaboration with the local department of transportation (data systems for civil society). She worked on building a data pipeline for a self-driving car project for Toyota, where they were interested in detecting wildlife that passes in front of cars (data systems for companies). After graduation, she gets a software engineering job at Google.

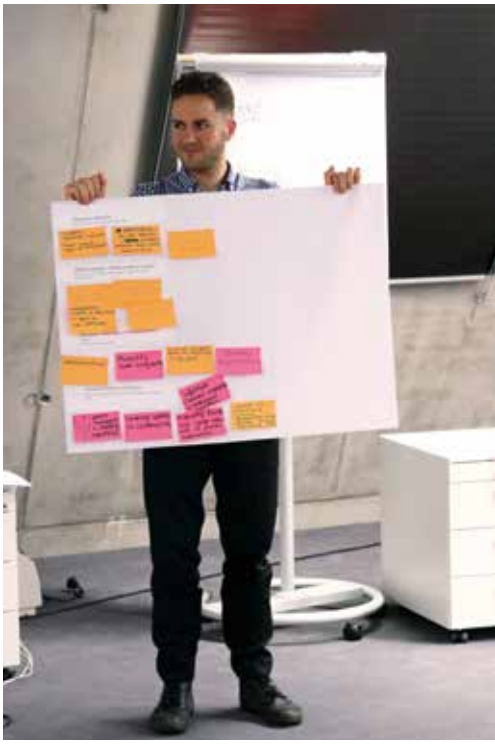
Njeri was interested in a design degree that tackles contemporary and future challenges. Their concentration was Beyond-Human Experience and during their masters degree, they collaborated with the Institute for the Environment at Johannes Kepler University and developed a VR experience to teach elementary school kids understanding and empathy towards the non-human (beyond-human experience for art). They also helped with the research design of urban wildlife tracking across major Indian cities (beyond-human experience for science). In collaboration with EXIT, a local non-profit focused on psychosocial care, Njeri built a website that would match emotional support pets with potential patients (beyond-human experience for civil society). As their final project, they co-developed a tailored large language model for Spotify (beyond-human experience for companies). After graduating, they built on the connections they made at EXIT and got a full-time job as a designer there.

Digital Society & Policy. Tech-diplomacy—Movements and Mobilities among Nature, Tech, and People.

January 21–24, 2024

In chapter VI of the FOUNDING LAB Fall Term, **Digital Society and Tech Diplomacy**, focused on how movements and mobilities between nature, tech, and people create conflict and cooperation. The Fellows Julia Kloiber, Alex Putzer, Lukas Fuchs, Kamya Ramachandran, and Elisabeth Windisch structured the chapter in three parts: After constructing narratives for the future of movements and mobilities based on science fiction imaginaries, a subsequent deconstruction and analysis of the underlying visions and values helped to broaden the spectrum of possibilities. This was followed by a mapping of stakeholder conflicts and cooperations. Building on more-than-human experiences from previous chapters, the task here was to move beyond species boundaries and recognize unconventional stakeholder compositions. In the final part, the students and fellows explored strategies to navigate these complexities. With insights from international policymaking, the students learned how to juxtapose diverging interests and approximate consent. How do we imagine a world that acknowledges dynamic diversity while creating a sophisticated outlook for future co-existences?

Hosted by Fellows:
- Julia Kloiber
- Alex Putzer
- Lukas Fuchs
- Kamya Ramachandran
- Elisabeth Windisch
- Futurelab Catalyst Cyntha Wieringa



Lukas Fuchs

(AT) , based in the Netherlands, is a post-doctoral research fellow in philosophy at Eindhoven University of Technology. The main drive for his work is the desire to develop a vision for societal change and to realize it through research, teaching, and societal engagement. He works on political philosophical questions arising from the interactions between policy, markets, universities, and civil society in innovation. His current 3-year research project *Understanding responsibility in the ecosystems of technical universities* is part of BoostEuroTeQ, funded by the European Commission (Horizon 2020). He received his PhD from University College London (under the supervision of Prof. Mariana Mazzucato) and an MPhil and a BA in philosophy from the University of Cambridge.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Eindhoven University Of Technology, Netherlands, Europe
Originally from: Austria, Europe
Area: Humanities

● Vision statement

Lukas Fuchs

I think the integration of the new university in society is a very important issue to address. This is not going to be a university with researchers in a back room, writing papers that nobody reads, as Stephanie, our founding president, said. We need to think about how we collaborate and the attitudes of approaching this. I propose that we look back to the work of Wilhelm von Humboldt who thought about this topic 200 years ago when the University of Berlin was founded. Humboldt thought that the university should be a partially protected space in society which is all about "Wissenschaft" [science], the creation of new knowledge, diving deeper into what we can't understand. I think we should collaborate with policy makers, industry, arts, and civil society, interact and be there. The primary goal and logic with which we do that should be science and understanding. Humboldt promises, that if we stay true to that vision, we will be able to make use of very different levers and help society in very different ways.

Personal Perspective

Lukas Fuchs

Idealists and philosophers are drawn to blank slates. The opportunity to build something completely new, something that corresponds to a coherent and well-developed idea kindles one's imagination much more than the arduous task of reforming and updating and tweaking an existing structure. Let's start a new university! Joining the IT:U x Ars Electronica FOUNDING LAB program was a great privilege for me because it allowed me to work with students, fellows, convention members, and the university president who all shared this idealistic spark; not just to combine the best practices of the universities we know, but in addition to create something novel, something unique that can be a beacon for a new vision of what a university can and should be.

I have spent the last two years conducting research about the role of universities as part of my postdoctoral research fellowship at TU Eindhoven. Eindhoven is the Linz of the Netherlands. A city with a proud industrial past (the former headquarters of the electronics giant Philips), it went through a period of deindustrialization. It has since then re-oriented and diversified its ecosystem and today hosts Europe's most valuable technology company on its outskirts. The local technical university, one of the most successful in the world in terms of industry collaboration, has been part of this structural transformation. As a result, researchers are highly attuned to questions about their role as part of this ecosystem and the wider society.

This experience and the resulting research about the idea of the university grounded the perspective I could bring to discussions at the IT:U x Ars Electronica FOUNDING LAB Forum. There, I argued for the importance of deep connections with the local industry, public sector, and civil society in Linz and Upper Austria; while at the same time protecting and advancing what distinguishes universities from other organizations in society, which is, according to the Prussian scholar Wilhelm von Humboldt, their commitment to "Wissenschaft und Bildung" (science and higher education). A first commitment to science and higher education must be woven into the fabric of the new university in order to protect it from the danger of becoming instrumentalized and reduced to serving foreign purposes, such as economic profit, political fashion, or academic vanity.

In the FOUNDING LAB Fall Term, I taught in chapter VI, **Digital Society & Policy**. Together with my excellent colleagues, I made students consider the different views and visions that citizens have on the future of digital society, how these diverging visions can create conflicts, and how policy can be a space for navigating and overcoming some of these conflicts. My own contribution to the chapter was to discuss the potentials and limits of *mission-oriented innovation policy,* a model for societal transformation which was highly influential both in Austria and in the EU in the last years. In this new model, the role of the state goes beyond the mere fixing of markets and provisioning of public goods mandated by economistic reasoning; instead pursuing ambitious missions to address grand societal challenges. In my teaching, I could draw on my previous research at University College London (UCL) where I conducted a political philosophical examination of this paradigm shift in policy making.

I am excited to see the new university unfold and become a space for people to meet, to discuss, to learn, to be curious, to be skeptical, to collaborate, and, eventually, to change the world!

Patrick Münnich

Julia Kloiber

(AT) is an esteemed digital expert whose work lies at the crossroads of technology and society. As the Managing Director and co-founder of Superrr Lab, a trailblazing feminist technology organization, she has been instrumental in spearheading various initiatives and organizations with a strong emphasis on promoting public interest in tech and digital public infrastructure. She has co-founded transformative projects such as the *Prototype Fund,* a public open-source fund, and the influential network Code for Germany. Julia's expertise and influence extend to advisory roles in the realm of digital strategies and tech policy. She serves on the advisory board for the Federal German Digital Strategy and is an integral part of the Digital Service 4 Germany. Driven by her commitment to a just and fair digital future, Julia Kloiber continually explores innovative avenues and solutions that bridge the gap between technology and society. She writes a monthly column for the MIT Technology Review Germany.

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Superrr Lab, Berlin, Germany, Europe
Originally from: Austria, Europe
Area: Natural Sciences, Mathematics and Data Science, Humanities

● Vision statement
Julia Kloiber

The University of the Future is not yet another elite institution for higher education for the privileged few. The University of the Future is free, transnational, and endorses pluralistic thinking. It is a space for critical reflection and creative practices that actively question the commodities of knowledge, power, and politics. It champions critical engagement with pressing global issues like the climate crisis, poverty, and widening social disparities.
The University of the Future helps to pave the way for futures rooted in justice, inclusivity, and sustainability.
The University of the Future, a nexus for collective imagining, learning, and action requires a solid foundation ensuring equity and access for all.

Personal Perspective

Julia Kloiber

"Tell me ten reasons why the world will end tomorrow," artist Steve Lambert asks the audience from the stage at the re:publica conference. Within a mere two seconds, the first hands shoot up. Suggestions range from a flood, nuclear warfare, or a meteorite collision to an AI-driven killing machine emanating from every corner of the hall. Each response is swiftly recorded on a blackboard. In under two minutes, the board is completely filled. Steve then seizes the microphone and poses another question: "Provide me with ten reasons why the world will be saved tomorrow." The audience falls into a stunned silence, punctuated by sporadic laughter. Gradually, a single hand rises... I frequently catch myself contemplating that crucial moment: Why is it easier to imagine the world's demise than envision a thriving, prosperous world? Our lives have, after all, consistently advanced over recent decades. Yet, why do we maintain such a bleak outlook on our future? Insights from cognitive science offer one explanation: Humans possess an innate attraction to catastrophe. There's a certain allure in dystopian narratives for us. Their simplicity and conservatism resonate with us, as they tend to focus on preserving what we already possess.

We are living in a time of multiple crises: the climate crisis, wars, and a multi-year pandemic. There's a lot on our minds. We are constantly

busy averting damage, preventing the worst from happening. As a result, the majority of our future scenarios are based on damage limitation, not on bold utopias.

This is also true for the digital transformation. A field that I have been working in for the last decade. Activists, researchers, civil society, and politicians have failed to craft alternative visions of digital futures. Visions that emphasize societal well-being over corporate interests.

This crisis of imagination leaves us bereft of answers to crucial questions: What do hopeful futures look like, ones where we've surmounted the climate crisis and AI hype? What new freedoms must we attain? Envisioning a fulfilling life in 20, 50, or 100 years, what steps must we take now to lay the foundation for sustainable and equitable futures? To challenge the dominant tech corporation narratives, we need to craft visions of just, hopeful, and diverse digital futures—narratives so compelling and optimistic that they can transform into self-fulfilling prophecies. Futuring methods, crucial for collective imagination processes, are indispensable for policymakers, scientists, artists, and educators.

In recent years, my work has focused on unraveling the complexities inherent in futuring processes, advocating for embracing these complexities instead of simplifying them. I've experimented with methods that facilitate the joint development of preferred futures among diverse groups. My involvement with the FOUNDING LAB has enabled collaborations with fellows and students from a wide array of disciplines and cultural backgrounds, fostering joint speculation on preferable digital futures. This collaboration is rooted in a deep commitment to comprehending and deconstructing the narratives that shape our perspectives, with the goal of collectively crafting new visions anchored in feminist values of equity, care, and sustainability. Our endeavor goes beyond merely predicting future possibilities; it is about actively shaping them through inclusive and ethically guided methodologies.

Alex Putzer

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Sant Anna School of Advanced Studies, Pisa, Italy, Europe
Originally from: Italy, Europe
Area: Life Sciences, Humanities

(AT) Alex Putzer wrote his dissertation on the Rights of Nature in Cities at Sant'Anna School of Advanced Studies in Italy, with affiliations at MIT, UPenn, and The New School in the United States. He has taught at the University of Amsterdam, the Netherlands, and the University of Applied Arts in Vienna, Austria. As a United Nations Harmony with Nature Expert and member of the Global Alliance for the Rights of Nature Academic Hub, Alex employs multiple strategies to develop his field. As a Fulbright-Schuman Visiting Scholar at New York University, he explores how novel rights regimes influence urban policymaking.

Patrick Münnich

● Vision statement
Alex Putzer
The University of the Futures not only dilutes the boundaries between but also beyond disciplines.

It should use its privileged position to both build and be part of a better world for all, or, to say it in the words of Schelling: “learn only in order to create”.

Personal Perspective

Alex Putzer

Universal Universities

In a world of wars and worries, environmental and economic crises, as well as structural and social upheavals, universities remain one of the few places where nuanced conversations on possible futures can be held. With the same etymological root as ‘universe’, its aim and imperative remain to include it all, the whole, the entirety of perspectives and opinions, and weigh them against one another.

Upon reading the vision of the IT:U x Ars Electronica FOUNDING LAB—especially the importance their founders put on interdisciplinarity mixed with a timely awareness of digitalization and its transformative effects on science, art, society, and the economy—I was immediately convinced that I wanted to be part of this journey. Navigating through it would entail exploring ever-new fields of knowledge as well as meandering through intentional and serendipitous encounters and means of co-creation. My contribution to this collaborative endeavor stems from my expertise in the field of rights of nature. This ethical and legal idea perceives not only animals but also rivers, mountains, and entire ecosystems as rights holders with value independent of human interests. As such, a river is protected for its own sake, rather than, among others, its instrumental one as a generator of electricity, provider of fish, or means of transport. Given that the theme for the FOUNDING LAB is a question of “Who owns the truth?”, following rights of nature thought, I came to analyze it as ”Who is asking?” and “Who is addressed?” Are all relevant stakeholders considered or even acknowledged?

Rights of nature are part of the wider posthuman turn, where truth has to be decided among non-human, more-than-human, and human stakeholders. It is the result of a negotiation between nature, tech, and people. As part of my scholarly work, I am combining rights of nature with a variety of other disciplines, stakeholders, and topics, always aiming to break new ground on the way.

My dissertation, for once, looks at rights of nature in cities. I have also written on rights of nature in combination with renewable energies and generative AI. As a former UNESCO Chair Fellow in Interdisciplinary Anticipation and Global-Local Transformation and a future Fulbright-Schuman Scholar, I look into and expand on the activism and policy potential of my extensive empirical and theoretical research. Having furthermore co-created and taught two seminars on the juxtaposition of nature, tech, and people, I was happy to join my fellow fellows in Chapter VI on digital society and policy and, together with the students, explore how to deconstruct narratives, understand conflicts, and navigate complexities of a multi-stakeholder reality. My counter-mapping exercise, in particular, aimed at creating a distinct consciousness regarding the difficulties yet inevitabilities of taking everyone and everything into both ethical and legal consideration.

One of the most famous quotes in environmental ethics is Leopold’s imperative to learn how to “think like a mountain.” Pelizzon and Ricketts reframe it as a necessity to “rethink the mountain.” I claim that the key is to “rethink the relationship with the mountain.” There is no need to own the entire truth. It has never been. Each part of the universe only owns part of it. These partial owners have to negotiate it. A next-generation university focusing on digital transformation can be a crucial component of such a negotiation process—especially if it considers not only human, but also non-human, and more-than-human perspectives.

Ramachandran Kamya

Role: FOUNDING LAB Fall Term—Fellow
Based in: BeFantastic, Singapore, Asia
Originally from: United States of America
Area: Humanities, Applied Arts

(US) is a trained architect, researcher, and design educator with career experience spanning multiple geographies from the UK, USA, India, and most recently Singapore. She has helmed Bangalore's premier Art organization Jaaga, with a focus on its tech art and public arts & design programs since 2014. This led to her current position as the Founder-Director of BeFantastic as well as Festival Director & Co-Curator of Bangalore's TechArt Festival series, the latest of which is FutureFantastic.in. Kamya is passionate about convening and engaging diverse collaborative communities for a better world. With a keen eye for conceptualizing and manifesting programs with socio-environmental themes at its core, Kamya is adept at engaging a variety of stakeholders ranging from government and academia, non-profits and corporates, to artists and audiences alike.

● Vision statement
Ramachandran Kamya
In an era when machine intelligence holds the promise of catering to more than just the mundane, we humans need to be sensitive, nuanced, and sophisticated in thought and action.

A University of the Future must present the potential of experiential learning that is interconnected and holistic, leveraging the intensity of discipline and creating space for other ways of knowing, for diverse communities to contribute their knowledge in co-creating our combined global future.

Personal Perspective

Ramachandran Kamya

I am the Founder Director of BeFantastic, an organization established in the geographies of South Asia (Bangalore, India) and South East Asia (Singapore). We have been a front runner at crafting the nascent ecosystem of TechArt, a term that connotes a wide array of technology enabled artistic & research practices. A key part of the programming I explore is the interaction between nature, society, and technology. In BeFantastic's engagements, a critical unpacking of India's renowned technology story with its mass adoption and a race for digital inclusion is vital.

Through robust programs for the upskilling of practitioners—artists, technologists, and researchers, I design and deliver *BeFantastic Colabs,* that include formats of an annual fellowship and smaller workshops throughout the year in hybrid online and face-to-face programs. This space of collaborative co-creation forms the foundation of our organization's ecosystem building efforts.

To bolster and guide communities through their innovative explorations, I curate along with my research team, the recurring *BeFantastic Dialog* series, to engage in critical discussions with experts in the field.

Patrick Münnich

To celebrate the efforts of our keen practitioner communities, as well as amplify such emergent & experimental works to both funders and audiences alike, I helm *BeFantastic Showcases,* that vary in scale from pop-up exhibitions in venues around India and Singapore, to a marquee festival—FutureFantastic—India's first AI Art Festival for Climate Change, as its Festival Director and Co-Curator.

At the FOUNDING LAB, I look to contribute my expertise in interdisciplinarity and co-creation, to address "wicked problems" of our time. Crafting and conducting interdisciplinary programs has been my forte, be they with experienced masons and uninitiated villagers in earthquake-hit villages of India (2001), participatory planning in the San Francisco Bay Area (2006), as a design educator, teaching students from varied disciplines (2018) or fellowships programs bringing artists and creative technologists together since 2020. With access and exposure to networks of artist communities in India and Singapore, I look to represent these geographies within the FOUNDING LAB, while simultaneously attempting to further this field for South Asia (India) and South East Asia (Singapore).

Elisabeth Windisch

Role: FOUNDING LAB
Fall Term—Fellow
Based in: Paris, France, Europe
Originally from: Austria, Europe
Area: Engineering

(A T) Elisabeth co-heads the Paris-based Research Centre of the International Transport Forum at the OECD, where she has been overseeing work ranging from transport decarbonization to transport innovation—always with a focus on helping policy makers come to the right conclusions. Previously, she worked in the private consulting sector in the UK and in Hong Kong, where she supported public authorities in their decisions regarding new infrastructure expansion plans or in the development of new legislation. Elisabeth holds a PhD in Transport Economics from Paris East University and a Civil Engineering degree from Delft University of Technology (NL).

● Vision statement

Elisabeth Windisch

The University of the Future provides access to education for all. It brings together experts from different walks of life, disciplines, and geographies to work collaboratively. It pushes the frontiers in the understanding of the most pressing public concerns and identifies and assesses possible solutions—solutions that are human-centered, just, equitable and workable. It's a place where staff and students work collaboratively—they learn from and challenge each other. It's a place where new ideas, technologies and innovation are embraced, explored, and taught across all disciplines.

Personal Perspective

Elisabeth Windisch

Policymaking is for all—is it?

Mobility and the transport of goods have been both an indicator and a driver for economic growth. The more we move and travel, and the more goods we ship, the better off we all are. But are we really? Moving people and 'things' comes at immense costs—not only at direct financial costs, but also at indirect and currently mostly unaccounted costs: transport pollutes, transport causes congestion, transport contributes to climate change, transport uses precious public space, and transport takes time. So… the more transport activity, the better? Really?

Digitalization and innovation, especially in the past decade, have made transport ever more fascinating: we can often choose among an increasing number of options when wanting to make a trip, can travel "seamlessly" (as some transport providers may claim), and often don't need to waste our time driving ourselves anymore. Often, we can even make productive use of our travel time. We have become comfortable traveling. But have we really? Increased levels of digitalization have often come at the cost of those who are increasingly stuck, and unable to move: people who may not have the means and/or mental or physical capacity to access or navigate mobility systems or their related payment systems. Some people may just not be fortunate or wealthy enough to live in areas that are served by decent, or indeed any, transport services and are increasingly made to pay for their mobility as they are bound to their old cars. So… the more innovation, the better? Really?

Policies try to navigate the challenges underlying the above questions. They try to shape developments, so they benefit everyone and, ideally, to the same extent. But how should policies look? Who are "all" stakeholders that they should account for? When should policies take effect? Should they anticipate developments and proactively regulate upfront, or should policymakers rather 'wait and see' and only react if need be? Moreover… who should be the policy makers and what know-how, capacities, and power should they have to intervene?

Chapter VI discussed these questions and more by exploring existing and potential future transport innovations. We are all transport users. We are all concerned. Answers were and will never be clear-cut though. What is clear, however, is that "it all depends" and that policymaking has become ever more complex, demanding, and fascinating alike.

Deep Dive Talks and Zoom-in and Zoom-out Calls

As an additional offer in this "learning buffet," the FOUNDING LAB Fall Term program hosted six Deep Dive Talks in the format of online keynotes and discussions. Local and international experts were invited to introduce students to their areas of expertise as well as provided insight into practical applications of digital systems and services. The selection of the Deep Dive speakers was guided by profound questions and engaged the students in their Fall Term projects.

Each of the three-chapter clusters were preceded by "Zoom-in calls" to introduce the students to topics, chapter fellows, and materials of the upcoming chapter content. Inspired by Ars Electronica Futurelab's Art Thinking approach and realized as an online workshop using MS Teams and Miro, the students and fellows created a landscape of creative and critical questions together, which give orientation when zooming into different aspects of the educational program. After each chapter block, a "Zoom-out call" allowed students and fellows to reflect together on the outcomes of the chapter blocks and to contextualize the contents and experiences of their on-site time into the bigger picture of their visions for a university of the 21st century.

Between the Fall Term Chapter blocks, six Deep Dive Talks in the form of online keynotes and discussions provided insights into practical applications of digital systems and services.

Deep Dive Speakers

Deep Dive Talk ①

What Art Does
A Fresh Perspective
on the Functionality of Art
Ryan Wittingslow

In this talk, associate professor and author Ryan Wittingslow led us through his life, interests, and studies. With this journey through the different phases of his life, we eventually understood the inspiration behind his latest book *What Art Does*. His book is based on society deriving a great deal of cognitive pleasure from asking what artworks mean. And yet, despite the seriousness with which it approaches these questions, they all too often rely on theories of art that fail to adequately explain how art conveys meaning. Ryan's book proposes a new theory. In contrast to more conventional definitions of art, *What Art Does* defends the claim that artworks constitute a class of tool. Like other tools, artworks are objects that have functions and that furnish affordances. However, thanks to the particular social and material facts that underpin the creation of artworks, the functions that artworks have and the affordances they furnish are special.

Biography **Dr. Ryan Wittingslow (AU)**

Dr. Ryan Wittingslow s an associate professor at the University of Groningen, a Humboldt research fellow at TU Darmstadt, and a research affiliate of the University of Sydney. He received his PhD in art history and philosophy from the University of Sydney in 2014. Before moving to Groningen in 2016, he experienced modest success as a copywriter, journalist, and magazine editor. He is the author of *What Art Does* and *Using Philosophy of Technology to talk about Art* (Rowman & Littlefield 2023), and is the editor-in-chief of the *Philosophy of the City Journal*. Most of his research sits at the fertile delta connecting aesthetics, philosophy of design, philosophy of technology, and political philosophy.

Ryan Wittingslow, Oscar Ekponimo, Tega Brain

Deep Dive Talk ②

Driving Digital Transformation for Social Impact in Africa

Oscar Ekponimo

In this talk, tech visionary Oscar Ekponimo shared his inspiring story that led him to establish himself as a true entrepreneur in the field of digital transformation. Oscar delved into his diverse background in software engineering, product design innovation and startups, showcasing how he leverages technology for positive change. We discovered the transformative impact of his innovative solutions, which have facilitated the redistribution of over 1.6 million meals from food at risk of waste.

Biography **Oscar Ekponimo (NG)**

Oscar is a driven entrepreneur, business visionary and innovator with a passion for leveraging technology to create positive change. At just 26, he founded Chowberry Inc., an innovative technology-driven social business in Africa, committed to enhancing food access for individuals experiencing hunger. Through strategic partnerships with Fast Moving Consumer Goods (FMCG) food brands, his groundbreaking technology has facilitated the redistribution of over 1.6 million meals from food at risk of waste. Drawing upon his diverse background in software engineering, product design innovation, and startups, he personifies the entrepreneurial spirit and possesses an innate drive to develop groundbreaking solutions and approaches to complex problems. As a true self-starter, he established Africa's inaugural multidisciplinary design lab, in collaboration with Ars Electronica FutureLab Austria. This visionary endeavor has nurtured a vibrant creative community of over 500 innovators, engineers, technologists, and artists.

Oscar has garnered various awards and recognition, which include being named as one of *Time Magazine*'s 10 Next Generation Leaders, named a Rolex Laureate through the Rolex Award for Enterprise, Harvard Medical bestowing upon him the title of Young Pioneer, an acknowledgment by the World Frontiers Forum that highlights his trailblazing approach in the field. The UN/ITU Young Innovators Award, BBC Top 10 Innovations of 2018 sponsored by the Bill and Melinda Gates Foundation, and inclusion in the Top 10 list of 2022 for Creative Entrepreneurs by 50Next at the Basque Culinary Centre are among other prestigious accolades.

Oscar serves as a member of Prix Ars Electronica's Advisory Board for Digital Communities and has contributed as a jury member at MIT Solve. Being passionate about creating positive change, he continuously seeks opportunities to leverage his entrepreneurial spirit and expertise to drive innovation and address pressing societal challenges with a keen eye for emerging trends and a deep understanding of market dynamics.

Deep Dive Talk ③

The Art of Working Machines and Environments

Tega Brain

We dived into the captivating world of Tega Brain, an Australian-born artist and environmental engineer, in this enlightening talk. Tega shared her unique exploration of ecology, data, automation, and infrastructure through innovative digital networks and thought-provoking projects. Tega's work challenges the boundaries of technology and human connection.

Biography **Tega Brain (AU)**

Tega Brain is an Australian born artist and environmental engineer exploring issues of ecology, data, automation, and infrastructure. She has created digital networks that are controlled by environmental phenomena, schemes for obfuscating personal data, and a wildly popular, online smell-based dating service. Through these provisional systems, she investigates how technologies orchestrate and reorchestrate agency. She is an Industry Associate Professor of integrated Design and Media at New York University and her first book, *Code as Creative Medium,* is coauthored with Golan Levin and published by MIT Press. She lives and works in New York and Sydney.

Deep Dive Talk ④

My Lesson Learned
Go Suzui

In his compelling Deep Dive talk, Go Suzui unveiled the pivotal moments of his career in four transformative steps. On his journey of trial and error, the students were able to understand what it took for him to reach his goal as CTO of the tech start-up Godot Inc. and spearhead a new branch opening in Vienna through Godot GmbH.

Biography **Go Suzui (JP)**

After researching the application of data science to sustainable development at the University of California, Berkeley's graduate school, Go Suzui joined a GovTech startup as their first data scientist. He spearheaded business evaluations using statistical causal inference. Later, he was involved in the launch of the behavioral design team that would become the precursor to Godot Inc., where he handled business promotion, predictive modelling using machine learning, and experimental design for statistical causal inference. Subsequently, he co-founded Godot Inc. he was responsible for product development using deep learning, obtaining and maintaining ISMS, and establishing information security measures. He led the establishment of Godot GmbH, a wholly-owned R&D subsidiary in Vienna, Austria, and served as its Managing Director.

Deep Dive Talk ⑤

Towards a Future for everyone
De-bunking dominant narratives about AI Technology
Marta Peirano

Marta Peirano's talk at the FOUNDING LAB event on January 25, 2024 delved into debunking dominant narratives about AI technology in contemporary society. Drawing on examples and research, she challenged the future portrayed by major corporations, emphasizing the need for critical examination and collective rejection of these visions. Peirano urges universities to spearhead the creation of alternative paths that align with a future beneficial for all. Her talk aimed to inspire a reimagining of the societal impact of AI and encouraged the development of inclusive and ethical technological trajectories.

Biography **Marta Peirano (ES)**

A writer and a journalist, Marta Peirano is a columnist at *El Pais* and runs a technology section in Radio Nacional de España (RNE). She co-founded Hack Hackers Berlin and Copyfight Berlin, co-directed Copyfight, served as Head of Culture at ADN.es, was deputy director at eldiario.es, Technology Commissioner for the Barcelona Thought Biennale, and a member of the cyber defense working group at CESEDEN. She directed (re) programming —Strategies for Self-Renewal, an interview program about technology and climate change at the Ljubljana Contemporary Art Institute, and Deep Journalism, a seminar on the new journalism at Medialab-Matadero (Madrid). Her publications include *El Rival de Prometeo,* a manual of illustrious automatons; *The Little Red Book of the Network Activist* (Rocaeditorial, 2015), foreword by Edward Snowden, and "The Enemy Knows the System" (Debate, 2019), an essay on surveillance capitalism linking our addiction to mobile phones with the data extraction industry and its role as a tool for mass control and manipulation. Her latest books are *Against the Future* (Debate, 2022), a critical analysis of climate technologies and apocalyptic narratives, and *(re)programming, a book of conversations with thinkers and visionaries about alternatives to the end of the world* (Aksioma, 2022).

Deep Dive Talk ⑥

Harmony in Innovation
Bridging Science and Art
Yoko Shimizu

In this Deep Dive Talk, Yoko Shimizu, Head of Creative Business Innovation at Ars Electronica Futurelab, talked about her evolution from creative director and consultant for technology companies in Japan to founding her own lab. Born in Japan and raised in the creative atmosphere of New York, Yoko's journey has combined her background in biology and chemistry with a passion for art and technology. She strongly believes that "the fusion of science and art opens doors to possibilities beyond our imagination". Her work in biology-inspired installations has garnered recognition and awards, propelling her to exhibit, speak, and travel globally.

Biography **Yoko Shimizu (JP)**

Yoko Shimizu is a researcher and artist at Ars Electronica Futurelab, with a background in biology and chemistry. She was born in Japan and raised in the United States, where she was inspired by the art scene in New York as a child. Her career started as a creative director and consultant for technology companies in Japan. Later, she started her own lab, receiving awards for biology-inspired installations, and has given exhibitions, talks, and performances worldwide. Yoko currently develops innovative technologies, methods, and installations that combine science and art, and works with companies, government entities, museums, and universities around the globe. Yoko has experience in managing and directing corporate as well as government projects and also provides talks and lectures in international events and conferences.


WHO
CARES?

IT:U
x
Ars Electronica
FOUNDING
LAB

Fall
Term

Experts

Led by Ars Electronica's Festival/Prix/Exhibitions department, a joint team from Ars Electronica Futurelab, Ars Electronica's artistic R&D department with its long history in experimental educational projects, and the staff from the FOUNDING LAB Summer School shaped, curated and guided the FOUNDING LAB Fall Term. This great team truly deserves to be called "Fall Term Experts" for their wide-ranging expertise.

● **The Facilitators**
designed and realized a nourishing support structure that enabled and provoked interdisciplinary collaboration for the students' Fall Term projects. The students teamed up in peer groups that were each guided through the process by their facilitator.

● **The Organization and Administration Team**
worked behind the scenes to ensure that the FOUNDING LAB Fall Term could be realized on site and supported the students with organizational tasks.

● **The Programming Team**
connected the six chapters of the FOUNDING LAB Fall Term introducing a thread through the whole semester program. They explored sustainable ways of documentation and learning collections for translating the experiences into a publicly accessible, meaningful learning outcome.

● **The Futurelab Catalysts**
were researchers and artists working at Ars Electronica Futurelab, the organization's interdisciplinary R&D center. Always on the forefront of technological developments with consideration of their social aspects and specialized in interdisciplinary artistic research, they supported the Fellows in the design and realization process of the chapter program, offering to bring in the Ars Electronica spark, experience, and network to students and Fellows.

Bart Grabski

Friedrich Bachinger

Role: FOUNDING LAB **Fall Term - Futurelab Catalyst**

(AT) Friedrich's role in the Ars Electronica Futurelab is akin to that of a software developer with a focus on human-computer interaction. His repertoire ranges from the realization of real-time applications (Unity, Unreal) to web applications (Angular, Django, Spring Boot, etc.). Currently, he dedicates his time to the Cinematic Rendering project, which allows a nearly realistic high-resolution representation of virtual anatomy in 3D in Deep Space 8K. Friedrich has studied a variety of subjects: electrical engineering, health care and nursing, and he has several years of professional experience in intensive care. Furthermore, he completed a bachelor's degree in media technology and design at the Upper Austria University of Applied Sciences in Hagenberg with a focus on game development. In the course of his master's degree in Interactive Media, Friedrich worked for BMW at the Research and Innovation Center in Munich. There, he worked on an interaction concept and prototypes to optimize the virtual product development process (Virtual Reality) in the automotive industry.

Chiara Croci

Role: FOUNDING LAB **- Facilitator & Fellow Management**

(IT) Chiara has a background in Industrial Design. She studied at the University of Ferrara where, in 2020, she completed her BA. In 2021 Chiara obtained a BA Hons from the University of Johannesburg, where she is now finishing work on her MA. Consistent with the topic of her thesis in computational origami and digital fabrication, Chiara is working at the Ars Electronica Futurelab as an assistant in Origami and Robotics research.

Peter Freudling

Role: FOUNDING LAB **Fall Term - Futurelab Catalyst**

(AT) Peter was one of the first members to join Ars Electronica Futurelab during his studies of Industrial Design at the University of Art and Industrial Design in Linz. As a researcher in the Virtual Environments group he helped to create several projects in the field, among others the CAVE in the Ars Electronica Center. Peter has passed on his knowledge by teaching the course Virtual Reality for Industrial Design at the University of Art and Industrial Design in Linz. As an industrial designer his focus shifted slowly from the virtual to the physical world, joining the Media Art and Architecture research team. Recent works mainly focus on artistic interventions in the semi-public space as well as design-related work on many projects.

Magdalena Giegler

Role: FOUNDING LAB **Fall Term - Organization & Travel Management**

(AT) Magdalena Giegler is part of Ars Electronica's Festival/Prix/Exhibitions department. As travel and accommodation manager she oversees all bookings. With her Web Science studies at JKU Linz and six years of experience as a project manager in a market research agency, she developed great organizational and coordinative skills. Her own passion for travelling and international exchanges compliments those skills.

Bart Grabski

Role: FOUNDING LAB **- Facilitator**

(GB) Bart Grabski is a dedicated professional immersed in the world of digital media, education, and the arts. Currently, Bart works as the Digital Media Engagement Coordinator at Robert Gordon University, where he fosters a unique synergy between technology and academia. In parallel, Bart wears the hat of Founding Lab Facilitator at Ars Electronica and Producer at Aberdeen Performing Arts, pioneering projects at the intersection of performing arts and digital innovation. Having journeyed through a variety of roles, Bart has made meaningful contributions at every turn. As the former Ambassador for the British Art Show 9 at Aberdeen Art Gallery, he effortlessly blended their love for art with their digital prowess. A tireless advocate for diversity and inclusion, Bart is determined to shape a future where higher education, culture, and the arts are accessible to all. With a unique blend of creativity, expertise, and a commitment to a brighter, more inclusive future.

Nurturing Care in the University of the Future

Bart Grabski

While thinking about higher education it is often where tradition meets innovation, the partnership pilot project between Ars Electronica and IT:U emerged called the FOUNDING LAB. This initiative aimed at exploring and navigating through the complexities of digital transformation, but it was not solely focused on redefining what university could be, it created a shared narrative by students, facilitators, experts, and fellows as well as the wider community. This network of interconnectedness recognized the shared responsibility, beyond the conventional notion of possession that propelled our progress as a collective.

In my role as one of the facilitators during the program, I have been able to witness that the collaborative learning experience is a catalyst in fostering a sense of community and integration. The educational learning environment during the FOUNDING LAB program went beyond the academic curriculum and allowed students to learn from one another. I believe that formulated connections as part of the program were not solely focused on networking but also aimed at creating relationships that allowed a deeper understanding of each other's backgrounds, cultures, and identities, contributing to a profound sense of belonging and personal growth.

Dedication to digital change positioned the FOUNDING LAB at the forefront of evolution of higher education. Teaching students technical skills was a key element but beyond that, an important role took consideration and care for

the ethical and human dimensions of technology. The program acknowledged that in the digital age, we not only have to develop proficiency in using those technologies but also recognize the aspects of critical thinking, responsibility, and compassion in educating students. Transformative digital change at the FOUNDING LAB went beyond the limitations of traditional education and focused on embodying an approach that equipped students with the mindset, skills, and moral considerations required to navigate the intersection of humanity and technology.

During my time at FOUNDING LAB, I had an opportunity to work with outstanding individuals who dedicated the last few months to studying their chosen topics, and it is important to recognize that they are not just academic beings; they are complex people with emotional, physical, and mental dimensions. The University of the Future should consider ways that not only support their students academically but also create opportunities to nourish both the mind and the body. One of the research trips during the program allowed students to visit and learn more about a mental health hospital, where they could openly ask questions to staff and explore the challenges and the stigma surrounding health. The university of the future will have to play an active role in creating societal change and teaching their communities about destigmatizing seeking support. Educational institutions must lead by example and demonstrate that this approach can contribute towards building more integrated communities without excluding those experiencing mental or physical crisis.

As part of the chapters, the emphasis was on shifting perspectives and presenting knowledge unconventionally, illustrating the importance of nurturing empathy in the educational landscape. During the Interfaces & Visualizations chapter block by Dietmar Offenhuber, Jiabao Li, and Barbara Lippe a key element was to acknowledge the diverse perspectives and experiences of the student body, but also to actively encourage a deeper understanding of others' viewpoints. Reimagining conventional ways of presenting knowledge and challenging students to explore the world through the eyes of diverse species fostered an environment where empathy became a foundational skill. Expanding intellectual horizons and cultivating a sense of interconnectedness with the natural world allowed students to understand the complexities of interspecies communication and identify unique ways animals interact and perceive their surroundings.

The interdisciplinary nature of the FOUNDING LAB fostered a sense of care that extends beyond the academic environment, focusing on the evolving nature of care in the digital era. It goes beyond the traditional teaching and learning paradigms, supporting interdisciplinary collaboration and highlighting empathy-centric education. This pilot program signified that care in education is a continuous process of exploration. We must be aware that education is not a static entity, and while the digital transformation unfolds, there is a necessity for continuity and adaptation as essential aspects of supporting students in an ever-changing world.

Barbara Habringer

Role: FOUNDING LAB **Fall Term - Administration**

(AT) Barbara Habringer studied communication and marketing in France at the Université de Nice Sophia-Antipolis. During her studies, focused on corporate communication as well as culture and communication in the digital age, she developed her knowledge of visual and digital arts and of information and communication technologies. She is experienced in the fields of media relations, event management, communication and office management. Barbara supports the Ars Electronica Futurelab team in operative and administrative activities. She contributes to procedures in contract and documentation management, travel management, and project documentation. Moreover, she is responsible for the reception and schedules and prepares meetings.

Denise Hirtenfelder

Role: FOUNDING LAB **Fall Term - Futurelab Catalyst & Deep Dive Talks**

(AT) Denise Hirtenfelder is an artistic match-maker, puzzle-builder and art-related researcher working in the field of Future Thinking and Art-Science. Her approach focuses primarily on critically examining the cultural model of the advancing 21st century in response to current challenges, in order to rewrite the script for a sustainable future as a global community. Therefore, she does not hesitate to confront the prevailing power structures and outdated systems within our society in the Global North with new creative tools and countermodels that show us alternative possible future scenarios.

Denise Hirtenfelder graduated Cum Laude with a Bachelor's degree in (de)Fine-Art from Willem de Kooning Academy in Rotterdam. For her graduation project *Re-Writing the Script – A New Relationship to Finitude* she was nominated for the Research Award of her educational institution, and received an Honorable Mention as the 3rd place winner of the Drempelprijs for Commercial Practice. She is currently working as a Researcher & Artist at Ars Electronica Futurelab in the field of Art Thinking.

Peter Holzkorn

Role:FOUNDING LAB **Fall Term - Facilitator & Futurelab Catalyst**

(AT) Peter Holzkorn is Key Researcher for Artificial Collectives and currently leads activities in the area of swarm robotics, such as Swarm Arena and Sky Compass. Before that, he focused on the design and implementation of software systems for distributed real-time sound and graphics, often involving sensor networks and generative content, from large-scale media art installations (ZeitRaum) and experimental audio games (Audioversum) to data-art projects (Soul of the Cube, Data Space Berlin). He also coordinates activity for the Ars Electronica Futurelab Academy, a framework for knowledge transfer with universities and organizations in related fields. Peter holds Master degrees in Media & Computer Science (Vienna University of Technology) and Interactive Telecommunications (New York University – Tisch School of the Arts).

Teaching is Learning
From the Futurelab Academy to the FOUNDING LAB

Peter Holzkorn

In 2013, only two years after I joined Ars Electronica Futurelab, I was asked to contribute to a collaboration with Brisbane's Queensland University of Technology: Mentoring of students from a variety of design-related programs with a focus on their semester projects, supporting them with feedback and advice based on the lab's experience in transdisciplinary work across art, design and technology. We called it the *Futurelab Academy.*

Since then, the Ars Electronica Futurelab has engaged in one or more such programs almost every year, and I am honored to have been centrally involved in most of these *Academies.* In some cases, this meant being part of students' journeys with their artworks from the initial concept to an exhibit for the Ars Electronica Festival; in others, the program was a condensed one- or two-week workshop in which students visited the Ars Electronica Futurelab and created mini-projects for Deep Space or the Ars Electronica Center's media façade. Regardless of the format, the interaction with engaged, smart students bringing a rich variety of ideas has always been inspiring and motivating and continued to infuse me with a different view and interesting change of perspective on my "regular" work.

When, at the 10-year-mark of this educational side-track journey, the IT:U x Ars Electronica FOUNDING LAB project manifested, it was obvious to me that I would want to be part of it in some capacity. It was equally clear that its scale was magnitudes beyond what we had ever done in the Futurelab Academy, usually with a small team of 2 – 4 people. An "Interdisciplinary Transformation University" (even though the institution would take on this name a little later) sounded like its core values would align very closely with what we had been doing when we connected existing course formats led by visionary teachers to the Futurelab in our *Academies.*

Like much else, the exact scope of the roles I took in the FOUNDING LAB had an initial definition, but were subject to constant change in this ceaselessly morphing experiment of a semester: On the one hand, as one of six Futurelab Catalysts, I was matched with one of six chapters (Machines, Robots and Tangibles) and would be expected to connect the fellows who were going to design this chapter's content with the perspective and knowledge of the Ars Electronica Futurelab, to both add value to the chapter and bring insights back to the lab. On the other hand, as one of the four Facilitators, I would guide several of the students on their journey to realizing their project ideas in the course of the Fall Term, with conceptual feedback, moderation of critique sessions, support in planning and structuring their work, and technical advice.

"Catalyst" describes a substance one adds to increase the rate of a chemical reaction. The metaphor we used for this role therefore implied that the process would happen either way, but Futurelab researchers might make it even more smooth and effective. However, it should have been readily apparent that assembling artists / researchers / entrepreneurs from around the world, as smart as they may be, and giving them a title and a paragraph of description does not automatically engender any "reaction" at all—quite the opposite. The precise fact that many of the selected fellows are well-known in their respective domains and have a full schedule makes it more unlikely that anyone feels fully responsible for kickstarting the process of designing a chapter that addresses a wide array of topics, not to mention taking the lead. The Catalysts, therefore, quickly recognized that they needed to carefully structure the conversation in many cases, simply because they were the ones more deeply connected to the FOUNDING LAB project over a longer time span. When these perceptions and responsibilities shifted, we were able to improve the quality of the chapters from one instance to the next and take the initiative in all the places where we saw how difficult it was for the fellows, who were not only geospatially distributed but also came from vastly different knowledge backgrounds, to converge at the stories they wanted to tell.

If there is one thing we've learned, it is this: The beautiful variety of personalities and approaches that the fellows brought to the table, and especially the very short involvement of each of them, exposed what was missing, which we eventually filled by expanding the responsibility of the Catalysts: What was missing was an overarching syllabus, and structured planning in realizing it. Even in a highly experimental semester, the chapters need to be connected within and to each other. Fewer fellows who are able to dedicate more of their time to designing the program would, perhaps, benefit the format in many ways without sacrificing the principal value of interdisciplinary thinking.

As Facilitator, I knew I would have the opportunity to see and support a number of fascinating project ideas. The plan was to have one session per 4-day chapter in which we would sit down with "our" (i.e. each facilitator's) group of students, the composition of which had been decided after their initial project proposal submissions. Initially, this worked well, with inspired critique sessions and discussion of milestones and work plans. However, the fact that most projects were individual works (and featured significant material and environment needs) exposed what else was missing: "project producers".

Again, the distribution of students in many corners of the world and their heterogeneous technical knowledge, paired with the ambition to showcase their projects in an exhibition of Ars Electronica Festival quality or in the demanding (and exposing) Deep Space 8K environment, created completely new roles: "Performances producer" and "Exhibition producer"—two roles that were split between two other team members and myself, and were, towards the end of the term, were the equivalent of a full-time dedication. The constraints of the projects had been left so open that many of them "naturally" converged towards full-blown, high-quality artworks and performances which, even as they multiplied the commitment that we had originally anticipated, are, I would proudly assert, as professional as many invited artists' works at the festival. And when the six beautiful, immersive, complex projects that I supported in their final production were shown in the Deep Space 8K and the Ars Electronica Center, I was no less moved and elated than if these projects had been "mine" in the narrower sense.

On the first day of this unbelievable FOUNDING LAB Fall Term, we started out with twenty-five chairs, a lecture screen, and a concept of a university. We could not yet rely on what we take as a "given" in an established institution: Certain technical infrastructures, well-defined hierarchies, unambiguous rules. While this tested our endurance in countless extended meetings in which we discussed what the structures and guidelines should be, and which ones we could define within the agency that we were given by IT:U, it also represented the opportunity (and

challenge!) to fill this empty canvas by thinking deeply about what we—students, fellows and team—wanted to create and experience, and by engaging with the requirements of how to make it happen. When we found that certain assumptions we had made about the progress of the infrastructure were not holding, we tapped the resources of Ars Electronica or adapted our program. When it turned out that there were many more solo student projects than anticipated, we spent many hours to allocate facilitation groups in a way that played to the strengths of the students and team, in order to reduce the workload of single individuals without compromising any student's vision. When different ways of communicating caused interpersonal friction, we devised a "code of conduct" document that would serve as a basis for mediation. Ultimately, the excitement of this experimental journey and the willingness to constantly learn and question one's own assumptions allowed us to guide this term to the outcome of twenty brilliant works of art & science, not to mention many personal and professional connections that will, in all likelihood, last for years to come.

In the end, throughout all the challenges and complications (many of which I could not even touch in this reflection), every member of the Ars Electronica Futurelab who participated in these FOUNDING LAB activities did so, consciously or not, with the enthusiasm and insight of our decade-long experiences of the Futurelab Academy providing a basis and confidence that make one thing clear: In the Ars Electronica Futurelab, profound critical discourse meets an exceptional readiness to make anything possible. And this is exactly what any university looking towards the future needs more than anything else.

Nicolas Naveau

Role:FOUNDING LAB **Fall Term - Futurelab Catalyst**

(FR / AT) Nicolas Naveau studied art at the Fine Art School in Angers, France. From 1997 to 2002 he worked as a course instructor for French culture (art history, comics, cinema) at the Centre for Adult Education in Vienna. Due to his interests and skills in the fields of art, graphic and information design, he became a freelancer for Ars Electronica in 2002. Since 2006 Nicolas Naveau has been working as an artist and senior researcher in the field of information design at Ars Electronica Futurelab. His current focus is on the threat of collapse—especially climate-related collapse—and how to communicate it. He is co-founder of the Ars Electronica Happy Collapse group.

Otto Naderer

Role: FOUNDING LAB **Fall Term - Futurelab Catalyst**

(AT) As Key Researcher on Algorithmic Apperception, Otto Naderer realizes projects with an emphasis on enabling machines' to perceive and interpret their surroundings. He developed Pharus, a versatile laser tracking system that is used in the Ars Electronica Deep Space 8K, where Otto also tutors classes for universities. He enjoys working on projects with challenging sensory tasks and automation. Otto joined Ars Electronica Futurelab's Creative Engineering team in 2006 after an internship during his bachelor program in computer science. He later became part of the Research & Innovation Group where he worked on large-scale tracking systems within the CADET research program. Otto holds a master's degree in Pervasive Computing & Software Engineering.

Anna Oelsch

Role: FOUNDING LAB **Forum & Fall Term – Lead & Programming**

(DE/AT) Working at the intersection of science and art has always fascinated Anna. Her scientific thinking and analytical skills were mainly shaped during her studies of Technical Physics at Johannes Kepler University, Linz, whereas her artistic way to approach ideas is currently being further developed at the University of Art and Industrial Design Linz, where she is studying in the teacher training program for visual arts and physics. Working for the Ars Electronica Futurelab allows her to bundle this varied skill set for project management, creative prototyping, art thinking research, mentorship for artists in residence, and much more.

Iris Tschank

Role: FOUNDING LAB **Fall Term – Student Communication & Organization**

(AT) Iris is a motivated and experienced professional with a strong background in international development and cultural affairs, who is skilled in project management, policy analysis, and stakeholder engagement and also fluent in English, Spanish, and German. Iris has a global perspective shaped by years spent living in Spain and Colombia. Now back in Austria, she is thrilled to be part of the FOUNDING LAB, collaborating with a diverse and intriguing group of individuals. In her role, Iris takes on a key responsibility for project management, student communication, and organization. Collaborating with the diverse team, the FOUNDING LAB contributes to creating an environment that nurtures creativity and collaboration. Together, they explore new frontiers at the intersection of art, technology, and society—defining elements for Ars Electronica's unique identity and shaping the distinct character of the new university.

Cyntha Wieringa

Role: FOUNDING LAB **Fall Term – Futurelab Catalyst & Deep Dive Talks**

(NL) Cyntha, originally from the Netherlands, feels right at home at the Futurelab. Whilst majoring in Artificial Intelligence during her BSc in Liberal Arts and Sciences at University College Groningen, she quickly came to the realization that she wanted to work with technology instead of in technology. That is why her MA in Science-Technology-Society (STS) at the University of Vienna was the perfect fit. The masters, which is rooted in the social sciences, teaches about the constant co-creation between science, technology, and society, which are themes that connect seamlessly to those present within Ars Electronica. Art, like science and technology, is interactive, combinatory, open-ended, partly predetermined and always evolving. Which is why working on the interface of these three domains, where these different qualities come together and innovate is exactly the kind of challenge she is looking forward to.

Maria Pfeifer

Role:FOUNDING LAB **Fall Term - Programming & Futurelab Catalyst**

(AT) Maria Pfeifer is Key Researcher for Future Narratives, where she investigates how stories about the futures can change the here and now. Other thematic interests lie in Art Thinking, art-inspired innovation, and the collaboration between art and science. She studied art, comparative literature, and cultural studies in Vienna and has been working for the Ars Electronica Festival and Futurelab on and off since 2011. She is particularly interested in the potential social impact of future technologies—such as artificial intelligence, automated driving, virtual reality—beyond their direct fields of application. Research projects she has been involved in include topics such as Work of the Future, Ethical AI, Automated Environments, Future Skills, Speculative Design & Artistic Strategies in Futures Research. Since 2022, she is a member of the Future Panel Oberösterreich, the interdisciplinary advisory board of the Upper Austrian Zukunftsakademie.

Regina Sipos

Role: FOUNDING LAB **- Facilitation Lead**

(DE) Regina Sipos is a researcher and founder at the intersection of technology and society. She wrote her PhD thesis focusing on intrinsic and collaborative technology design and innovation in grassroots communities in the Global South. She developed and managed the EU-funded Critical Making project. She is Founder and Director of the Social-Digital Innovation Initiative, a social enterprise facilitating the cross-pollination of open-source technology and social innovation. She designed and managed the United Nations' first global co-creation and incubation platform for social entrepreneurs working with technology at the International Telecommunication Union (ITU) before moving to Berlin to advise Ashoka Germany on their Digital Fellowship strategy. She speaks frequently at international conferences, has published multiple peer-reviewed papers, is a mentor in the Innovative Manufacturing in Africa Programme, a program committee member of the International Conference on Communities and Technologies and IMPETUS4CitizenScience, a member of The Design Society and Association of Internet Researchers, a steering committee member of the Centre for Internet and Human Rights at the European University Viadrina, and Executive Board Member of Appropedia and the Global Innovation Gathering.

Future Skills as a Framework for the University of the Future

Regina Sipos, Maria Pfeifer

The University of the Future must train the workforce of the future. While traditional educational systems may be slow to adapt to the rapidly changing needs of industry and businesses, the birth of a new university opens a window of opportunity to act.

A new higher education program can address two global trends. One is that due to the climate crisis, there is an urgent need for people with the skills to sustainably transform the world. The other pertains to the changing landscape of work: as technology is rapidly adopted in the workplace, jobs are becoming obsolete, and new jobs are being created that need new types of expertise. With the IT:U x Ars Electronica FOUNDING LAB, we have the chance to experiment with how education can help address these issues. We designed a training program for a group of international and interdisciplinary students that covers key competencies according to UNESCO guidelines,[1] with the aim of equipping them with the recommended competencies found in the Future of Jobs WEF (World Economic Forum) reports[2,3].

The 2023 WEF's Future of Jobs report highlights cognitive skills, particularly complex problem-solving, which are anticipated to experience the fastest growth in evolving significance of skills for their workforce for the upcoming five years. Creative thinking is projected to rise slightly more swiftly than analytical thinking, while technology literacy ranks as the third-fastest growing core skill. Notably, self-efficacy skills are reported to increase in importance at a higher rate than working with others. Businesses identify socio-emotional attitudes such as curiosity, lifelong learning, resilience, flexibility, agility, motivation, and self-awareness as rapidly growing in importance. This underscores the emphasis on cultivating resilient and reflective workers who embrace lifelong learning in an environment where skill life cycles are diminishing. The top 10 also include systems thinking, AI, and big data (WEF, 2023, p. 38).

The report "Learning to transform the world: key competencies in education for sustainable development" emphasizes crucial competencies essential for sustainability. These competencies include Systems Thinking, Anticipatory, Normative, Strategic, Collaboration, Critical Thinking, Self-awareness, and Integrated Problem-Solving. Each competency addresses specific aspects related to understanding relationships, anticipating multiple futures, negotiating values, collaborating effectively, and critically examining norms. The integrated problem-solving competency is highlighted as particularly important, emphasizing the interconnectedness of these skills. While these competencies are essential for sustainability, the document underscores the need to integrate them with basic competencies like communi-

cation skills. Furthermore, the development of these competencies must align with individual values and motivations to translate capacities into real sustainable actions (UNESCO 2018, p. 44–45). Key pedagogical approaches named are: *A learner-centered approach, action-oriented learning,* meaning that the "learners engage in action and reflect on their experiences in relation to the intended learning process and personal development," and *transformative learning,* defined as "by its aims and principles not by a concrete teaching or learning strategy" (UNESCO, 2018, p. 49).

IT:U x Ars Electronica FOUNDING LAB

For us, this was the starting point. We sought out relevant overlaps between the two sets of competencies—for sustainable development education and the future of jobs—to create a framework of **eight key Future Skills** that guided the IT:U x Ars Electronica FOUNDING LAB and its curriculum.

① Interdisciplinarity

Highlighted by UNESCO and the WEF as one of the major Future Skills, interdisciplinarity involves the ability to integrate knowledge and perspectives from various fields, fostering a holistic understanding of complex issues. This skill is particularly crucial in research and education, where it plays a vital role in breaking down silos, promoting collaboration, and encouraging innovative solutions by working with people from diverse backgrounds. Effective communication is key in conveying complex ideas and encouraging the development of innovative solutions.

② Collaboration

According to UNESCO, in education, this refers to the ability to learn from others; empathy: understanding and respecting the needs, perspectives, and actions of others; to exercise empathetic leadership, meaning to understand, relate to and be sensitive to others, and to deal with conflicts in a group; and facilitate collaborative and participatory problem-solving. According to WEF, in the workforce this includes emotional intelligence, or the concern for others (being sensitive to others' needs and feelings and being understanding and helpful on the job); cooperation, or being pleasant with others and displaying a good-natured, cooperative attitude; social orientation, meaning that the job requires preferring to work with others rather than alone and being personally connected with others on the job; as well as social perceptiveness, or being aware of others' reactions and understanding why they react as they do.

③ Futures Literacy

UNESCO coined the term Futures Literacy to describe the skill of cultivating optimism and motivation for change amid global challenges. While literacy traditionally refers to basic reading and writing skills, in the context of the future, it involves training imagination to construct narratives that address and overcome challenges. This also encompasses anticipatory competency, involving the understanding and evaluation of multiple futures—possible, probable, and desirable. It includes creating personal visions, applying the precautionary principle, assessing consequences, and navigating risks and changes. Additionally, strategic competency plays a crucial role, emphasizing the collective development and implementation of innovative actions to promote sustainability locally and globally.

④ Critical Thinking

In UNESCO's summary, this means the ability to question norms, practices and opinions; reflect on one's values, perceptions, and actions; and take a position in the sustainability discourse. According to WEF, this means critical thinking and analytical skills, e.g. using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems. It also includes monitoring and assessing the performance of yourself, other individuals, or organizations to make improvements or take corrective action.

⑤ Problem Solving

In education, UNESCO highlights the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive, and equitable solutions that promote sustainable development. In the Future of Jobs, competencies include reasoning, problem-solving, and ideation, which are abilities that influence the application and manipulation of information in problem-solving. It also includes quantitative abilities, in the case of problems involving mathematical relationships.

⑥ Anticipatory and Systems Thinking

According to UNESCO, this is summarized by the ability to recognize and understand relationships, to analyze complex systems, to perceive the ways in which systems are embedded within different domains and different scales, and to deal with uncertainty. In WEF's understanding, analytical thinking and innovation will be relevant in jobs that require analyzing information and using logic to address work-related issues and problems. Furthermore, creativity and alternative thinking skills will be necessary to develop new ideas for and answers to work-related problems.

⑦ Self-Management

For UNESCO, self-management is the self-awareness competency: the ability to reflect

on one's own role in the local community and (global) society, continually evaluate and further motivate one's actions, and deal with one's feelings and desires. In the Future of Jobs, this translates to resilience, stress tolerance, and flexibility, as jobs require being open to change (positive or negative) and to considerable variety in the workplace. Jobs will also require maintaining composure, keeping emotions in check, controlling anger, and avoiding aggressive behavior, even in very difficult situations. Finally, self-management includes accepting criticism and dealing calmly and effectively with high stress situations.

⑧ Technology Use

In education Technology Use plays a role that is becoming more and more important—from media competency to actual skills of using technology to learn, research, and create results. Using technology with a critical awareness and basic understanding of the underlying rules and technical properties. For WEF, this means technology use, monitoring and control, being able to determine the kind of tools and equipment needed to do a job, including controlling operations of equipment or systems, but also technology design and writing computer programs for various purposes, as well as generating or adapting equipment and technology to serve user needs.

Students' Requests for the University of the Future

The Future Skills Framework was a key starting point. In addition to the skills presented in the previous section, we need to keep in mind that the group of diverse and curious students who took part in the program already had many of the key competencies, which we were able to build upon.

In addition to the skills, the students also had visions and requests for a University of the Future. During the FOUNDING LAB Summer School, we used several ways to collect these, including group work to create manifestos and policy recommendations, which were thoroughly documented. In addition, in one of the facilitation sessions, a group of students were inspired to share approaches that worked and approaches they see were still necessary to implement in the FOUNDING LAB Fall Term program. These are summarized here, alongside insights collected from two previous summer schools, and while such a brief summary is reductive, it does contain important information about how a University of the Future should be designed.

Interdisciplinary and Transcultural

Interdisciplinary collaboration cannot happen without clear communication and mutual respect. In collaboration, it is important to understand that one has to give, and that there will be times when the collaborators must be willing to lose a bit. In an international group of students, it is key that environments are proactively created that actively prevent segregation and foster transcultural inclusivity. In the University of the Future good dynamics must have priority over a focus on output, to achieve a human value-based education that makes for conscientious individuals rather than human tools.

Project-based and Research-based Learning

Instead of "info dumping" and "info collection," the focus needs to be on developing insight from knowledge. This includes having enough time to discuss, and also having enough time to digest and process. Time needs to be created during the lectures and workshops and outside of them. To achieve the goal of more learning by doing and making, a timeboxing approach that schedules time for production and work is recommended.

Classes Designed for Gradual Learning

In an interdisciplinary environment that includes people at different stages of their studies, there are different levels of knowledge present. It is crucial that everyone starts from at least a basic, "101" understanding of the learning material. The lecturers can enable this either by sharing some reading material, or by clarifying key concepts at the beginning of the lecture. In addition, instead of getting a mix of input, it helps to concentrate on learning a specific topic over a prolonged period (in this case, 4-day chapters). As there will be more experienced students in the community, the lecturers can also build upon their knowledge, including peer input and knowledge sharing through student-led workshops.

Teachers share Knowledge

and are not using their lectures for self-promotion. Students know when they are the product.

Measuring Future Skills in the FOUNDING LAB Fall Term Program

In addition to us listening to the students on an individual and qualitative basis, the program is also accompanied by a feedback and evaluation process that allows us to assess whether it lives up to its promises regarding the development of Future Skills. Close communication between students and faculty support individual accommodation of the students within this project-based, interdisciplinary program, and students carry out a self-assessment on the development of their competencies and skills.

To make this process easier we narrowed it down to the following five skills and asked students to give us anonymous feedback and rate how the program supported them in developing:

- **Critical thinking**—including problem-solving, questioning norms, and creativity
- **Technology Use**—including the use, design, and development of technology
- **Futures Literacy**—including anticipatory competency and the ability to understand and evaluate multiple futures
- **Self-management & Self-awareness**—including active learning, curiosity, and the ability to reflect on one's own development
- **Interdisciplinarity**—including collaboration and communication across disciplines

As we are writing this summary during the ongoing Fall Term program, it is not possible to give a detailed analysis of the results. Nevertheless, preliminary observations indicate a reflection of the program's inherent heterogeneity. The curriculum, a result of interdisciplinary collaboration among a diverse cohort of fellows, consists of varied educational methods and individual thematic approaches. The students bring diverse backgrounds and skill levels too, so their individual responses exhibit a substantial range. The average ratings are clearly favorable. These early indications suggest that the program, marked by its diverse and collaborative nature, is effectively enhancing students' skills to meet the challenges of the future. In the overall feedback we received so far, we can also see a strong tendency in the development of one of the skills the WEF named as one of the "core skills top 10" in their Future of Jobs report 2023: "empathy and active listening" (WEF, 20223, p. 38) and propose that it should also be added to the education of interdisciplinarity.

In the FOUNDING LAB program, we combined the idea of *saying goodbye to one's individual ideas and embracing change and collaboration for novel outcomes* with UNESCO's *action-oriented learning* for a *transformative learning experience.* All of this was only made possible by bringing together a diverse group of students: diverse in terms of age, gender, cultural background and nationality, and disciplines. As the project descriptions show, interdisciplinarity was not the result of different disciplines working alongside each other, but of allowing different ideas to merge and emerge through collaboration.

1 Rieckmann, M. (2018): Learning to transform the world: key competencies in education for sustainable development. In: Issues and trends in education for sustainable development, UNESC https://unesdoc.unesco.org/ark:/48223/pf0000261802

2 World Economic Forum (2020): The Future of Jobs Report. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf

3 World Economic Forum (2023): The Future of Jobs Report. https://www3.weforum.org/docs/WEF_Future_of_Jobs_2023.pdf

Regina Sipos ↗ page 187
Maria Pfeifer ↗ page 187

Parts of this text were published in "Navigating Future Skills: The FOUNDING LAB Experience in Shaping the University of the Future", by Dr. Regina Sipos, Mag. Maria Pfeifer, and Anna Oelsch BSc. This paper was published in the "Conference Proceedings of the STS Conference Graz 2024", Critical Issues in Science, Technology and Society Studies, May 6–8, 2024.

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Over the course of four months
the FOUNDING LAB students
worked on Fall Term projects
that unite various disciplines.
The 25 Master and PhD students
from all over the world brought
in an immense variety of
personal projects and skill sets.
In this eclectic composition
and with carefully curated
and designed support
structures by the FOUNDING LAB
Fellows and the Facilitators, the
processes took fascinating turns.

Pro

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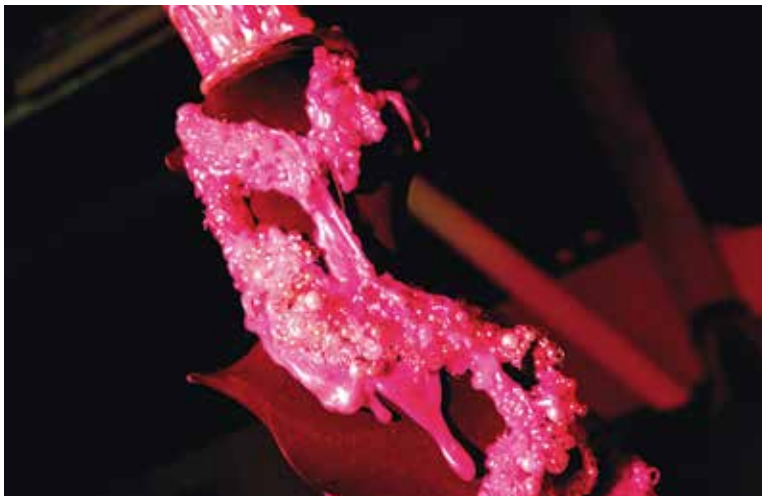

Bimbo Dildo

Mar Osés

In the realm of gender performance, adopting a hyperfeminine role has been proven to be a sign of resilience against deep-rooted misogynistic prejudice. And this is the case in the *Bimbo Dildo. Prototyping penetration technologies* (2022 – 2023), the project discusses the self-sexualization and embracing of hyperfeminine codes that take place through the reappropriation of the bimbo stereotype, presented via the image of the dildo. This concept references and builds on Paul B. Preciado's theoretical framework in *Countersexual Manifesto* (2018) as it explores the notion of dildo from a polyhedric perspective: considering all its symbolic, artistic, technological and sexo-political possibilities.

The project suggests reinterpreting the exaggeration of the stereotype/gender performance as a method of infiltration, subversion, and penetration (this is a paradoxical game of oxymorons because the concept traditionally aligns with the phallus and its strongly masculinized character) while bimbos subjects have demonstrated they have the power of transforming the subjectivity of those who interact with them from within and function as a clear example of body modification.

Embarking from this theoretical framework, the DIY *Bimbo Dildo* is presented as a symbolic-operative object for pleasure and gender disruption. Prior to my participation in this program, the dildos I had produced served as symbols that represented the bimbo penetration technique in a more inconspicuous way and which harbored a high degree of DIY potential, urging the audience interacting with them to craft their own bimbo devices for self-pleasure, the dismantling of gender binarism, and the penetration of

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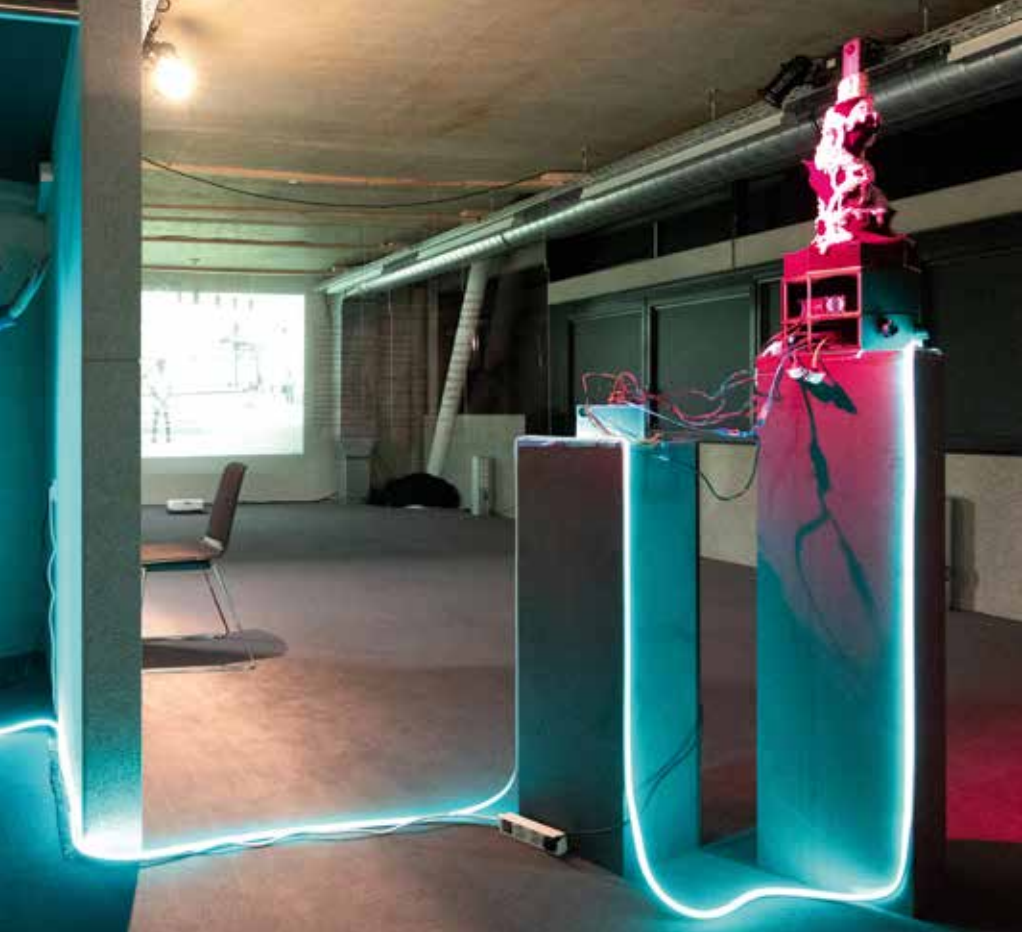


other people's subjectivities. These previous iterations of DIY dildos were constructed using basic physical computation knowledge and components, such as vibration motors or pushbuttons, and the information provided by the online DIY sex toys communities. A web of collective wisdom was proposed through the distribution of physical copies of a *Bimbo Dildo* zine during the showcasing of these prototypes (for example, in the Arse Elektronika *Sexponential* venue, Ars Electronica 2023). This manual offered detailed, step-by-step instructions and coding guidance for making one's own dildo, thereby fostering a collaborative knowledge-sharing network.

Alternatively, during the FOUNDING LAB Fall Term program, *Bimbo Dildo* has culminated in the production of a more mechanically ambitious proposal. This prototype features three key dimensions: an internal movement system derived from mechanical engineering, a hyper-feminine exterior crafted with artistic expertise, and, for the first time in this project, the usage of Virtual Reality and 360-degree video. These two elements are used to visually represent the agency in bimbo gender performance, by offering a metaphorical insight into this system's perception that can be experienced by the audience firsthand through VR. In this exercise of repositioning, traditional dichotomous roles associated with hyperfemininity—such as consumption versus objectification or passivity as opposed agency—are blurred.

Process Reflection

By Mar Osés

Previous iterations of DIY bimbo dildos had been developed during my research on this topic, but in the context of the FOUNDING LAB Fall Term, and with the support of my collaborator Daniel Michalski, the project aimed to develop an enhanced version of a dildo that would help us to rethink gender performance from a broader perspective and through a new set of similes. With the resources and collective wisdom available through the FOUNDING LAB team, alongside insights from peers and fellows, this project found its way into exploring the construction of a *Bimbo Dildo* that embodies greater agency. This text primarily focuses on the development of the internal system of this prototype, as opposed to elements such as its hyperfeminine exterior or the use of VR.

In its initial stages, the prototyping of this *Bimbo Dildo* involved an assessment of the most desirable features to equip the system with, such as the ability of the dildo to sense movement (e.g. using PIR sensors) and its reactivity to such presence of the public. The final design, refined and brought to fruition through the valuable insights and mechanical engineering training of my collaborator, Daniel Michalski, incorporated four NEMA motors. Through a threaded system, these motors manipulated the four axes of a core spring, which served as the backbone of the dildo itself.

During the implementation phase, incremental modifications were accommodated to overcome system performance challenges (such as limiting the range of data the sensors could collect or using strong thread instead of the first alternative, less flexible metallic cables). Designing and 3D printing specific components was essential for constructing the structure, including the motor housing, the double-height base walls, and the support structure for the core spring. Chiara Croci, a key member of the FOUNDING LAB team, provided essential support with her in-depth 3D printing knowledge, crucial for the successful production of these pieces.

Efficiently powering the two microcontrollers responsible for controlling the motors and sensors was a major challenge. To address this, we acquired a second-hand PC and repurposed its components, primarily reusing its power source and wiring. This approach not only provided an effective solution but also aligned with sustainable practices by utilizing existing technology, while other parts of the PC were also allocated for reuse in future projects, in a commitment to resourcefulness.

The process of building this more ambitious system gave me a broader skillset in terms of design, mechanical engineering and programming. Nonetheless, while significant progress was made in regards of endowing *Bimbo Dildo* prototypes with more agency, there remains untapped potential in the motor and string system used, suggesting that with further time and exploration, we could further elaborate on its range of possibilities, not only as an effective mechanical system but as a symbolic machine. Therefore, this prototype lays a promising foundation for future research on user-level designing and hacking of digital technologies.

Within the framework of the *Bimbo Dildo* research project, this prototype represents a significant advancement in building experimental dildos for gender disruption. It is not only proof of successful transdisciplinary collaboration in terms of infrastructure and design achievements but also particularly in terms of personal growth and community building. The insights of my colleagues, Dimitris Mertzos, Amanda Bennetts, and Nathan Cornish, with whom I had the pleasure of sharing the studio with on-site, as well as the mentoring of Regina Sipos were crucial to keep this project evolving, but ultimately the most fulfilling aspect of this experience was the knowledge and perspective exchange that took place between every participant—the students, fellows, and team members.

Mar Osés ↗ page 85

Crip Sensorama

Puneet Jain

As a part of the FOUNDING LAB program, I investigated how the technologies of XR (eXtended Reality) could be re-imagined and hacked (in their early stages) to act as a platform of storytelling for (and with) people with disabilities—enabling people with disabilities to shape and share their own future imaginaries. XR is an umbrella term for computer-generated environments—Virtual/Augmented Reality (VR/AR), comprising a set of body-worn interfaces (head-mounted displays, hand-held controllers, wearable haptics etc.) that bridge the physical body within a continuum of real and virtual space. However, the current generation of XR technologies demand an intricate

Martin Hieslmair

coordination between the head (e.g. 360-degree head movements) and dexterity of hands (e.g. rapid finger movements on hand-held controllers) to navigate and interact inside the virtual environments—a gestural landscape that my close friends and collaborators, Eric Desrosiers and Christian Bayerlein, cannot afford.

Eric (based in Montreal, Canada) and Christian (based in Koblenz, Germany) are artists and disability activists living with quadriplegia, who regularly work with technologies such as robotic arms for painting, facial recognition algorithms for music generation, and brain-controlled interfaces for flying drones. Unfortunately, even with such technological expertise, they cannot access the world of Virtual and Augmented Reality, which indicates that these technologies are still designed with implicit assumptions about human bodies—what HCI researchers Gerling and Spiel have also described as a "corporeal standard" (2021) (i.e. an ideal white able-bodied user).

Crip Sensorama opened the world of VR/AR for Eric and Christian by enabling them to access VR/AR through a sequence of mouth gestures. Using the methodology of "criptastic hacking" (Yergeau, 2014) (an approach where technologies are hacked along with people with disabilities), I trained and parametrized a set of mouth gestures (e.g. opening of the mouth) using machine learning algorithms on Eric and Christian—acting as an input method to navigate and interact in VR and AR. Additionally, utilizing the immersive medium of VR/AR storytelling, 360 degree videos, spatialized sound, I stage *Crip Sensorama* as an invitation for people with and without disabilities to re-configure and re-adjust their facial micro-gestures to that of Eric and Christian—the tongue, the chin, the gaps between the upper and lower lip, the opening of the mouth as a story unfolds around disability culture and living. Hence, enabling the audience to adjust to the temporal experience of living with disability, what disability scholars have described as living in "crip time" (Kuppers, 2014; Samuels, 2017) foreseen as "a means to wrestle the ways in which "the future" has been deployed in the service of compulsory able-bodiedness." (Kafer, 2013)

Overall, *Crip Sensorama* as a VR/AR project harnesses the technologies of VR/AR and Artificial Intelligence to critique the perception of disability as a "problem" but rather flips the power dynamics by introducing the non-disabled groups to disability culture and living through accessible VR/AR technologies.

Process Reflection

By Puneet Jain

The project *Crip Sensorama* investigates how the current generation of Virtual and Augmented Reality technologies are designed with implicit assumptions about human body-minds. Demanding extensive bodily movements such as rapid hand gestures and hand-held controllers as the only input modalities to navigate, move, and interact, 360-degree head movements as measures of immersion reveal that the proposed "Metaverse" is inaccessible for people living with sensorimotor disabilities such as my friends and collaborators Eric Desrosiers and Christian Bayerlein, who have quadriplegia.

This does not come as a surprise, as accessibility is often an afterthought, a bare-minimum action performed by able-bodied people to "adjust" the marginalized body-minds, what disability media studies scholar Elizabeth Ellcessor has described as the "common-sense idea of accessibility" (2017). *Crip Sensorama* thus critiques such an ableist design strategy and instead draws on "Nothing about us, without us" (Spiel et al., 2020), which calls for including people with disabilities in the design and critical modification of technologies from the very start of a design process.

Hence, as a non-disabled HCI researcher and artist, I worked closely with Christian and Eric to investigate how technologies of VR/AR could be hacked, tinkered, and modified to make them accessible for people with sensorimotor disabilities and in-return how accessible VR/AR (as a storytelling medium) can enable us to reimagine bodily subjectivity, interaction, and experience. Concretely, I followed the methodology of "criptastic hacking" (Yergeau, 2014), an approach where technologies are hacked and reversed by embracing the already existing resources, bodily knowledge, and "disabled" technologies (technologies already in use by people with disabilities). Hence, with Christian's and Eric's long practice of using mouth gestures to operate and control computer joysticks and their wheelchairs, I developed custom mouth gesture recognition algorithms, and a set of mouth gestures as a means of input to navigate and interact in VR/AR.

Additionally, utilizing the immersive medium of VR/AR storytelling, 360-degree videos, spatialized sound, I stage *Crip Sensorama* as a multisensory 10–15-minute VR/AR installation—and as an invitation for people with and without disabilities to re-configure and re-adjust their facial micro-gestures to that of Eric and Christian—the tongue, the chin, the gaps between the upper and lower lip, opening of the mouth as a story unfolds around disability culture and living.

Working as a non-disabled researcher/artist with people living with quadriplegia during the FOUNDING LAB Summer School, I got exposed to the hacks, the wisdom, and unique bodily embodiment of navigating an inaccessible world—an everyday experience for Christian and Eric.

Hence, thinking of the University of the Future, I would like to encourage the new university to not only welcome people with disabilities but also to embrace the knowledge they bring with them—for instance, as starting points, incorporating disability studies, introducing students to sign languages (ASL, ISL) and mathematical tools used by people with low vision and visual impairment such as Taylor Frames.

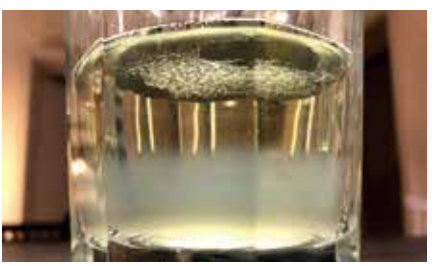
Puneet Jain ↗ page 108

DinkA

Qi Chen

The results of my research during the FOUNDING LAB Fall Term program are a series of tools for collecting genetic fragments and a DNA ink for authentication using human genetic fragments. I recorded all the genetic traces that could be left behind, such as saliva, hair, skin, urine, blood, etc., and used these genetic traces to enhance our identity. Hair and saliva were the easiest and most widely left behind. It was the start of a genetic series of projects. I made ink by mixing DNA extracted from saliva with melanin extracted from hair and blending the tangible and genetic dimensions of identity condensed into a signature stroke.

By sending out adverts, many people expressed an interest in becoming volunteers and donating saliva and hair samples on social media platforms as well as in my comments. However, there is always some bias in the collection process.



Martin Hieslmair, Qi Chen

Therefore, I designed tools to collect hair and saliva samples. Inspired by the design idea of the Japanese Chindōgu[1], the solution I came up with was that it would be interesting to use a portable device that automatically sucks up the hair. So, I started experimenting with a Dyson Hoover and kept iterating the device's design.

For the Bio Art experiment, I learned about biology and got technical support from the BioLab at the Ars Electronica Center. Starting from how to calculate the volume of reagents, then trying to extract DNA from saliva with detergent and salt at home in order to understand the principles involved, and then to professional equipment, I modified my experiment protocol many times. However, I also experienced many failures during the experiments. When extracting melanin from hair, I first used the method of extracting melanin with acid and alkali, and the obtained melanin yield needed to be higher. The acid and alkali damaged the structure. Then, I tried to extract it with the enzyme method. I need to look further into whether users can use DNA ink for authentication.

After realizing the personal experiment, I also explored whether users of different race and cultural backgrounds psychologically accepted and used their DNA ink. Some stated that it was exciting, that they would like to have their own DNA ink, and that perhaps writing with it would make them more accountable for their words and actions. A few also said it would be creepy to receive someone else's writing in DNA ink.

The project demonstrates the fusion of art, science, and technology. Through DNA ink, I have created a novel medium of artistic expression. This transcendent expression not only weaves the narrative of my life but also explores the creation of a novel and intriguing intersection between biological identity and self-expression. In the hair-collecting installation, I propose a new method of harvesting genetic material, demonstrating how the field of bio-art makes innovative use of engineering techniques. Beyond this, the project raises questions about informed consent, privacy, and the responsible handling of sensitive genetic data. The exploration of the use of DNA ink for authentication introduces new applications of genetic information and opens up discussions about the intersection of genetics, identity, and security.

1 Chindōgu (珍道具) is the practice of inventing ingenious everyday gadgets that seem to be ideal solutions to particular problems, but which may cause more problems than they solve. https://en.wikipedia.org/wiki/Chind%C5%8Dgu

Process Reflection

By Qi Chen

The project was inspired by my personal experience when I was stressed at work, and I noticed my hair falling out everywhere. I began to observe its color, quantity, length, and where it fell. It has a narrative quality, recording the trajectory of my life, reflecting my state of being, my physical condition, and all sorts of other information. At the same time, it means that I leave genetic traces everywhere. Could this genetic information be encoded and decoded in an interesting way? Therefore, my initial concept was to extract DNA and melanin from the hair, develop it into a unique ink, and utilize it for identification and authentication.

The original experimental protocol was to extract DNA from hair with hair follicles and melanin from the hair shaft portion of the hair, thus mixing and making the ink. During the experiment, I assumed that if the melanin in the dissolved hair contained DNA, then I would not need to extract the DNA separately and would only need to verify that the words written in the ink contained DNA. However, with the technical support of BioLab, I quickly disproved the hypothesis. Because the DNA extracted from hair is only a DNA fragment, I cannot use the ink-mixed melanin for authentication.

Since then, I have widened my focus from only hair and have recorded all the traces of DNA that can be left behind, including saliva, fingernails, dander, and more. I expanded this project into a series that utilizes these genetic fragments left behind to enhance our identity. I found that hair and saliva were the most accessible and most widely left behind; most importantly, saliva had the complete DNA sequence. Therefore, my program changed to extracting DNA from saliva and mixing it with melanin from hair as an ink.

At home, I have studied the extraction of DNA from saliva using pineapple juice, washing up liquid, salt, and alcohol. Pineapple juice containing bromelain acts as a protein hydrolyzer to rupture cell membranes and washing up liquid is a detergent to break down cell walls and expose DNA. Add a small amount of salt, which acts as a flocculant to make the cells' contents stick together.

Extracting melanin from hair requires removing 65-95% of the hair protein, which can then be separated from the melanin by acid-base and enzymatic methods. Initially, I used the easier-to-achieve acid-base method, but the results were not very satisfactory. Acid/base extraction not only changes the structure of the melanin molecule but also destroys the structure of the DNA if it is mixed with it. In contrast, enzymatic extraction of melanin retained the morphology of intact melanosomes.

Interdisciplinarity played a vital role in the project, bridging different fields such as biology, art, genetics, and technology. The project originated as a personal experience and evolved into a multifaceted exploration that required interdisciplinary collaboration. It integrated the biology of extracting DNA, the chemistry of extracting melanin, the art of creating DNA ink, and the hair collection installation technology. The collaboration with the BioLab at the Ars Electronica Center exemplifies the importance of interdisciplinary collaboration, as technical support from biologists helps increase the project's scientific rigor.

I think the new university could be strengthened by fostering collaboration between the biology, art, and engineering departments and could include the project as part of the Bio Art program. Design collaborative spaces that bring scientists, artists, and technologists together. Develop a public engagement program to provide public awareness and understanding of bio art. Exhibitions and lectures could demonstrate the potential of bio art and encourage dialogue between the university community and the wider public.

Qi Chen ↗ page 91

Martin Hieslmair

Flagged in Flux

Dorotea Dolinšek

The return of life to the Moon is becoming increasingly tangible. Removed from the Earth, this natural satellite represents a kind of 'elsewhere', an alienated, unclaimed environment that holds a possibility of another geographical frame. The initial dream of space travel, however, soon became tied to the premise of colonialistic and nationalistic territorial claim along with commercialization and privatization, mirroring planet Earth's models of conquest. As such, the Moon stands as the initial extraterrestrial landscape to undergo colonization as a material process. When the first humans stood on the Moon, they symbolically marked the landscape by planting a flag, with its fabric supported by a metal frame, since the Moon lacks wind. Furthermore, the Moon also lacks oxygen and a layer of atmosphere that shields our biological bodies and infrastructure of ideologies from UV radiation on Earth. Since the astronauts and cosmonauts first planted the flags, they have endured 600 cycles of +100 degrees Celsius two Earth-week-long lunar days and equally long -150 degrees Celsius lunar nights. Unfiltered solar ultraviolet radiation on the airless lunar surface has bleached all the flags white, marking forced surrender.

Martin Hieslmair

The white flag on the Moon was the main object of investigation in this project, which has various levels of ambition—the first one being presented as a kinetic sculpture, an exercise for self-reflexivity. Together with collaborators, we made a replica of a hammer that was used to plant the Apollo flags on the Moon. The hammer, made out of two types of aluminum, is slowly but gradually being dissolved in an electrolyte and as such works as a galvanic cell—a battery that powers the propeller it is linked to, creating artificial wind that enables the white flag to flutter. The volume of the hammer was based on calculations modified and slightly enlarged, for the purpose of providing a suitable amount of energy for the propeller.

Through the project I wanted to address the productive limit to the possibility of colonization and provincialization, as well as a productive moment of alienation—when we see a blank flag, and can no longer recognize ourselves in it.

Amid explicitly troubled ecological and geo-political times, confrontation with the challenges of hostile outer space environments has an enormous impact, for it challenges us on practically all fronts of existence. Once confronted with its hostile and abiotic environmental characteristics, we find a renewed form of manifestation that goes beyond settler colonization, a zone where, to really inhabit it, we must aim to transcend various kinds of borders.

Process Reflection

By **Dorotea Dolinšek**

Interdisciplinarity is a cornerstone of my artistic practice, where I tend to integrate science and technology, as they are integrated into the fabric of our daily lives. In the creation of my works, I often delve into the realms of technology and biotechnology, where I create own tools to execute the ideas. This is a collaborative process that usually involves engaging with scientists and engineers who are my crucial dialogue partners and collaborators. In these kinds of projects, everyone involved has a different metaphysical interest and therefore different entry points to the narrative and the project's execution. These collaborations can be mutually inspirational, but are rarely smooth, and the journey can get quite bumpy; which usually results in a deepened mutual understanding that enhances the outcome.

The presented kinetic sculpture is a result of collaborative efforts on different levels. The sculpture contains a replica of the Lunar hammer, which is used as a galvanic cell and therefore works as a battery that powers an electric motor for spinning a propeller blade. This propeller produces an artificial wind that makes the bleached-white flag flutter, expressing a human approach to Lunar infrastructure. The meticulous design and execution of the Lunar hammer involved the expertise of mechanical engineer David Kolšek, who runs Peskovnik laboratory at the Faculty of Mechanical Engineering in Ljubljana, Slovenia. Two types of aluminum were chosen based on David's thorough calculations, for the two parts of the hammer that served as two electrodes of the cell. In our case both electrodes are submerged in the same electrolyte, so he separated them using a non-conductive spacer. Materials were selected with the help of electronegativity charts with the intent of them being as far apart as possible to achieve a higher voltage. For further development, artist Dmitry Morozov was a crucial collaborator. With his help, I linked the two metal elements to the propeller. Metal designer David Drolc was the operator of the metal stand, which was based on my plans and sketches.

While my projects often emerge from collaborative efforts, each project-making journey stands on its own and has its own challenges and level of intensity and unpredictability. This specific collaboration, though a small scale and straightforward one, symbolizes a dynamic between art and science. Rather than viewing them as a seamless merger, I perceive their intersection as a dynamic friction. The metaphor within the project speaks to the necessity of crossing various borders in outer space exploration, emphasizing the interdisciplinary frictions between disciplines and human and non-human agencies. Outer space explorations speaks volumes about our earthly endeavors, where interdisciplinary frictions can serve as a catalyst for creativity and innovation, pushing the boundaries of artistic expression and scientific exploration.

Dorotea Dolinšek ↗ page 60

Glitching Optimization in a Few Steps

A Performance-Lecture about Robotic Failures

Julie-Michèle Morin

In collaboration with Letta Shtohryn, Daniela Brill Estrada, Lea Luka Sikau, Bart Kuipers

Hacking Techno-Capitalism through Failures and Glitches

Historically, robotics has relied on familiarity to optimize interactions between humans and robots (Mori 1970, Turing 1955). However, what appears familiar, and therefore implicitly normal, remains highly subjective and biased (Rhee 2018). Once human values and perspectives are encrypted in software and hardware, technologies massively adopt dominant views and normative behaviors (sexism, racism, ableism, etc.) (O'Neil 2016, Wachter-Boettcher 2017, Noble 2018, Benjamin 2019, Atanasoski & Kalindi 2019, Crawford 2021). As a PhD student in intermedia theater and dramaturgy investigating robotics and performing arts from queer, decolonial, and anti-capitalist perspectives, I believe the stage is a rich site of experimentation to diversify robotic imaginaries.

Martin Hieslmair, Dorotea Dolinsek

The performance *Glitching Optimization in a Few Steps: a performance-lecture about robotic failures,* is a video and performance-based artwork that dives into the realm of robotic labor. Featuring a diverse array of robots attempting and failing to complete assigned tasks, the performance brings into question how the concept of robotic optimization contributes to maintain neoliberal perceptions of performance, while reinforcing a limited understanding of both humanness and machineness.

The project adopts the format of a lecture-performance, where I blended theoretical reflections on robotics standards with intimate stories about different types of failures encountered in my own queer academic trajectory. During my performative experimentation with the robots, I designed different dramaturgical tasks for them to fail softly: the *Roborock S8* (a robotic vacuum) tried to clean a mess in a useless and challenging maze. The *Igus Rebel Cobot* (a robotic arm without claws or grasping device) attempted to draw with a 3D pen and compete in a rock, paper, scissors game with myself. The *Thymios* (three tiny wheeled robotic devices used for educational purpose) did everything they could to stay on a table without any sense of orientation. And *Spot* (a robotic dog), gave its 100% to stabilize itself while navigating slippery surfaces. Structured by a textual narration performed by myself, the performance unfolds in three distinct chapters: "Dealing with your own mess," "Trying to grasp the world as it is," and "Looking for balance: becoming slippery". It materializes itself as a series of filmed and live performances with those robotic agents.

Drawing on queer theories and the way they envision failures as a form of activism against the hegemonies (Halberstam, 2011), and on my own experiences as a queer person who failed so many times to respond adequately to the so-called norms, the project tackles the myth of familiarity, normality, and optimization in the robotic field. By hacking with care the role and purpose of these robots, I hope to make visible marginal visions of robotic imaginaries and, in doing so, materialize ways of protesting against the objectives and methods of techno-capitalism.

This project is therefore an opportunity to re-imagine our entanglements with robots outside of our desires for optimization. My performance aims to escape techno-capitalist assignations, and temporarily break away from the productive destiny reserved for the robots. As such, I wish to add a socio-affective and political depth to the debates around the robotization of work and put forward critical perspectives on the technological alienation of labor that this technical revolution underpins.

Collaborating with humans and other-than-humans agents: interdisciplinarity leads to weird drama

This research-lead performative work is interdisciplinary in its approach as it combines insights from critical science studies, new materialism philosophy, queer theories, and robotics. The project engages with critical science studies by bringing into question the historical patterns of optimization at the core of the robotic field. New materialism's perspectives are enmeshed in the concep-

tual fabric of this work, as they constituted a way to better understand the agency and behaviors of robotic devices outside normative and traditional conceptions of living and non-living matter. Queer theories and their perspective on failure as a gesture of resistance were central in my attempt to broaden our robotic imaginaries outside the trope of performance and optimization.

The use of a lecture-performance format combines theoretical reflections with intimate storytelling to explore hybrid ways of mobilizing intellectual resources such as articles, conferences, and academic knowledge. Merging multiple disciplines such as poetic writing, live theater, academic codes, and video-based performance, the project goes beyond academic or artistic inquiry to engage in interdisciplinary hacktivism.

Gaining access to specialized equipment that might not be readily available to individual artists was also impactful on the development of my project. Indeed, having the possibility to borrow Spot from the Institute of Business Informatics / Communications Engineering at Johannes Kepler University (JKU) and the IGUS Rebel Cobot from the Creative Robotics department of University of Arts Linz allowed me to engage with a broader spectrum of robotic possibilities.

During the Fall Term, we visited the MARK factory for metal goods, where I had the opportunity to observe and engage with robots in a manufacturing setting, which provided valuable insights and inspiration that significantly contributed to my project. The physical presence, sounds, and movements inspired the aesthetic choices in my performance and allowed me to capture visual and sonic material onsite for the artwork.

Letta Shtohryn oversaw the video and sound editing aspect of the performative work and brought her expertise in visual storytelling to the project, enabling me to craft a compelling narrative through the arrangement of visual, sonic, and textual elements. Her perspectives and feedback enhanced the overall pace and consistency of my performance-lecture, making it more engaging and impactful for the audience. I also acquired technical skills as Daniela Brill Estrada (artist and researcher at the Institute of Business Informatics / Communications Engineering at JKU) taught me how to control the robotic dog from Boston Dynamics, Spot. This hands-on experience enhanced my technical proficiency in working with robotic technologies, providing me with insights into the practical aspects of interacting with and managing a sophisticated robotic system. Observing how Spot navigates different environments, responds to commands, and handles challenges has contributed to my insight into the intricacies of robotic behaviors.

Overall, this interdisciplinary approach to performative work allowed me to acknowledge the agency and viewpoints of both human and other-than-human entities, creating a more inclusive and nuanced exploration of the themes within my performance-lecture. It provides an opportunity to uncover and address biases in design, usage, and societal perceptions, contributing to a critical examination of the impact of technology on various aspects of human and robotic standards toward optimization and failure. These encounters were the joyful foundations of some weird drama.

Julie-Michèle Morin ↗ page 63

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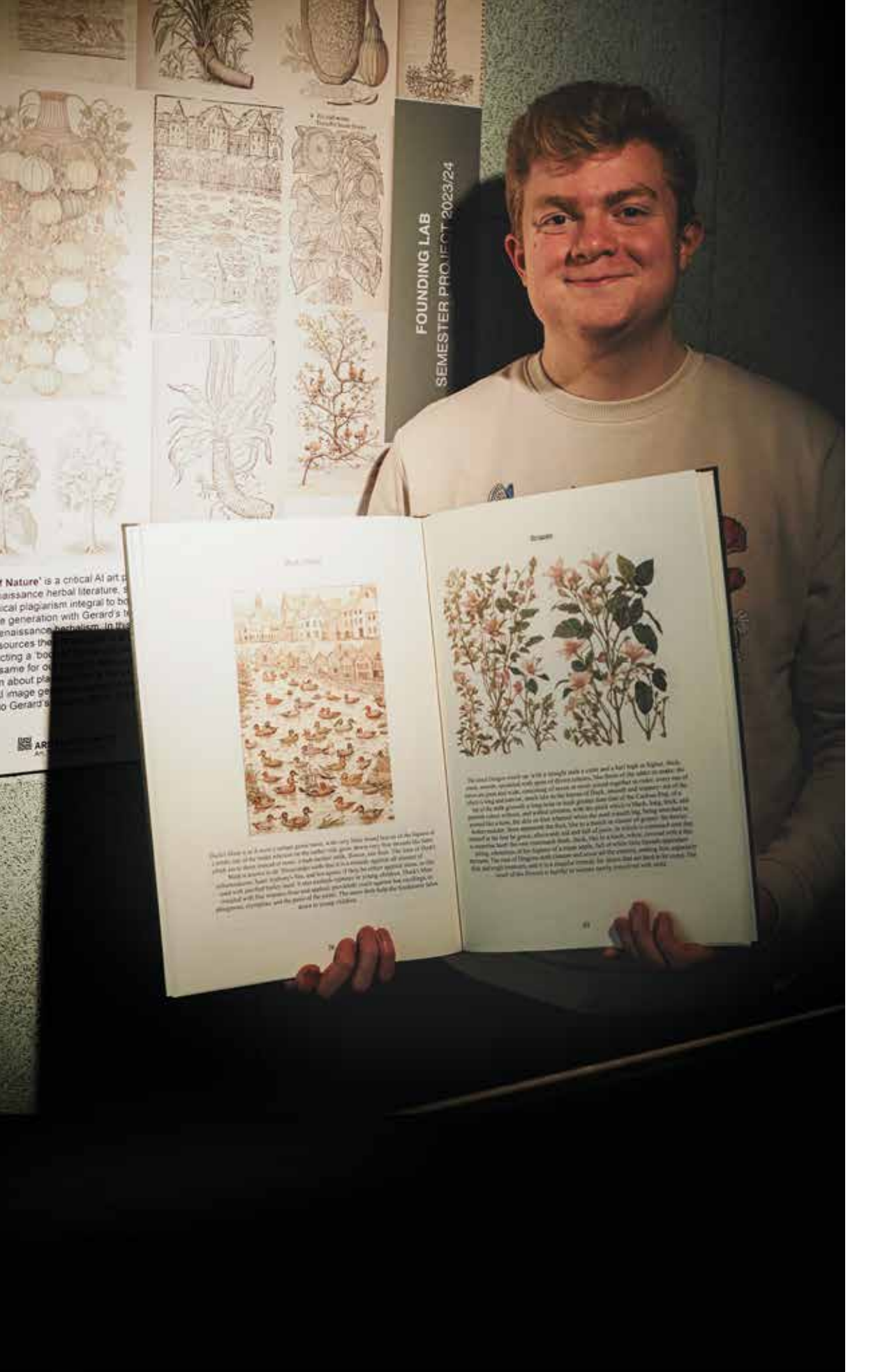
Mechanical Learning and the Book of Nature

Nathan Cornish

Mechanical Learning and the Book of Nature is a critical art piece that suggests an alternative history of AI through comparison with Renaissance herbal literature. This project draws connections between the generation of nonsense from the uncritical plagiarism integral to both knowledge systems. In this context, the results of system combination highlight the way knowledge technologies reproduce the sources they draw from and undermine the idea of AI as a new and futuristic system. The idea of a General AI that can, by containing a full picture of available information, come up with new ideas greater than the sum of their parts fits nicely with the idea of a book of nature that could contain all of created knowledge.

Combining AI image generation with texts and images from John Gerard's 1597 *The Herball or General Historie of Plants* and Thomas Johnson's edited edition of 1633, a book was created to root AI knowledge systems in the aesthetic landscape of Renaissance herbalism. The book is 54 pages long and includes a frontispiece, introductory comment, and 50 plant pages, each of which combines an AI generated image with Gerard's original text. As the texts introduce real observations of the plants alongside strange tales and dubious medical advice, the images introduce modern details and colors mixed in with the original inaccurate illustrations and generative AI's characteristically vague imitations. Generating

Martin Hieslmair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SEMESTER PROJECT 2023/24

nonsense from both sides creates a work which looks beautiful and academic but the closer one looks, the more obviously tangled it becomes.

The novel aspect of this project is the facilitated interaction between future and past knowledge technologies that challenge the prevailing narrative that Artificial Intelligence is a technology at the forefront of a scientific progress story. Instead, looking critically at the ways AI is created, used, and promoted, we see that mechanical knowledge and the dream of a total system is a much older phenomenon. I hope to provoke a reassessment of AI as a knowledge system through a tangible experience of shared hubris, aesthetic power, and plagiarism.

In this process I asked questions around the role of historical analysis and comparison in contextualizing contemporary issues and speculative futures. Does AI really represent a new knowledge system? Which ideas about the past are undermined by analysis of contemporary technology? How can parallel studies of the history and future of science inform both the study of plant history and our understanding of Artificial Intelligence. This opens up possibilities of further study exploring the mechanisms by which we have encoded interaction with plants into knowledge technology as well as exploration of a wider history of mechanical learning. Plant herbals are one of many comparisons that could have been made and this project also shows the value of creative approaches along the intersections between individual interests and interdisciplinary community.

Process Reflection

By Nathan Cornish

In the process of creating *Mechanical Learning and the Book of Nature* I explored a new way of doing history in critical artistic dialogue with technological pasts and futures. My key interest is the way knowledge systems have encoded interactions with nature and manipulated them through copying, collecting, and reproducing information. Artistic approaches allowed me to take this central interest and combine one of my areas of historical expertise with critical AI studies, an area completely new to me, in a way that simply and humorously expressed my ideas. I felt like this way of working with creative space and public installation allowed me to explore the subject clearly and to present something tangible that was of deep academic relevance and also accessible to the general observer.

Collaboration and interdisciplinarity were key to my project even though I did not have an official collaborator. My use of plant herbals came from several years of study with academics and archivists as part of previous research projects. These collaborations came with me into the process. While working on this project in Linz, two collaborations were vital. First, artistic community and advice helped me to brainstorm and create ways to present my ideas as an installation. As a historian, this was a completely new research presentation process to me, though it felt like a natural way to express my ideas. Secondly, working in an interdisciplinary space between critical AI and plant history required a long succession of tutorials and conversations about machine learning and artificial intelligence. It took a lot of different perspectives and explanations to give me the confidence that my intuition had connected my plant studies with critical AI in a meaningful way. This refining of ideas and exploration of presentation methods was the key process between my initial idea and the final output.

The installation itself looked very similar to how I had sketched it out initially, with the hybrid plant pages highlighted by the aesthetics of Renaissance herbal books and their memory. I found that designing and commissioning the book brought the processes of 16th century knowledge into connection with 21st century technology in a mutually informative study.

I did not select Renaissance herbals because they were the perfect comparison to AI but rather because they were the links that were made through interaction between my academic background and the interdisciplinary community in Linz. As a model for the new university, this is exactly the kind of connectivity an interdisciplinary institution should promote. It is important to stress the importance and value of historical perspectives and methods of analysis as context, inspiration, and comparative studies in the study of digital transformation. A continuation of the project would involve the fine-tuning of a theoretical methodology for studying knowledge mechanics and writing up the herbal-AI comparison into a general audience book.

Nathan Cornish ↗ page 70

Metalens

Johanna Einsiedler & Linas Vaštakas

In a world of information overload, finding information on a certain topic is not a problem. The real challenge is making sense of the available information. This is also true for scientific knowledge: since 1996 more than 45 million articles have been published in scientific and technical journals and every year over 2.5 million new ones are added.[1] This makes it increasingly hard to find evidence-based answers even to simple questions.

In our project, we posed ourselves the question: Is it possible to make finding science-based answers easier? The project outcome is *Metalens*—a small website prototype that allows users to interactively search and filter meta-studies. It is publicly accessible at *https://metalens.tech*

Aggregating Scientific Results

Metastudies are statistical analyses that combine the results of multiple scientific studies on the same topic. This makes them a great starting point for collecting published research results on a specific subject. However, meta-analyses are usually not easily accessible to the general public: the relevant studies are often difficult to find or detailed subject-matter knowledge is needed to interpret the results. Further, their static, paper-based format makes it impossible to use the data to answer any questions not explicitly investigated by the researchers.

tom mesic

"Living Reviews" which are typically periodically updated reviews that are published online[2], is a fairly new publishing format developed in response to this challenge. However, these are usually targeted at researchers and mostly focused on one specific point. Our project seeks to build a middle ground by creating a tool that provides insights into a broad range of topics to anyone interested in science, not just scientists.

Making it user-friendly

This requires two main challenges to be solved:

1. To make the website accessible, the user interface needs to allow for intuitive interaction with the displayed scientific content.
2. To make the website relevant, it needs to be based on an extensive database of scientific results of general interest.

In our project, we tried to investigate and prototype ways to address both of these challenges. Based on standard ways of displaying meta-analysis results in scientific literature, we built a website featuring an interactive visualization of scientific findings with incorporated filtering functionality. Further, we have been iteratively developing a standardized yet flexible data storage format that enables us to easily add new studies to the website at any point in time.

Building a Database

Regarding the actual building up of the database, we conducted research on already existing open-source databases and talked to academics doing research in meta-science[3]. Based on this, we decided to use the open-source metadat[4] dataset as the foundation of our database of scientific studies. This allow us to first test the relevance of our service as well as its functionalities with potential users, before investing substantial amounts of time in data extraction.

Our next step in building a database is to use large language models (LLMs) for partially automated extraction of information from metastudies. We have started investigating state-of-the-art tools for retrieval augmented generation (ranging from ChatGPT to Llama 2), and have achieved some promising results extracting text from individualized data samples. Yet it is exactly the scaling up of this process along with corresponding improvements in data extraction accuracy that we are setting our sights on right now. This would allow us to make our tool truly universal—and not just limited to a small set of scientific questions.

Link: https://tiny-boba-d30542.netlify.app/
Website: https://metalens.tech

1 World Bank (2022); United Nations (2022). https://data.worldbank.org/indicator/IP.JRN.ARTC.SC

2 Wikipedia contributors. (2023, December 3). Living review. In Wikipedia, The Free Encyclopedia. Retrieved 20:58, January 16, 2024, from https://en.wikipedia.org/w/index.php?title=Living_review&oldid=1188076700

3 Specifically we attended the Open Science Community Sweden & Swedish Replication Network Conference 2024, the MASSHINE Generative Methods — AI as Collaborator and Companion in the Social Sciences and Humanities Conference 2023, and the Cultural Data Analytics Conference 2023.

4 Thomas White, Daniel Noble, Alistair Senior, W. Kyle Hamilton and Wolfgang Viechtbauer (2022). metadat: Meta-Analysis Datasets. R package version 1.2-0. https://CRAN.R-project.org/package=metadat

Process Reflection

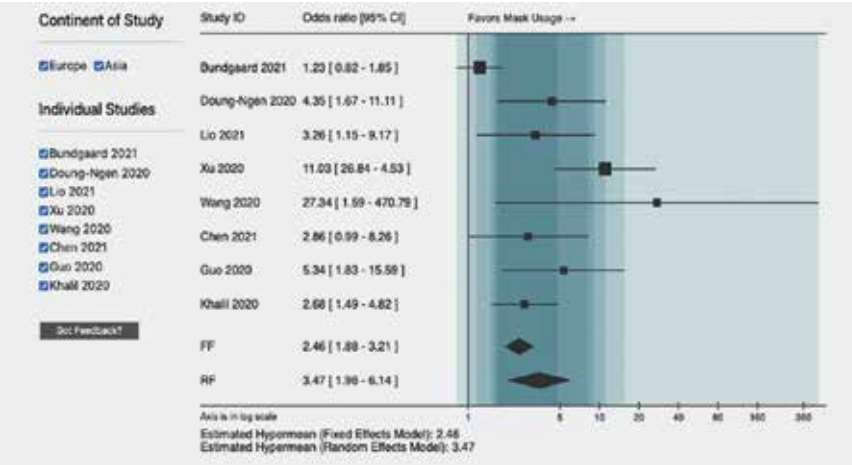

Figure 1: Screenshot from the prototype's forest plot displaying aggregated study results fitting a set of criteria chosen by the user

By Johanna Einsiedler & Linas Vaštakas

We started tackling our research question by getting an overview of alternative tools existing in the space. This led us to further refine our research question: while we had initially decided to—very broadly—digitize meta-analyses, we found that there was a lack of websites catering to the general public (as opposed to researchers). In response to this, we decided to focus on answering questions that are of general interest (e.g. What drugs help against the common cold?) and delivering information in a format that is understandable to people without domain knowledge. We understood that the first and most relevant step for our project was to find out whether we are able to build a product that people would actually be interested in using.

This is why we decided to initially focus on user experience development. In addition, by doing so we were able to fully draw on our respective interdisciplinary skill sets. While Johanna was able to bring in statistics knowledge and experience in data analysis, Linas contributed with his expertise in front-end development and insights from digital humanities. This resulted in a seamless task delegation with everyone taking over responsibility for a part of the project. Nonetheless, we both supported each other in the implementation phase, which also enabled us to extend our respective skills and gain insights into the other's area of expertise.

Based on this experience, we would suggest that a new university should emphasize project-based learning. Retrospectively speaking, we drew a lot of motivation for learning from working on a 'real' product that we would both be excited to use. Further, the unexpected challenges that typically arise in any kind of real-world project naturally incentivized collaborative problem solving and transfer learning.

When it comes to technologies, we mainly investigated interactive user-interfaces. Our goal was to make it easy for anyone to use ours too. While we certainly have not reached the optimum with regard to user-friendliness, critically questioning and testing our design has already helped us improve the interface. Apart from this, we also investigated the use of language models for information retrieval. We ran small experiments with commercial APIs and locally hosted open-source models, thereby testing the feasibility of such an application. Initial results have been promising and we are aiming to explore this in much more depth in the future.

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Linas Vaštakas ↗ page 75

Mirror Mirror

Chelsi Goliath

In collaboration with Christopher Theys

Mirror Mirror on the wall, show us the fairest truths of all. Unveiling the biases in machines, algorithms and AI.

Our project investigates the vital question of creating unbiased technology, specifically in AI and algorithms, for a more equitable future. We initially aimed to eradicate technological biases but realized the complexity of these issues, leading to an exploratory approach without definitive solutions. Our centerpiece, the *Bias Mirror* installation, serves as a literal and metaphorical reflection. It transcends being mere technology, emerging as an artistic medium that provokes introspection about AI biases and personal prejudices.

The *Bias Mirror* shifts the focus from providing answers to sparking questions and self-reflection. It's a catalyst for recognizing societal biases and personal involvement in these systems. The installation's strength lies in its ability to embrace complexity, offering a space for critical thought and personal discovery. It reveals biases in digital frameworks and personal biases, urging users to confront prejudices in their interactions with technology and each other.

Our collaborative approach was key, transcending disciplines and pooling diverse insights to create a multifaceted understanding of bias. This synergy ensured an inclusive environment, crucial for addressing bias and representation issues. Our introspective methodology fostered a mindful development process, contributing to broader discussions on equity in technology.

We adopted design thinking, empathizing with users, defining biases, ideating solutions, and rigorously testing our concepts. This human-centric approach transformed AI bias from an abstract concept into a tangible, interactive experience.

We utilized data science methods, including algorithmic analysis and machine learning, complemented by ethnographic research and critical theory analysis, to holistically understand and mitigate AI biases. Our analysis of datasets like Olivetti's face dataset, LFW, CelebA, and FairFace, along with CNNs and debiasing techniques, informed our approach to how biases in AI actually exist.

The novelty of our project lies in merging interactive art and technology. This integration elevates the project beyond technical solutions, creating an engaging, emotional, and intellectual user experience. The *Bias Mirror* is not just informative; it actively involves users, making abstract bias and fairness concepts personal and tangible. Its use of machine learning in an artistic context bridges the gap between complex AI technology and public engagement.

Our project poses the question: How can interactive art reflect and challenge hidden biases in technological systems? This underscores the role of art in revealing and questioning prejudices in technology and its broader societal implications.

Process Reflection

By **Chelsi Goliath**

Our project embraced interdisciplinarity, integrating fields like technology, psychology, socio-economics, and the social sciences. This multifaceted approach was crucial in comprehensively understanding and addressing biases in AI. By merging the technicalities of AI and algorithm development with human behavioral insights and societal implications, we crafted a nuanced and effective interactive installation. This interdisciplinary strategy enriched our perspective, allowing us to delve deeply into the intricate relationship between technology and societal dynamics.

In the project's early stages, we grappled with an overload of information and diverse viewpoints. This led us to hone in on personal experiences of bias and microaggressions, both in personal interactions and through technology. As the project progressed, guidance from mentors helped us navigate this emotionally charged topic in a healthier, more con-

Martin Hieslmair

structive manner, shifting from anger or frustration to a focus on open dialogue and deeper understanding of ongoing experiences of bias and unfair treatment.

Our exploration of various biases, coupled with practical applications in AI algorithms and user interactions, offered tangible evidence of AI's deviation from neutral interpretations.

We started off with trying to solve or figure everything out. Our early research question involved so many 'hows' and 'how can we solve this problem' in comparison to where we are now. We want to imagine a world where the technology we are exposed to on a daily basis, from artificial intelligence to biometric and facial recognition on our devices, is fair and unbiased.

Our question now is can we begin to rethink how these AI & algorithms are developed to mitigate these biases especially for people of color? At the core we have always stayed on track with trying to demystify the nuances of algorithms and AI just from a different perspective. There's the perspective of being very critical of how opening up these discussions can take different turns, there's the perspective of how differently this affects different people, and then there's the perspective of viewing this through a cultural lens as a form of artistic expression.
Chelsi Goliath ↗ page 82

Process Reflection

By Christopher Theys
As a collaborator in the pioneering field of interdisciplinary and transcultural collaboration, particularly in the context of a progressive university model, my experience has been profoundly transformative. My journey in this collaboration was not just about contributing my skills in data, science, creative art and expression through code and technology but also about learning from and with diverse individuals.
Interdisciplinarity was central to our project, integrating various fields such as technology, psychology, socio-economics, and social sciences. This approach was essential in understanding and addressing biases in AI. By combining technical aspects of AI and algorithm development with insights into human behavior and social implications, we were able to create a more comprehensive and effective interactive installation. This interdisciplinary methodology enriched our perspective and allowed for a deeper exploration of the complex interplay between technology and societal issues.

Initially, our project was overwhelmed with abundant information and diverse perspectives. This led us to focus on personal experiences related to bias and microaggressions, encountered both interpersonally and through technology. As the project developed, mentor discussions guided us to approach this emotionally charged topic from a healthier standpoint, rather than a position of anger or frustration. Our evolved research question aimed to foster open dialogues about the continuous experiences of bias and unfair treatment, seeking to explore and understand these issues more deeply and constructively.

Through our project *Mirror Mirror* we learned that our hypothesis about biases in AI algorithms held substantial truth. The development of the *Bias Mirror* installation revealed significant biases in AI, particularly in facial recognition. Our research on various biases, combined with the practical implementation in AI algorithms and user interactions, provided concrete insights into the deviations of AI from unbiased interpretations. The project, evolving through mentorship and focused discussions, taught us the complex nature of bias in technology and its interpersonal impacts, enhancing our understanding beyond the initial hypothesis.

Mosaic of Memories

Pritha K.

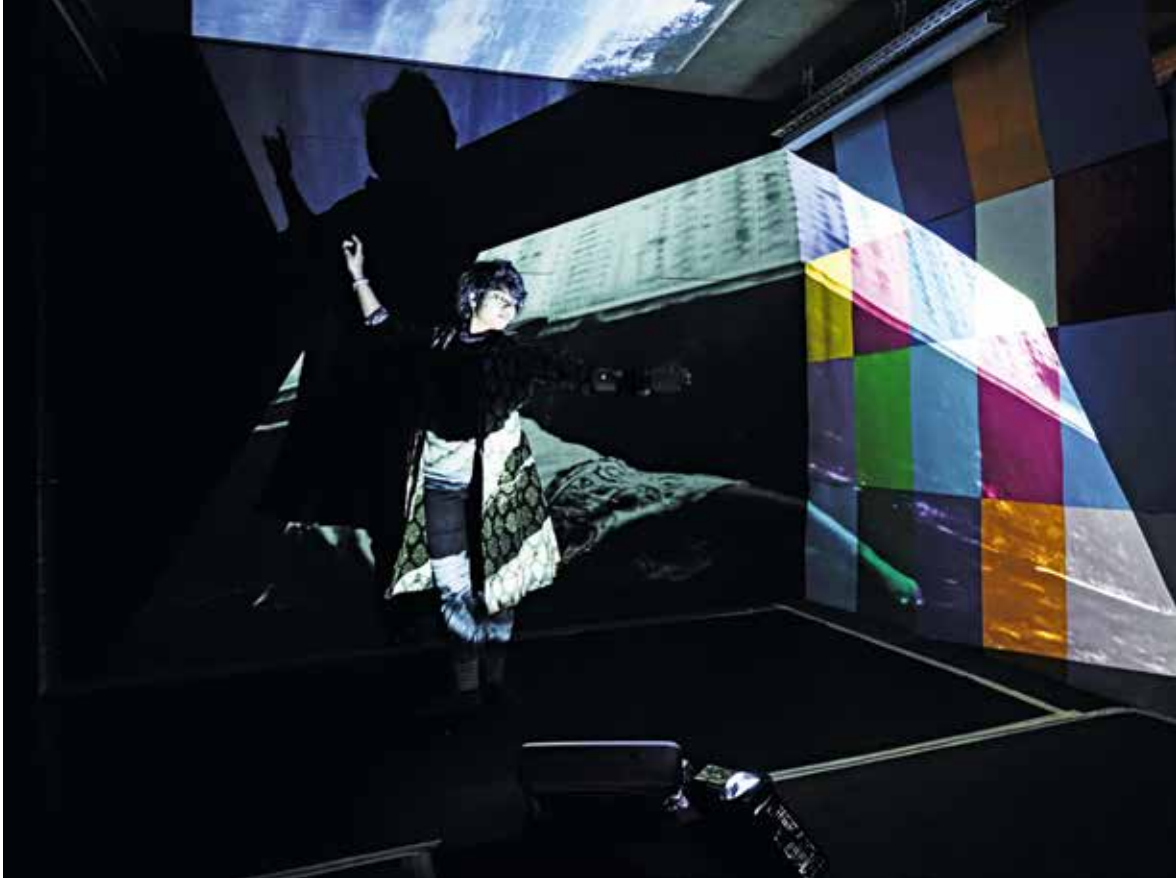
For this semester at FOUNDING LAB, my work was based around the question of how we can facilitate the accessibility of embodied practices and movement arts through the integration of multi-sensory experiences and generative art technologies. The realm of movement arts and somatic practices, often perceived primarily as visual and performative, holds a rich, yet underexplored, internal and somatic dimension. These practices often remain confined to the domain of practitioners, discouraging broader engagement from those intrigued by the potential within. In the project *Mosaic of Memories* I aim to create inclusive spaces for non-practitioners to explore the kinesthetic potential of their bodies in space, emphasizing the subjective experiential dimension over the external visual aspect—exploring how bodies can move in space, what the scope of such a practice is, and how it feels for their bodies to move in space.

How Does it Feel vs. How Does it Look?

I wanted to research methodologies for transitioning from human-facilitated movement exploration and participatory performances to machine-facilitated collective behavioral spaces. It transcends traditional binaries, such as audience versus performer and artist versus non-artist, to redefine the boundaries of what constitutes performative spaces.

I chose to continue my work involving practice-based research of movement and visual arts, sensor-assisted interactive installation, participatory performance, workshop design and facilitation, designing interactive wearable that generates sound based on movement.

A focus was on creating spaces facilitating artistic expression, drawing from lived experiences and making accessible spaces for artistic practices and storytelling. As the project pro-



gressed, a primary focus was on practice-led research which prioritized rest and care, breaking away from ableist, productivity-driven indices of progress.

My work revolved around somatic-practices-based movement research drawing from my background of having practiced various forms of movement arts—Indian traditional and modern dances, Yoga, Kung Fu, Butoh, and several others. It was combined with facilitation methods derived from movement therapeutic approaches, behavioral sciences and evolutionary biology focusing on group behavior and pattern formation. Lived experiences-based methods of movement exploration and storytelling also played an important role.

Between October 2023 to January 2024, among regular research, I was able to design and host six participatory workshops and research spaces with various communities and also continue my movement research on camera. Other outcomes included an installation, a sensor-assisted interactive wearable design, and a participatory performance.

Everything that has happened, is happening, and will happen to us, stays with us as memories. *Mosaic of Memories* invites us to feel our experiences and create memories with movements. It is a space for to explore what movement means for us and where it can take us. It is also a space to contemplate, reflect, and react, through movements, to explore moving bodies in the space around us. I explore how our lived experiences take us into movement and share my memories—what moved me—thoughts, words, places, feelings, and senses and I invite individuals to explore what moves them.

Developed with support from Kaunas 3022 Residency
Co-creator: Aman Prasad
Technical collaborator: Povilas Brazys
Sound consultant: Michael Wall
Special mention: Augustas Lapinskas, Gary Markle, Pit Frantzen, Jiabao Li, Bart Grabski, FOUNDING LAB Students, Fellows and Facilitators

Martin Hieslmair

Process Reflection

By Pritha K.

My work revolves around creating accessible spaces for voicing and embodying narratives through movement arts and visual arts. This project was just as multi-faceted and a part of a larger work. Therefore, it was important for me to first have clarity on how I wanted the project to shape up, to have conceptual clarity on the work, and build my vision around it before I could understand where a collaborator's role would fit in. I wanted to make sure I was doing justice to the collaborator's time and effort and the contribution to the project.

Having been in a space where I was craving to resume my movement research and delving into it as much as possible, it was difficult for me to focus on building the technical aspect of the project—the interactive sensor-driven wearable. Actively seeking collaborations with an extremely creative technologist from Kaunas, Lithuania was an important milestone in the project.

All artistic or scientific or applied research is inherently interdisciplinary in nature—we choose to isolate parts of it in helping build the work. Therefore, this project is also situated in an interdisciplinary space at the intersection of movement arts, visual arts, sensor-driven interactivity, behavioral sciences, participatory arts and pedagogical research.

Having transitioned into practicing artistic research after almost a decade of research in ecology and evolutionary biology, a large part of my work is informed by my background. This project is also informed by research from group behavior, pattern formation, neuroscience of memory and learning and proprioception.

Artistic choices and decisions played an important role in shaping this project: from the spaces I chose to work with to the participatory nature of the work. I did not choose to create this work for Deep Space 8K at Ars Electronica Center even though it would have been an incredibly immersive and visually stunning experience and would also not require me to modify an exhibition space to accommodate the technical equipment. However, it would also mean that this installation is tailored for a space which is present in two places in the whole world and it is less adaptable to being installed in other places—thus excluding a large number of individuals and communities from this experience. The design choices in the installation are heavily informed by the constraints of the exhibition space and time. But it reminded me of a very important and constraint-heavy time of my movement research and thus, the installation aesthetics are partly based on my room and memories during the pandemic. It expresses how I would have wanted that room to feel and could not modify it at the time. The design choices and interactivity is also informed by the workshops and research I have conducted since October 2023 in Kaunas, Lithuania with communities there.

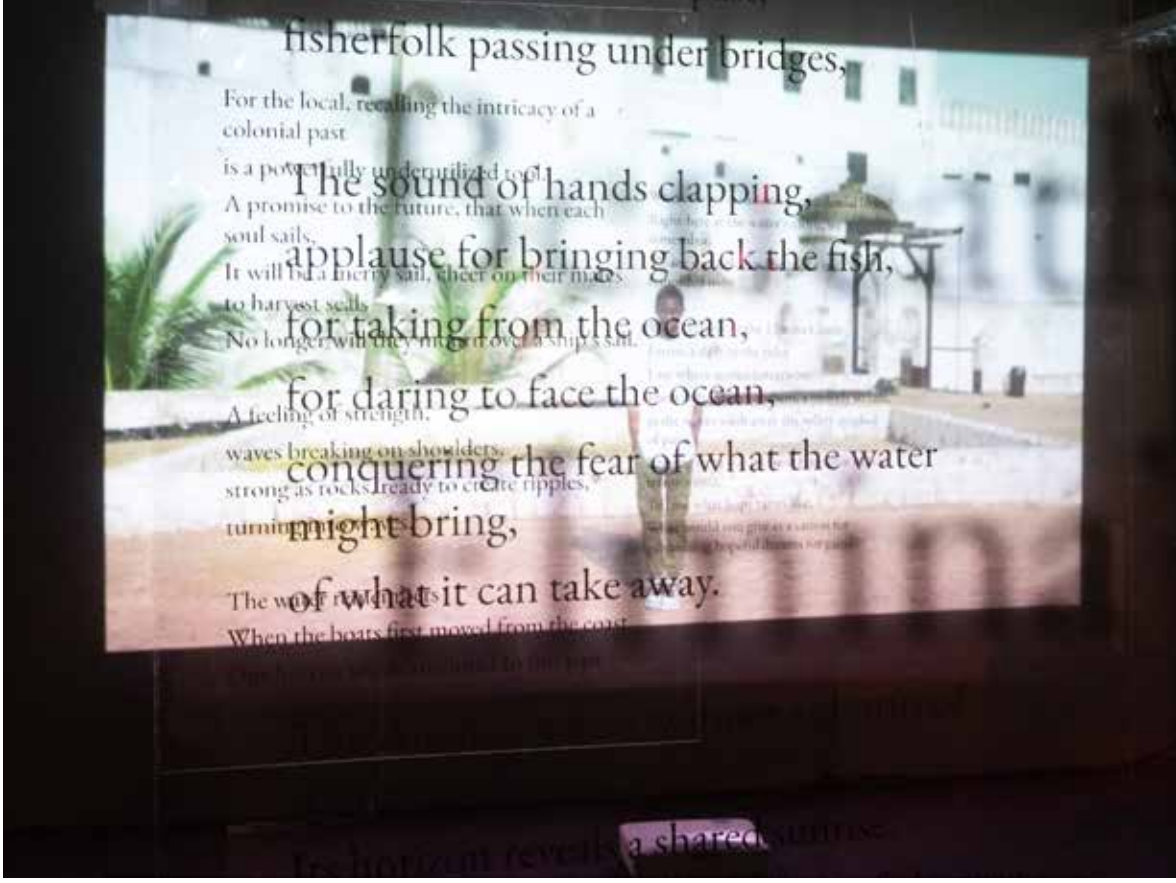
This project incorporates microcontroller driven interactivity. We used a GY-521 module as an initial measuring unit, which can detect 3-axis acceleration and rotation among other things. This data is transmitted wirelessly to a Python script which receives it and processes it. The sensor and microcontroller, attached to a battery, makes a wearable device that can detect movement quality of the body part where it is worn. Based on the movement quality, the Python script can modulate audiovisual projections which serve as a feedback to the mover with the wearable.

My work is grounded in storytelling and expression in somatic practices and movement arts. However, such practices have been developed through ableist lenses and remain accessible to few. My project started out with an overarching aim of making embodied practices accessible to individuals living with disabilities through multisensory integration.

With time, I was able to narrow the focus to the essence of this question and take the first of many steps involved in reaching the goal.

In the course of the research and development of the project, I find that this space is able to help individuals find a way to explore what movement means for them and search for their expression in this process. I am looking forward to future iterations of this work and how it evolves. I believe it is essential to make space for welcoming and valuing diverse expressions and experiences and it is important to craft pedagogical and research environments around lived experiences of individuals. This is where my work situates in the context of the founding of a new university.

Pritha K. ↗ page 108



Shared Futures

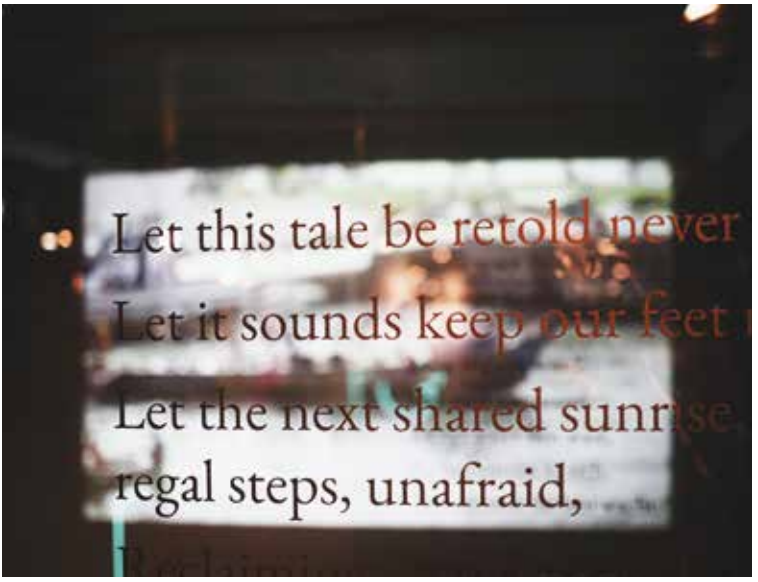
Bart Kuipers and Paul Akrofie

In 1637 the Dutch West India Company (WIC) conquered Elmina Castle in Ghana, starting an occupation that lasted for over two centuries. Resources were extracted and many Ghanaians were forced into slavery and taken on WIC ships never to return.

Cultural heritage sites stand as silent witnesses to these atrocities, yet they remain in many cases at odds with the communities they impacted and forced themselves upon. With *Shared Futures* we aim to collectively reclaim these spaces using community-led XR interventions in order to empower local communities in Elmina and Amsterdam.

The first intervention we created is an Augmented Reality (AR) experience where we layered the poem *Thinking of Elmina,* that was co-authored with the local community in Elmina together with Accra-based poet Emma Ofosua Donkor and the researchers, on the walls of Elmina Castle. For the installation, the text has been printed on Perspex sheets and layered onto a video projection of members of the community of Elmina in front of the castle as their feelings are voiced through Emma's recorded spoken word performance of the text.

Martin Hieslmair, tom mesic



To come to this result we went into the local communities in Elmina and Amsterdam to conduct workshops in which we aimed to achieve three things: firstly, we attempted to collectively define what decolonization and reclamation means; secondly, we wrote texts together trying to capture what it feels like for locals to be confronted with Elmina Castle and the former headquarters of the Dutch West India Company—still a prominent building on Amsterdam's canals—that formed the basis for the co-authored poetry; thirdly, we collectively identified key points of other actions necessary to achieve reclamation.

The results of this examination shed light upon the current state of thought in the communities. The key take away in Elmina was that the castle does not serve the local community in any way. The vast majority of the people have never been inside it, and not even the revenue generated from the castle benefits them, as it is collected by the national government in Accra that does not re-invest it in Elmina. As such, the town is underdeveloped, with high rates of unemployment.

In Amsterdam the debate largely centered around the collective awareness of the history of the sites and what they represent. In many Dutch-Ghanaians living in Amsterdam Zuid-Oost, the confrontation with the West India House instills negative emotions that lead to a similar disconnection as in Elmina. A first step in reclamation would be to increase the awareness and as such to come to an acknowledgement of what happened.

Even though *Shared Futures* helps to raise awareness, there is a long way to go to truly reclaim cultural heritage sites for the communities that were impacted by them. Future initiatives should focus on educational programs for youth in both countries, actions to repurpose Elmina Castle and ways to have the site benefit locals, and the strengthening of the connection between the communities in both countries.

https://shared-futures.net

Process Reflection

By **Bart Kuipers** and **Paul Akrofie**

The community-led nature of *Shared Futures* proved both to be its strength and the cause for its complexity. It required us to go into the local communities in two countries, on two different continents, and collaborate with a wide range of people across many different disciplines, which made putting it together challenging yet extremely rewarding.

As we progressed, the scope of the project slowly dawned on us and at first complicated finding a focal point. But the decision to approach the project as a project of co-creation with local communities with a research component gave us a solid framework to work within. From there we sought collaborations with organizations and individuals in Ghana and The Netherlands that could help us with our research in Elmina and Amsterdam.

In Elmina, we worked together with NadèLi, a non-profit organization that supports emerging Ghanaian creatives, that helped connect us to organizations in Elmina, such as Brand Elmina, an idealistic traveling organization that concerns itself with putting Elmina on the map and improving chances for the local community. Together we worked on shaping a program for the workshop that would bring out different perspectives on Elmina Castle, stimulate participants to reflect on its role throughout history and today, and enable us to collectively find concrete action points to improve the relationship between the town and the site managed by UNESCO. For the workshop, we were joined by Accra-based poet and spoken word artist Emma Ofosua Donkor, who helped us lead the co-creation part of the workshop.

In Amsterdam, seeking partners in the short term with the limited budget we had at our disposal proved challenging. Many smaller and larger NGOs were very interested in the project but were unable to support it on such short notice. Eventually, we found fantastic partners in Recogin, an umbrella for Ghanaian organizations and clubs in The Netherlands, and the Ghana Diaspora Development Network, a trade company for Ghanaian diaspora. With them, we centered the workshop around bringing out perspectives, ideas, and reflections on colonial heritage sites in Amsterdam, what they represent, and what role they play in the lives of the Ghanaian diaspora living in Amsterdam Zuid-Oost.

After collecting these perspectives and reflections, we started co-creating the poetry we would use to layer on the colonial heritage sites in Elmina and Amsterdam in order to make a first (symbolic) step towards reclamation. Together with Emma, we wrote in English, Dutch, and Twi, to symbolize the unity and possible shared futures for our countries. We had help from a befriended graphic designer to set the text to the Perspex sheets we had printed in Linz. The AR platform that existed in a proof of concept format was expanded and the poetry was uploaded.

What stood out in our research was the disconnection between the local communities in Elmina and Amsterdam and the colonial heritage sites that had gravely impacted them and their ancestors, and the discomfort and agony that brought to them. A key moment in our research process was an interview we had in preparation for the workshop in Elmina with Michael Kunka, the director of Brand Elmina, who told us that 90 percent of the people of his community had never visited Elmina Castle and most of them didn't know about its history or what the site represented. It changed our perspectives completely, as in our hypothesis we had always assumed that knowledge to be there. At this point, we realized both that we had a long way to go to learn about the relationship between the sites and the communities and the significance of having these conversations in the light of raising awareness and asking for attention for this part of the history.

Bart Kuipers ↗ page 84
Paul Kweku Akrofieo ↗ page 116

Songs for NPCs

Claudix Vanesix Figueroa Muro

Songs for NPCs is an anti-futurist XR concert. It uses videogame culture of "users" and "NPCs" (Non-Playable Characters) to talk about power dynamics between post-colonial nations around the globe. Are you a user or are you being used in this game? Can an NPC turn into a user? How to escape this binary that implies a power dynamic is the topic of the multimedia performance.

During the Fall Term at the FOUNDING LAB, I had the chance to test some of the workflows that my long-term project requires to exist as a live event.

In my past experiences creating live XR art, I felt limitations because the hardware that I had access to was not powerful enough to create a fully animated avatar. I had been trying to implement Full Body Motion Tracking systems into my performance and was unsuccessful. These implementations require a hardware that is capable of streaming big amounts of data such as XYZ coordinates to different parts of my human anatomy to later process it into an input to animate 3D modeled avatars in real time.

There are multiple challenges in achieving this live stream of data into a low latency translation of movement from my body into my avatar. This principle is fundamental for the concept of the artwork, since the hypothesis of my research is that a phygital performance can allow a single physical performer to control multiple digital characters inside a fictional narrative that is being animated live in front of a live audience.

The timeframe of the FOUNDING LAB's development was very politically agitated, this helped inform my project as a global structure in which different actors play roles and have established limitations in their freedom. I got to experience it myself as I went through multiple Visa Applications processes during the duration of this research. This situation happened to me (from Peru) and other colleagues who were born in former colonies; it was a strong reminder that my project has a very urgent nature that goes beyond the fictional storytelling that I am building through XR.

The art and technology that a society is able to create are a political statement. During my research I intended to point out the social gaps in terms of working rights and access to a quality life around the globe. While doing so I learnt the difference between two very different and very relevant human projects: Post-humanisms and Trans-humanisms. To understand these directions of philosophy one must ask themselves what it even means to be a "human". And I find again and again in history and in present war that to be human is a social category that not every human being belongs to.

De-humanization is a word that comes to mind when I call for the massacre that Palestinians are currently experiencing to stop. My project is fed with the rage felt when watching genocide taking place in front of my screens in real time. I am constantly reminded that the nations with power can take decisions that terminate the lives of thousands when it suits their interest.

In my project I use the term NPC from videogames to address a real-life emergency: some humans are being treated as less/other than humans. NPCs (simulated non-humans) exist for the (real life humans) users just in the form of a utilitarian relationship: for them to get a resource from, to finish a quest, to be confined in a forever repeating loop of service.

Process Reflection

By **Claudix Vanesix Figueroa Muro**

Having the maximum realistic available tools, together with a sense of humor and an erotic tint to my project was necessary for me to handle the embodiment of such complex discussions. The artistic approach makes the storytelling somehow digestible; I believe that "yassification" can be a great tool for navigating extremely unattractive topics. Through the music, makeup, hairstyles, sexy avatars, and seductive energy on stage, I design an aesthetically pleasing space and experience. This allows me to dive into conversations of historical abuse and current ultra-violence.

Before the FOUNDING LAB, I had managed to use three tracking sensors in my live performance, by using a Virtual Reality device called Meta Quest 2. But this device had a particularity that was limiting the development of the artwork: I cannot see the physical world when I am wearing the VR headset, making it unsustainable for the future of my project. I wanted to implement a Full Body Motion Tracking system that would allow me to use my face as an expressive medium for song interpretation during the performance, and allow me to use the inferior part of my body as an input for the movement of my avatar.

To find the medium that would communicate the narrative in a more authentic way, I evaluated the available tools for capturing movement and decided that I would work with Rokoko Smartsuit Pro II, together with the Studio software. I tested different software for creating human visual representations and animating with live inputs, and after multiple trials I decided that the aesthetic value of the software was very relevant for the project. To express better that sexy personality that I want the concert to have, I chose DAZ 3D, since it has a futuristic realness to the rendering textures that makes the characters feel uncannily real. In future research steps I plan to stream the data from the Motion Capture into Unreal Engine for the live concert final performance.

During the process of the FOUNDING LAB my research question evolved, gaining a greater sense of urgency. When I started conceptualizing *Songs for NPCs*, I was bringing my perspective as an indigenous person with a history of colonization that questioned the humanity of my people after the so-called discovery of the Americas. The controversy of deciding whether people of the Abya Yala were human or not was the crucial point for deciding whether we would be enslaved or forced into Catholicism. The time I spent in Europe allowed me to observe the international reactions to real time genocide, and it is an event that has marked my life and the way I understand myself in the world. It goes beyond my artistic project: I understood in a deeper sense what international solidarity means.

I learnt that it is powerful to be the voice that speaks up against abuse. I am now reassured that dynamics of power and oppression are preventing certain humanities from existing in freedom. My video game approach is only one strategy of the many that need to be visible. I understand that my voice has a tone, and I want that tone to be friendly enough so audiences will want to listen. I believe my voice can also be used to amplify other voices.

No science or art exists in a vacuum, everything we make or stop making is telling the story of who we are.

Claudix Vanesix Figueroa Muro ↗ page 113

Claudix Vanesix Figueroa Muro, Cristobal Parra

Stealth Care:
wellness from the algorithm

Amanda Bennetts

During the FOUNDING LAB Fall Term, *Stealth Care: wellness from the algorithm* emerged as a critical exploration of the intersection between personal health data, AI, and artistic research. The project originated from an AI-driven analysis of non-specific symptoms I was experiencing, which intriguingly aligned with a subsequent medical diagnosis of a rare muscle disease. This serendipitous alignment between AI insights and medical reality ignited a journey into the potential and pitfalls of using personal data in AI-driven healthcare, particularly in the context of chronic illnesses and disability.

Martin Hieslmair

Central to this inquiry was the research question: can the quantified self serve the ill body? My approach combined self-tracking and scientific data collection with artistic research. An N=1 study (the study of one subject) was the foundation, involving the daily use of an Electromyography (EMG) wearable to gather neuromuscular activity data, supplemented by questionnaires for qualitative health insights. This amalgamation of quantitative and qualitative data was then analyzed in collaboration with Nathanya Queby Satriani, a JKU AI Data Science student, who employed machine learning to accurately decipher patterns, particularly those predicting the need for rest as a preventive health measure.

In an era where AI-driven healthcare converges with the capitalistic motives of the wellness industry, the lines between empirical treatment and pseudo-scientific wellness industries increasingly blur, fueled by the commodification of personal biological health data. This blurring of healthcare and wellness industries fueled the conceptual framework for the immersive installation that physically re-embodied the extracted biological data as a “bio-resonance” wellness elixir. Using an existing campus bathroom to construct a space where clinical and therapeutic elements precariously coexist, reflecting both the sterility of medical spaces and the tranquility of wellness spas. I used audio cymatics to visualize my EMG data, giving physicality to the unseen frequencies of my muscles. Re-embodying my muscle frequencies aims to bridge the clinical data with human experience but also explores these frequencies as a form of speculative ambiguous therapy.

Throughout the process, questions were raised about the role of AI in healthcare and the data that feeds it, the ethical considerations of algorithm-driven health management, and the potential of artistic research to add depth to scientific findings.

However, a critical question emerges: do the technologies employed in this project, aimed at illuminating the obscure inner workings of the body through wearable technologies and AI analysis, truly render one’s health fully visible and knowable, and does this perceived clarity translate into effective management and autonomy in personal healthcare?

Acknowledgements: Dimitris Mertzos, Nathanya Queby Satriani, Anthony Dein, Atelierhaus Salzamt Linz

Process Reflection

By Amanda Bennetts

Art X Science Collaboration

As an artist profoundly influenced by my personal experiences with chronic illness and disability, I am deeply fascinated by the convergence of art, science, and healthcare. This compelling interest motivated me to pursue the opportunity presented by the FOUNDING LAB, leading me to apply for both their Summer School and Fall Term programs. During Summer School, my initial objective was to find a data scientist for a collaborative Art X Science project. Enthusiastically, I embraced my role as an extroverted Australian artist, eagerly sharing my conceptual artwork ideas and seeking collaboration opportunities with every science-disciplined peer I met. In hindsight, this approach, though well-intentioned, was a rookie mistake. However, during the Fall Term, I gained a deeper understanding of the nuances of interdisciplinary and transdisciplinary collaborations, particularly with art and science.

Through my experience, I realized that successful transdisciplinary collaboration extends beyond mere enthusiasm and creativity; it involves respecting and understanding different disciplines. During the Chapter Blocks and critical discourse group discussions, it became evident that transdisciplinary communication was more challenging than anticipated. Recognizing the importance of speaking the language of other fields, understanding their objectives, and finding common ground in our expertise and interests became crucial. This shift in my approach was instrumental in integrating scientific elements into my project. It not only provided me with a new

tom mesic

vocabulary and perspective but also facilitated clear communication with potential scientific collaborators, such as AI Data Scientist Nathanya Queby Satriani, whose interest in both medicine and AI was particularly relevant.

Applied Technologies and Science

In developing my project, I engaged extensively with a blend of scientific approaches and technologies, focusing on the realms of human-computer interfaces, biosensors, and the N=1 study model. The use of wearable Electromyography (EMG) technology, a prime example of a human-computer interface equipped with biosensors, provided a direct, quantifiable link to my physiological data. My health data harvested from these sensors were adeptly interpreted under the expertise of AI Data Scientist, Nathanya Queby Satriani, who used a Recurrent Neural Network (RNN) model for classification purposes. This model was chosen due to its ability to handle the complexity and non-linear relationships in EMG data. Choosing an N=1 study model was both necessary and a conscious decision, reflecting the realities of researching rare diseases where larger subject sets are not feasible.

As the research questions evolved, they increasingly focused on the subjective experience of the body, challenging the cultural and institutional norms of medical and technological observation. The project demonstrated how artistic practices could offer unconventional narratives, renegotiating the relationship with institutional healthcare and emphasizing the subjective, lived experience.

Amanda Bennetts ↗ page 58

Streams in the Veins

Chiao-Chi Chou, Kaito Muramatsu, Youngjun Choi

In collaboration with Youyang Hu

Streams in the Veins conducts a 15-minute piano ensemble involving a human pianist and plants. During this performance, the transmission of sound from various pianos leads both agents—humans and plants—into a continuous cycle of communicative improvisation. This process examines an interactive approach to non-human agency within the framework of interspecies co-creation, specifically through the medium of music. Through our attempts at musical sessions with plants, we were able to experience the temporal differences in the umwelt of plants compared to humans, such as their distinct response times to external stimuli and the resulting differences in perceptual worlds.

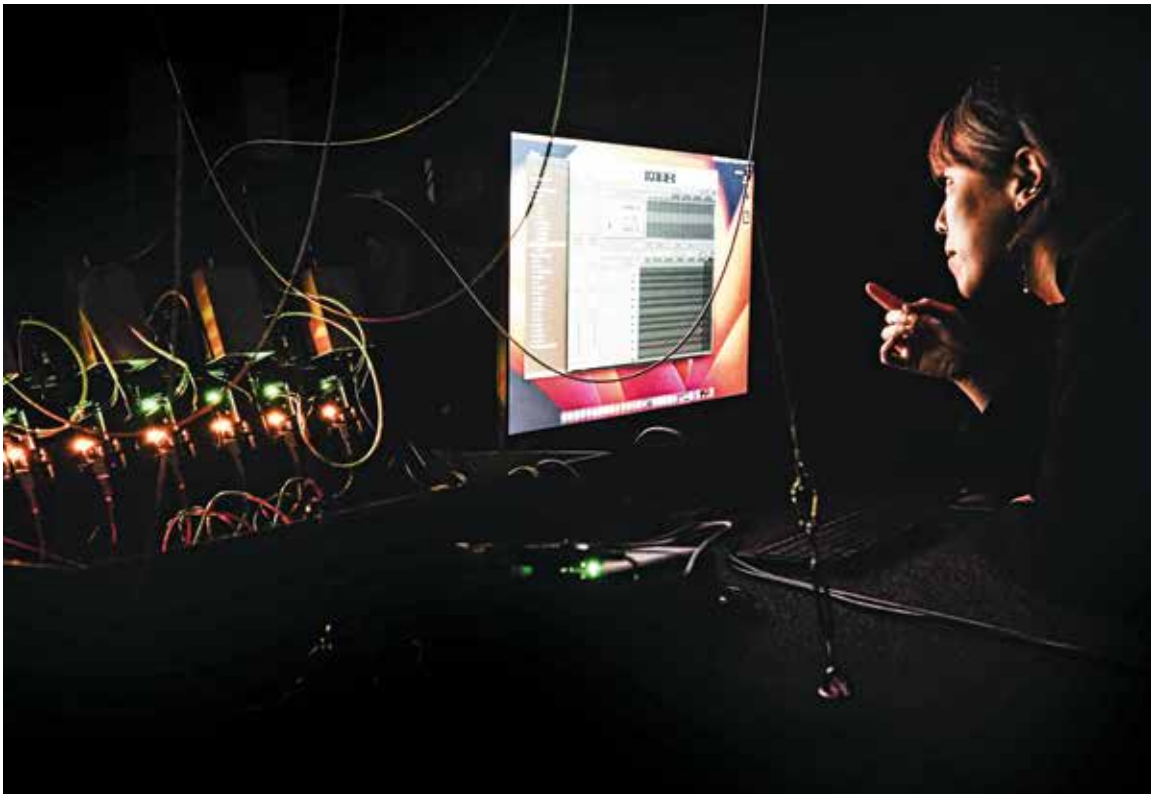
Martin Hieslmair

Chiao Chi Chou, Youngjun Choi, Kaito Muramatsu, and our collaborator Youyang Hu each brought distinct perspectives to the project. Chi focused on developing plant installations and laser devices. Youngjun handled the development of software modules enabling plant performance and AI-driven music generation. Kaito was responsible for conceptualizing and performing the musical piece, and Youyang contributed to the hardware modules of lasers and biosensors. We found ourselves deeply immersed in conversations about the music that plants might play, their physicality in performances, and the intricate process of translating plant biosignals into musical form.

Within this realm of collaboration and communication, a contemplative mind might reflect on the subtle distinctions between exerting mutual control, engaging in reciprocal learning, and the art of influencing one another. Mutual control, marked by its structured approach, risks dampening the spontaneity of creation. On the other hand, reciprocal learning, embracing an ethos of equality, nurtures innovation but requires the patience to meld diverse perspectives into a coherent whole. Meanwhile, mutual influence delicately balances guidance with the fluidity of creative thought, orchestrating an outcome that is both harmonious and dynamically enriched.

The performance begins with optical stimuli delivered by laser modules, interacting with plant leaves to elicit an action potential. The inherent latency in the plants‘ response to these stimuli necessitated a careful composition of the musical piece to align with their delayed reactions, underscoring the contrast in responsiveness to external stimuli between humans and plants. This context was then reinterpreted through transferred timbre and generated notes passed through the Differentiable Digital Signal Processing (DDSP) models, aiming to equitably honor the agency of both human and non-human entities in each musical decision.

Our speculative approach thus wove together the equal contributions of all entities, cultivating a dynamic and improvisational milieu within the piano performance. The play’s essence, mirroring the fluid and ever-evolving attributes of nature, invites a deep immersion into the experience. As plant leaves react to the caress of light, we find a parallel in the way musical notes resonate within our cochlea, creating a symphony of interaction between humanity and nature. This artistic pursuit transcends conventional boundaries and emerges as a profound metaphor, celebrating the interconnectedness and harmonious coexistence of diverse life forms and modes of expression, much like streams flowing seamlessly in the veins of all beings.



Process Reflection

By Chiao-Chi Chou

I focused on the execution of the project's hardware and exhibition. I needed to integrate the work of collaborators and organize a hardware-software integration system to support two main systems: (1) the plant photonic signal-sound conversion system and (2) the sound-light conversion system with a user interface. I envisioned myself as a figure bridging the virtual and real worlds, fully accessing the knowledge in my collaborators' fields through extensive discussions.

For the plant photonic signal-sound conversion system, I selected suitable broadleaf plants to meet the requirements of plant photonic detection. I also set up the power system for the plant sensors and integrated it with the structural aspects of the plant landscape. In the case of the sound-light conversion system and user interface, I designed a device that incorporated electronic keyboards, computers, sound source integration systems, LiDAR controllers, and a suspended laser emitter structure. These designs were guided by numerous discussions with collaborators from different fields and implemented on the foundation of exhibition hardware such as the internal network structure and power system.

As I integrated the requirements from different fields and attempted to run the entire project, I consistently pondered the significance of each artifact in the performance. This was quite different from my collaborators, as they won't participate in choosing the color of a wire. Such choices, particularly reflected in the visual meaning of human-plant interaction, led me to think about the historical image of humans dominating other living beings since the agricultural era, especially when humans stand taller than the plants. Through discussions with collaborators, I maintained the same volume for both main systems (connecting humans and plants), ensuring a certain level of symmetry, such as the piano keys arranged in opposite directions. When the audience watches the performance, they can easily observe the alternating play of the piano keys and the interconnection in an equal state.

I am excited about seeing information flow through different objects, from the pianist's fingertips touching the keys, the signal passing through the electronic keyboard, reaching the computer, and then being converted into light by the driver. The light passes through the leaves, transforming into biological energy and another signal, and finally returns to the piano keys. This becomes a mechanism composed of living and non-living elements. This also reflects my personal approach to observing and interacting with everything in the world.

By Youngjun Choi

The project entailed a collaborative endeavor in creating a piano composition, which was a joint effort between a pianist and a plant equipped with biosensors. Our collective inquiry centered on discerning the nuances between mutual influence and direct control, and the various outcomes each might engender. A pivotal aspect of our approach was a conscientious effort to refrain from reducing the plant to a mere passive element in our arrangement. Instead, we aimed to recognize it as an active participant. This shift in perspective posed a significant challenge.

For me, the project was an enlightening experience in appreciating the aesthetic dimensions of performing arts, a departure from my prior focus on the technical aspects of backstage functionalities and the development of efficient programming, with less regard for the concept of agency. To underscore the importance of considering all participants in a system, animate or inanimate, the active agents must be equally influencing the outcome. Such approach of implementation through speculation enriched my understanding of the delicate balance between the technical and the artistic, fostering a newfound appreciation for the interplay between functionality and creativity.

In this project, I implemented the Differentiable Digital Signal Processing (DDSP) model that was primarily utilized for sound design and piano note generation for Disklavier placed in the Ars Electronica Center "AI x Music" exhibition. This implementation focused on the fine-tuning of the model's decoder component to our aesthetics in piano performance. I also developed a real-time audio-reactive visualizer, aligning with our project's philosophy of interspecies co-creation. This visualizer functions through the circulation of musical notes, wherein each note and chord acts as a catalyst, triggering subsequent notes and chords in a harmonious exchange.

Sound's ephemeral nature, inherently tied to the relentless progression of time, both enriches and limits our understanding of its contextual essence. This paradoxical rela-

tionship sparked my interest in the DDSP model, a neural network designed to learn the timbre or tone color of specific audio samples. This model achieves its results by analyzing a smaller dataset compared to previous methods. I chose to use DDSP to capture the essence of instruments or acoustic materials selected for their artistic value. Consequently, DDSP allowed us to explore the possibilities for endless sonic variations, surpassing the constraints of temporality in understanding the given characteristics of the other.

Throughout our collaboration, ensuring that all involved parties—including the performer, the audience, and the plants—were genuinely integrated into the cycle of interactions and influences was crucial in designing a musical piece that treats interspecies collaboration as a partnership of equal agents in co-creation.

By Kaito Muramatsu

The most significant realization I had while participating in this project was that the collaboration between individuals with different cultural and professional backgrounds served as an analogy to the theme of our project. Furthermore, the fact that English, being the medium of communication, was a non-native language for all participants similarly accentuated this aspect.

In my interpretation, a distinct aspect of this project lies in my pursuit as a human of engaging in a collaborative performance with plants through music sessions. These sessions resemble conversations without words, encompassing various prerequisites and characteristics. For instance, in a performance it is essential to 'listen to each other' in a way that complements each other's output. This 'listening' involves adjusting one's own sounds based on the already produced sounds, aiming for the 'whole' to form a harmonious relationship—music. This is true regardless of whether a predetermined score exists or not.

If we draw an analogy to this aspect, in collaborative creation, we communicate using words and expressions for 'better output.' However, this involves not just understanding the superficial meaning but also inferring what the other person is trying to convey and why they are focused on certain aspects, considering their cultural, personal, and professional backgrounds. In other words, it becomes increasingly important to solve the inverse problem of interpreting the received words and non-verbal cues, continually searching for a better output.

Additionally, and this is not unique to our case, even when using the same language, English, musicians and engineers had different protocols for decision-making and word usage. For instance, in this project we created a system that uses AI to compose music reflecting the physiological state of plants. This required overcoming the distinct narratives of musicians and engineers.

This means that such challenges are anticipated to be more pronounced in performances involving humans and plants. Compared to sessions with musicians who share the same musical education, the physical composition influencing the performance and the different methods of music creation present unique conditions.

What surprised me most in maximizing co-creation through consideration of others was the effectiveness of a sensation akin to positive resignation. There were times when I felt mentally unstable by contributing to aspects I was highly interested in while confronting approaches different from my own. However, ultimately realizing that I was not the sole agent in everything, accepting that fate while striving to do my best in those circumstances—essentially not personalizing the entire team's project (which is somewhat misleading as a participant)—led to creating under the constraints of the environment. By facing the conditions presented and creating within them, I encountered unexpected musical experiences and a deeper understanding of others.

To draw an analogy again, attempting to control everything in a music session is not co-creation. In other words, the key may lie in how one maintains the 'leeway' to tolerate multiple outcomes, and how adeptly and spontaneously one can continue to propose the desired direction. Moreover, this might be something that humanity, not just in collaborative creation but also in facing the external world, always needs to maintain. The question then becomes: what exactly is this 'leeway'?

Furthermore, it reminds us of the chicken and the egg dilemma (Which comes first, leeway or better output?), which may also lead to a deeper understanding of the external world. Searching for and nurturing a method to methodologically acquire the flexibility to tolerate and catalyze such external disturbances and constraints is likely a crucial element especially required in future interdisciplinary educational fields.

Chiao-Chi Chou ↗ page 120
Youngjun Choi ↗ page 59
Kaito Muramatsu ↗ page 95

Stuff Change & After Swallowing

Lea Luka Sikau

The IT:U x Ars Electronica FOUNDING LAB Fall Term kicks off an artistic research project *(the gut rehearses to tell you something)* of artist-researcher Lea Luka Sikau, funded by S+T+ARTS, that investigates ways to influence gut health and understand gut feeling through sonic approaches. In the FOUNDING LAB showcase, you can experience two of Sikau's works under the umbrella of multispecies metabolizing:

The video work *Stuff Change* features ants and a pain au chocolat at IT:U; the performance *After Swallowing* shows an endoscopy with a capsule in Deep Space 8K at the Ars Electronica Center. The preliminary outcome will be an explorative study that the audience of her performance *After Swallowing* will participate in. Following up on this study, the artist-researcher collaborates with the Max-Planck-Institute for Empirical Aesthetics for an extended exploratory study investigating patterns of gut synchronization (gastric movements) via sound. These findings will be turned into performances and medical treatment approaches together with the Casa Paganini Research Center, Genova, and Sónar.

As a mezzosoprano, media artist, and musicologist, Sikau examines the medicalized history

Martin Hiesmair, vog.photo

of guts with philosophies of making connection and rehearsing multi-organ communication. Diagnosed with irritable bowel syndrome (IBS) and gastric mucosa, she has been engaging with the paradoxical signals of her gut since childhood. But whereas gastric mucosa is a diagnosis, irritable bowel syndrome (affecting 10-15% of the population in Europe) is merely a description of ambiguous symptoms that so far cannot be successfully addressed within the healthcare system. Untraceable via visual means such as coloscopy or gastroscopy, she was curious to approach her gut through the media Sikau is most familiar with: sound technologies and performance.

In relation to the physical constitution of this organ, the semi-permeable quality of its serpentine lines undergo significant transformations within the clinical environments—with one of the extremes being a lifelong ostomy (a surgically created outlet for the bowel). As such, the artist-researcher intends to apply these theories to the gut as a queer organ that, beyond its material form, inherits a queer slippage between "physiological matter, metaphor or figuration, and "gut-level" feeling states".[1] Whereas a lot of artistic and research processes currently oscillate around the microbiome, Sikau sees some avenues for research with relation to our guttural capacity to attune to sounds, thereby potentially enhancing our wellbeing by hearing beyond the ear.

1 Ramzi Fawaz, *Queer Forms* (New York, USA: New York University Press, 2022), p. 296.

Process Reflection

By Lea Luka Sikau

Guts of ants, and of our species alike, silently navigate bodies in today's world. In this intestinal loop of metabolism—from Fall Term to speculative futures—what does your gut rehearse to tell you? How can you sound it out in queer ways?

Throughout the artistic research process, artist-researcher Lea Luka Sikau worked with and through an exploratory approach of listening to guts. She focused on medical technologies, in particular capsule endoscopy and AI-assisted fluorescence in image processing for diagnosing gastroenterological pathologic diseases. Along the way though, Sikau also became increasingly fascinated by research into organoids and sonic ways to understand the guts of non-human species.

In the beginning, Sikau wanted to focus on the role that gut feeling plays in artistic processes (such as theatrical rehearsals). After collectively working with gut sounds and detecting the effects they had on the vocality of our own gut, she expanded the research scope. In the scope of her S+T+ARTS project *the gut rehearses to tell you something,* the artist-researcher focuses on how gut sounds can influence and evoke synchronization with listening enteric nervous systems. So far, Sikau has noticed a significant effect on her gut and her collaborators' intestines that were increasingly sounding while immersing in this endeavor. It felt as if the enteric nervous system was attuning to their practices.

In the key of audible diversity, Sikau encourages people to listen beyond the ear and create forms of research and learning that go beyond being of transdisciplinary nature and to support multisensory and multimodal approaches.

Artist-researcher Lea Luka Sikau collaborated with two artists for this project, Denisa Pubalova (media artist) and Ella Kay (sound artist) as well as with medical institutions such as the Medical School Hannover, the Veterinary School Hannover as well as the Christopherus Hospital Coesfeld. Beyond this scope, the FOUNDING LAB students (particularly Julie-Michele Morin and Bart Kuipers) and her mentors within this program, such as Darsha Hewitt, greatly supported her with refining the approaches to storytelling and coherence of the performance presented in Deep Space 8K at the Ars Electronica Center. Additional thanks go to Dr. Friedrich Krings, Dr. Henrike Lenzen, Prof. Dr. Gemma Mazzuoli-Weber, Dr. Kristin Elfers, Carsten Husch, and Johannes Teller.

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Martin Hieslmair, vog.photo

The Sketches for Self-Analysis

Luisa do Amaral and Cyan D'Anjou

The Sketches for Self-Analysis is a share process which Cyan d'Anjou and Luisa do Amaral explored and addressed in two distinctive formats—the exhibition installation *Anamnesis* and the immersive visual performance *Unknowable Uncertainty*—and summarized in an academic paper.

Process Reflection

By Cyan D'Anjou and Luisa do Amaral

In his discussion of subversions of rationality, Norwegian philosopher Jon Elster describes the moral and intellectual fallacies that humans are guilty of, when dealing with mental or social states that are "by-products of actions undertaken for other ends". (Elster, 1983) These are states that cannot be brought about intentionally, nor can they be "explained away" easily by connecting the outcomes to specific actions.

The Sketches for Self-Analysis are explorations born out of our mutual experience of eluding the feeling of loss by seeking understanding through rationalization and finding explanations through analysis. Our projects have two distinctive formats, an immersive visual performance and an exhibition installation summarized in an academic paper. Both delve into different theories of how the human mind processes and interprets life experiences, from philosophical, sociological, psychological and cognitive perspectives. This study investigates the obsessive search for meaning or purpose in uncertainty, and it starts from ourselves, who connected through a shared process of grieving and navigating personal crises. We combined our backgrounds and dispositions to craft a framework that would allow us to reinterpret our situations. Our interdisciplinary approaches, characterized by the deliberate convergence and divergence of our inquiries, culminate in the physical representation of a shared reflective process—a candid exposition of self-analysis.

Our exhibition space includes a cartography of the theoretical journey of developing the philosophical framework for our project, and how it intertwines with our life events and emotional processes. It demonstrates how our intellectual investigations reflected or affected our insight into personal thoughts and feelings. Particularly relevant are the different ways that the desire for self-validation was revealed through our choices of literature and line of inquiry, eventually coalescing into an aggregated framework that channeled our best skills in the service of the task we were set to accomplish.

In a sociological sense, we started out with theories that explained social action by rationalizing actors into mathematical models. Reading agency and social exchanges as economic transactions seems very natural to the neoliberal subject, but it is insufficient at accounting for the complexity of social reality, and all the omitted factors that go unobserved and might so easily skew our models.

As we developed both our conceptual understanding and the artistic execution of this concurrently, the endeavor to translate the scale of our research into a tangible artistic output initially posed a daunting challenge. Searching for personal clarity within our work meant that the expressive elements of the cyclical rationalization we were investigating—such as desire, fear, and restlessness—were all our own. In order to find the comfort and compassion we hoped to convey in the piece, it was imperative for the artistic narrative to tell a story beyond our own. That moment of clarity arrived in the vulnerability of giving the project space to exist with others. We invited new collaborators who contributed their own approaches to honoring sentiment amongst reason, allowing for the final account to speak from a collective perspective.

The work originated as an attempt to bring about comfort as a by-product. However, our extensive intellectual exploration, the time and change that was brought about in poring over this topic, the experience of bringing in other people who resonated with the work, might have just given us the tools to reframe our perception of our personal experiences.

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Luisa do Amaral ↗ page 102

Anamnesis

Luisa do Amaral and Cyan D'Anjou

The installation project *Anamnesis* is one of the results of the share process—"The Sketches for Self-Analysis" which Luisa do Amaral and Cyan D'Anjou pursued.

Anamnesis means "a calling to mind"—the French sociologist Pierre Bourdieu called the task of socio-analysis a labor of anamnesis—of bringing to mind one's own knowledge of the world, and one's self-awareness concerning the conditions for this knowledge. In clinical psychology, "anamnesis" refers to the patient's recollection of events that are relevant to their case history. And in the Christian Eucharist, the anamnesis is the part that recalls the Passion, Resurrection and Ascension of Christ. These three contexts provide different devices to articulate the three pieces that make up the final exhibition installation:

● *Go to the limits of your longing* is a map, made of post-its, of the shared intellectual journey that Cyan D'Anjou and Luisa do Amaral went on when developing the philosophical framework for this project. It narrates the journey from trying to develop a project that would validate their feelings, collecting perspectives and insight into a framework serving both science and creativity.

● *Zettelkasten* (card or note box) is a recreation of the Christian Eucharist. The box of cards represents the bread, and the labor. The cards (in bite-size) contain notes, essays and references from the creative development process. Homemade calendula and wild pansy syrups represent the artist's heart, and they are shared with visitors using a dropper.

● *Things of Boundaries: a Case Study of Interdisciplinarity* is an ongoing study on different ideas of interdisciplinarity and different professional and academic trajectories of FOUNDING LAB Students, Fellows and staff members. For the academic paper, these protagonists were interviewed to investigate how different actors view their own life journeys towards working in interdisciplinary settings, and hypothesize how their views reveal their social position and whether we find radically different ideas of what interdisciplinarity is.

Process Reflection

By Luisa do Amaral

Anamnesis is an account of methodical discovery and exploration, triggered by an identity crisis that I was navigating around the time when I came to Linz for the FOUNDING LAB Summer School, and which sparked the friendship with Cyan D'Anjou, my teammate. We turned to art and science to help us understand our thoughts and feelings as we navigated personal processes of grieving and moving on.

It further develops topics that I discussed or worked on during the first part of the FOUNDING LAB, such as transparency in the digital age, in the Brain-Computer Interface topic group; social interactions in interdisciplinary teams, the topic of my speech for the Conference Task Force; the robotic aspirations and reason-emotion split, discussed in the play *Uncanny Valley* by the German artists collective Rimini Protokoll.

We delved into a broad range of references, from art, philosophy of mind, sociology of knowledge, cognitive science, social psychology, and artificial intelligence, to understand different approaches to how the human mind interprets and processes our life experiences. In his discussion of subversions of rationality, Norwegian philosopher Jon Elster describes the moral and intellectual fallacies that humans are guilty of, when dealing with mental or social states that are "by-products of actions undertaken for other ends" (Elster, 1983). These are states that cannot be brought about intentionally, nor can they be "explained away" easily by connecting the outcomes to specific actions.

The most important output of this project is actually a by-product of the intellectual exploration that was undertaken. Through the trust of my collaborators and

tom mesic

facilitators, and my professor's validation, I was able to see myself as a sociologist for the first time since my current research started, in mid-2019. The third output, the paper about interdisciplinarity, is articulated through the sociological framework developed throughout the project, employing relational analysis (with the work of Harrison White and Ann Mische) and insight from reflexive and lyrical approaches (after the works of Pierre Bourdieu and Andrew Abbott). Although I recognize how my background in architecture influences my approach to research design, I was able to curate a methodology to leverage my skills and unique social position to the service of the social sciences.

The project has three different parts. *Go to the limits of your longing* is a map of the shared intellectual journey that Cyan and I went through when developing the philosophical framework for our project, and how it intertwines with our personal life events and emotional processes, and especially my own development as a sociologist. Using predominantly post-its, it narrates our journey from trying to develop a project that would validate our feelings, towards aggregating perspectives and insight into a framework that would put the characteristics we were conscious about to the service of science and creativity. The map contains personal insight from our conversations, my therapy sessions, and meetings with my professor and other peers.

Zettelkasten represents my personal process during the FOUNDING LAB. The box of cards stands for the bread, and it represents my labor, with bite-sized versions of all the notes I took, essays I wrote, and the over 100 references I read for this project. Homemade calendula and wild pansy syrups represent my heart, and they are shared with visitors using a dropper.

Things of Boundaries: a Case Study of Interdisciplinarity is an ongoing study on different ideas of interdisciplinarity and different professional and academic trajectories of FOUNDING LAB students, fellows and staff members. We investigate how different actors view their own life journeys towards working in interdisciplinary settings, and hypothesize how their views reveal their social position, and whether we find radically different ideas of what interdisciplinarity is. Interviews are currently being conducted.

Luisa do Amaral ↗ page 102

Unknowable Uncertainty

Luisa do Amaral and Cyan D'Anjou

The immersive visual performance *Unknowable Uncertainty* is the other result of the share process —"The Sketches for Self-Analysis" which Luisa do Amaral and Cyan D'Anjou pursued.

It embodies the narrative of aging as the metaphorical confrontation of a definite ending. The combined elements of a visual film, live choreography, and the durational depiction of a graphical analysis converge to illustrate the process of breaking from reliving in cycles of the past.

In the face of a definite ending emerges an uncompromising realization: the expansion and weight of the past as the future narrows to an unknowable but certain finite point. To extend time, a cycle of reaching into a database of recollection hopes to yield validation for the cumulative result—the emotional landscape of now. To tell the story of failing to capture the full depth of lived experiences within societally valued frameworks of rationality, *Unknowable Certainty* is conceived as an immersive performance embodying the narrative of aging as the metaphorical confrontation with a definite ending.

The pieces show the experience of being caught in a search for an unidentifiable variable that might help quantify the cumulative experiences leading up to the present—as if to balance a scale caused by a debt created somewhere in the past. It portrays the fallacy in the hope that finding this variable would prove that the gravity of feeling has a logical explanation and is thus perfectly solvable. The combined elements of a visual film, live choreography, and the durational depiction of a graphical analysis converge to illustrate the process of breaking away from reliving in cycles of the past and extending an invitation for sentiment that exists beyond understanding.

Cyan D'Anjou, tom mesic

Process Reflection

By Cyan D'Anjou

I've been restless, like I have a debt to settle. But I'm running out of time, so I tried reaching out to you in the places where time feels endless. If I could go back there I could measure and show you; I can prove that I bore the weight of our presence. I was there, amongst the sea, part of something before it ever had an ending.

I had been accustomed to seeing failure as a balanced opportunity for growth and learning; each loss being reframed as an eventual win. But suddenly, I was met with the uncertainty and unpredictability of feeling, or a feeling of loss that I had not been able to place in an equation that would output a counterfactual gain. I couldn't move on until I felt I had identified its use, so I employed every systems thinking approach I learned through my design background to thrust myself into an analysis that I trusted would provide me with a perfect testable hypothesis for an objectively satisfactory reason behind the implacable sentiment.

It would have been honest of me, in my moment of restlessness, to accept that our lives, experiences, and decisions can never fully fit into a logical framework for my understanding. Nevertheless, they exist. They are the "unknowable certainty". Within every seemingly logical computational model is a built-in margin of error accounting for the immeasurable human capacity for unpredictability. The work was born out of a desire to express compassion for my futile search and allow myself an opportunity to be at rest by acknowledging the inherent value of simply being.

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Urban Oasis

Sonia Litwin

When you walk through the city, how do you feel? Are you connected to yourself? Or distracted, scattered, in a rush? Are you in control, or is it the environment that controls you?

Urban Oasis lies at the intersection of environmental psychology, neuroesthetics, and bio-inspired design. Grounded in the principles of architecture, neuroscience, and biophilia, it aims to create an artificial representation of nature that can be applied to the urban design of future spaces.

The phenomenon of the impact of the physical environment on human behavior, health, and well-being has long been the interest of researchers and designers alike.[1] The diversity of fields studying this relationship ranges from environmental psychology to embodied cognition, neuroscience, and architecture. Hybrid practices like neuroarchitecture try to bridge those disciplines to understand the correlation of architectural features with the brain basis of well-being. The studies published in top-tier journals investigate the significant relationships between certain characteristics of living spaces and their effects on human health including affective symptoms and cognitive abilities. The behavioral settings that encourage focus are shown to have a profound effect on human health.[2, 3]

At the same time, distraction, in particular, is shown to have a decremental effect on health. Controversially it is the distraction and forced attention that are dominant feelings in modern urban spaces. [4]

If we view the places and the objects within them not as discrete, unrelated elements but as part of a larger order—a system of "wholeness", we can see that in this system certain geometric properties and structures have a universal ability to evoke specific emotional states. [1, 5]

Wouldn't it be then possible to use those visual qualities to engineer the feelings of focus into cityscapes? To create an *Urban Oasis?*

Biophilic hypothesis—"the urge to affiliate with other forms of life" is a theory that suggests humans have an innate tendency to seek connections with nature and other forms of life. This concept, now proven by research, is rooted in our biology and reflects a deep affiliation humans have with other life forms and nature as a whole. It suggests that "living structures" possess qualities that evoke a natural and intrinsic response from humans. Natural environments are perceived as restorative and universally beautiful.[1, 5, 6]

However, there are places where "biological nature" cannot be invited. Places like hospitals, light-deprived small spaces, and space stations. Is it possible to use construction and design to recreate nature in those spaces? To create an "artificial nature"?

Urban Oasis explores the possibility of using the shapes and visual qualities of the forest to create a design language encouraging focus and calmness.

This project stands as a "preliminary exploration, a first word not a last word, an attempt to capture ideas and suggest how they might be developed and tested." In this first chapter, I invite you to explore the visual qualities of the cityscape and their consequences for human health and well-being.

Process Reflection

By Sonia Litwin

We are constantly exposed to stimulation overload. "A man's eyes cannot be as much occupied as they are in large cities by artificial things (...) without harmful effect, first on his mental and nervous system and ultimately on his entire constitutional organization".[7]

Most often, our perception of the environment is not sustained, but rather partial, fragmentary. Nearly every sense is in operation, and the image we experience is the composite of them all.[6]

From all the senses, vision is widely considered to be the most important and most complex. The term "visual dominance" means that the sensual information is not treated equally. The visual quality of the scenes seems to dominate over other modalities.[8] It is therefore reasonable to assume that our experience of the urban environment is to a great extent shaped by its aesthetics.

Many studies also support the fact that just by looking at "living structures" the patterns of brain activity transition to the states of restoration and healing. However, little is known about which visual features of the natural environment have this restorative impact.[9]

If we had this understanding, would it be possible to create an artificial nature? To engineer an architectural language of harmonious shapes and structures that would evoke a state of calmness? To create an oasis in urban space?

But how to understand how we perceive the forest?

Visual perception has long been a fascination of the researchers. Cognitive science and neuroesthetics agree that there are two main processes, top-down and bottom-up, in which the human brain formulates the images of objects. Moreover, the human visual system is wired to organize the visual input in terms of image features: edges, shapes, and structures. The bottom-up visual pathway starts at the lowest level of the image—edges. From there, subsequent regions of the visual cortex 'build up' the image constructing the shapes and structures. The images we see can therefore be understood in terms of the basic features.

But how do we measure the actual information content of the image? The image complexity?

For this purpose a commonly used measure is entropy. It has been also shown that the complexity of the image is related to the emotional valence.[10]

To understand how the image of the forest is perceived in the visual cortex and how it impacts the emotional states, I've used a set of tools that mimic the human visual processing pathway.

The resulting dataset represents the images segmented into the features and organized on the scale of decreasing complexity. Original photographs are the representation of the highest level of complexity—textures.

The aim of segmenting images into different complexity levels is to study, with the use of an EEG headband, the brain response to the obtained geometries and to determine the minimal level of complexity that has the potential to create the well-being enhancing effects, as measured by the front alpha asymmetry, similar to the experience of forest viewing. This would enable the answer to a question: Is it possible to use shapes and structures of the forest to create an architectural language of 'artificial nature' that evokes the same brain response as the 'real nature'?

In this study, the images of the forest are viewed as artificial agents and the relationship between them, and human beings is studied with the approach derived from human-machine interaction. This way the artificial nature becomes an agent that is a part of the larger system of behavioral setting—the speculative urban space of the future.

Sonia Litwin ↗ page 109

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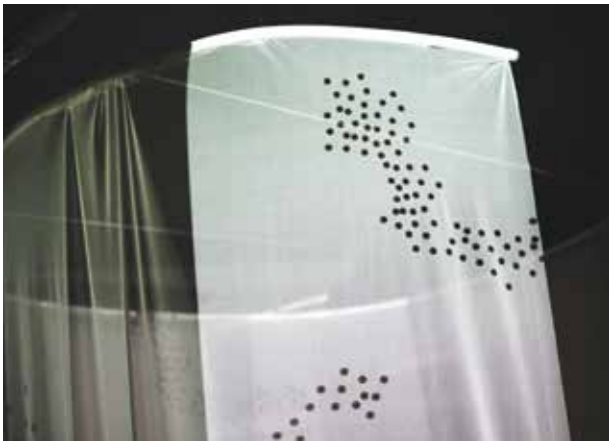

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Virtual Dream Reliving

Pinyao Liu

Contemporary psychologists and neuroscientists often employ the term “dreamwork“ to encompass a spectrum of methodologies that deepen and engage with dreams to gain new understandings and personal insights. Central to many of these approaches is the concept of re-experiencing dreams—immersing oneself in the recollection of dream memories, emotions, and bodily sensations. This project introduces the innovative concept of “dreamwork engineering“ and presents a generative AI powered VR system that facilitates dream re-experiencing within a virtual reality (VR) environment.

Over a two-week period, I conducted an autoethnographic study, recording and documenting my own dreams using a voice recording app each morning. From four memorable nights of dreaming, ten distinct dream images (N = 10) were obtained. At the close of each day, I utilized the VR system to re-live these dream experiences, recording both my behaviors and the on-screen VR interactions. During the VR session, I start to retell my own dream in the present tense, first-person perspective. Whenever it comes to a concrete dream object, I put my palms up together, and a tiny ear grows in my palm. I then whisper the dream object into the tiny ear. After 25–30 seconds, the AI generated dream object appears in the air. I can then manipulate the scale and position of the dream object using my hand. After the VR dream reliving session, the Heaton’s

Martin Hieslmair, vog.photo

Gains from Dream Interpretation (GDI) questionnaire was completed, with each item serving as a prompt for written reflections.

This research is a collaboration with Human-Computer Interaction (HCI) expert Alexandra Kitson, dream scientists Claudia Picard-Deland and Michelle Carr, FOUNDING LAB Fellow Ray LC, and data visualization scientist Chen Zhu-Tian.

Our findings suggest the potential of a technology-aided dreamwork framework, where spatiality, movement, interactivity, and abstract anchors could enhance traditional dreamwork methods. We propose a collaborative role for generative AI in facilitating insights by fully re-experiencing dream emotions. Moreover, we posit that the scientific community could benefit from integrating dreaming and dreamwork practices to foster scientific creativity.

The system's development extends beyond individual exploration, culminating in an audio-visual performance in Deep Space 8K. This performance invites audience participation, encouraging them to share their dream objects, which are then dynamically generated and visualized in real-time projections. The result is a collective dreaming experience that intertwines art and science, offering a unique and immersive exploration of altered states of consciousness.

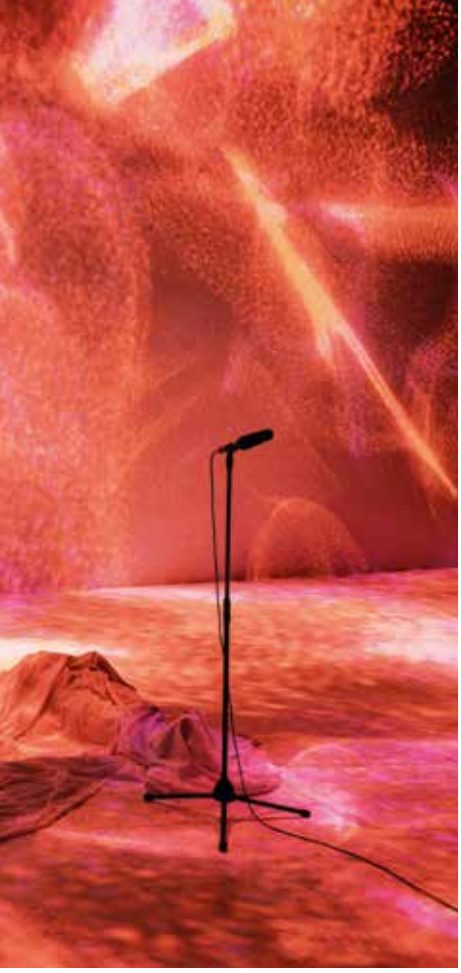
Process Reflection

By **Pinyao Liu**

Collaboration has been at the heart of this multifaceted project, weaving together diverse fields such as Generative AI systems, dreamwork methodologies, Virtual Reality (VR) experiences, and audio-visual performance. The exploration of generative AI and VR technologies, specifically focusing on text-to-3D diffusion models, underscores the technological foundation of this work.

In fostering interdisciplinary collaboration, I engaged with experts across various domains. Collaborating with dream scientists and neuroscientists Claudia Picard-Deland and Michelle Carr in Montreal provided invaluable insights into the intricacies of dream phenomena. Additionally, partnering with a Human-Computer Interaction (HCI) expert Alexandra Kitson in Vancouver contributed to the research methodology. The collaboration extended to include the data visualization scientist Chen Zhu-Tian from Boston. The guidance and consultation from Ray LC, a FOUNDING LAB Fellow, further enriched the research process.

Artistic approaches played a pivotal role in shaping the project's expressive dimension. Collaborating with the sound artist Keon Ju allowed for the composition of dream-like soundscapes, enhancing the immersive quality of the dream reliving system. Constructive feedback from FOUNDING LAB Fellows Edwina Portocarrero, Darsha Hannah Hewitt, and Barbara Lippe added valuable perspectives to the artistic creation process, fostering a dynamic exchange between science and art.



As a conceptual outcome of this collaborative endeavor, I propose the establishment of a global network of experts for universities to tap into. This network would serve as a hub for shared interests, enabling in-depth discussions and fostering interdisciplinary collaborations. Recognizing that no single institution can encompass every expertise, establishing connections with external experts becomes a catalyst for innovative research. For instance, my collaboration with the HCI expert from Vancouver and dream experts from Montreal proved instrumental in advancing scientific research. Similarly, the collaboration with an electronic musician significantly influenced the artistic dimension of the project.

In translating these experiences and learnings into a concrete suggestion for a new university, I advocate for the integration of interdisciplinary collaboration as a foundational principle. Establishing connections with a diverse array of experts, both within and outside the institution, fosters a rich environment for research and creativity. This approach aligns with the dynamic nature of contemporary research, where the convergence of multiple disciplines yields innovative solutions. Embracing this interconnected model ensures that the university becomes a vibrant hub for knowledge exchange, where collaborative efforts transcend disciplinary boundaries, paving the way for novel discoveries.

Pinyao Liu ↗ page 110

Ὅσιο

Dimitris Mertzos

Ὅσιο is a project at the intersection of the digital and biological realms, delving into the process of generating and nurturing a hybrid creature. By merging the digital and biological, it strives to depict the peculiarity of existence within an exclusionary landscape and ultimately creating an entirely new sacred realm where the hybrid can live and thrive.

An allegory of self-discovery and healing, this project serves as an exploration undertaken during the FOUNDING LAB Fall Term. Central to my process was the profound shaping of the creature, a transformative process that allowed me to redefine the familiar—my own body—and perceive myself as an entirely distinct entity within the spatial context.

Within my broader artistic practice, I consistently delve into materiality and explore innovative approaches to digital and physical transformation through transmedia installations. I work with a diverse array of mediums, including sculpture in both analog and digital formats, 3D gen-

erative programs, video, photography, artificial intelligence, and data collection/processing—spanning the physical, digital, and bodily realms. Specifically within the scope of this project, my objective was to seamlessly merge my cultural traditions, steeped in traditional craft, rituals, and landscapes, with the technological tools offered by the Founding Lab, thereby creating a novel reality.

This endeavor saw the convergence of digital generative tools like photogrammetry and digital fabrication processes, such as 3D printing, with bio-materials such as animal gelatin, beeswax, dried flowers and bio-technological techniques that focused on cell collection from my own body. The synthesis of these seemingly disparate elements resulted in an odd but harmonious blend, a manifestation of the union between tradition and technology, giving birth to the unique reality of *Όσιο*.

An integral facet of this project involved an in-depth exploration of traditional rituals and customs, particularly those characterized by normative and binary nature. I embarked on a journey of performative research, immersing myself in rituals that felt forbidden, seeking to reshape them through my own experiences. The outcomes were hybrid acts and products, each contributing to the creation of the envisioned new land for the creature—a landscape rich in symbolic significance, a testament to the transformative power of merging tradition and innovation.

With this project, I am questioning of the agency I hold over my own body and contemplate the potential for self-healing and nourishment through the integration of technological tools. The FOUNDING LAB provided an incredible platform for this exploration. While the final outcome deviated from the initial concept, the beauty of performative research lies in its dynamic evolution—from attempting to 3D print a life-sized creature to ethically collecting and processing my own blood. Despite the obstacles faced, we successfully birthed the creature into space, sculpting a world where it could thrive. I view the audience as integral to this creation, hoping that *Όσιο* transcends boundaries, inviting everyone to see themselves within its unique essence. I extend a heartfelt invitation to explore the realms I have crafted, encouraging each individual to embark on a journey of self-healing within this sacred space.

tom mesic

Process Reflection

By **Dimitris Mertzos**

The process of creating *Όσιο* involves careful rituals which combine digital and physical elements. I start by 3D scanning discarded bodies, capturing their unique features digitally and blending them into one form. Using 3D printing, these digital shapes become physical molds. These molds are coated with melted animal (goat) gelatin creating a new protective skin. Gelatin is a material that symbolizes discarded bodies and acts as a connecting tissue for the new creature. In a symbolic act of care and sacrifice, I then infuse the creature with my own Peripheral Blood Mononuclear Cells, drawn from my blood. This simple yet powerful process establishes a deep connection between me and the emerging being. Creating a bond of rebirth and decay.

This project thrived on collaboration, with performative research serving as the catalyst for numerous partnerships. Initially immersing myself in the new Austrian landscape, I sought inspiration for fresh narratives and discerned patterns. My collaboration with nature proved fruitful as I collected materials, identifying familiar aspects within them. Engaging in discussions with fellow Fall Term students, particularly Amanda Bennetts and Mar Osés nurtured a circle of opinions and feedback that significantly enriched all our projects. Sharing a Fine Arts background facilitated a common vocabulary, paving the way for fruitful collaborations. Notably, teaming up with Chiara Croci, we digitally fabricated the body, navigating practical challenges that intricately intertwined with the project's conceptual depth. Maintaining a vital link to Greece, I kept those back home in the loop, their insights integral to the project's progression. My master thesis supervisor, Fani Boudouroglou, played a pivotal role in shaping the project conceptually, leading a research trajectory that seamlessly intertwined materials and narrative. Lastly, collaboration with Anastasia Bragina from the Ars Electronica BioLab provided invaluable scientific perspectives, guiding decisions on how to seamlessly integrate bio elements into the project.

These collaborations formed the backbone of an interdisciplinary research project. The exchange within a space teeming with diverse experts, coupled with connections to familiar faces, crafted a hybrid process that boosted both my artistic practice and project forward. Navigating the intersection of art and technology posed challenges, but the technical environment provided invaluable tools, enriching my artistic toolkit and expanding my narratives.

Developing an art project in this technical setting proved transformative, offering solutions to challenges that were insurmountable back in Greece due to resource limitations. Bridging the gap between the digital and the real world became a tangible reality. Interdisciplinarity, inherent to the core of my work, seamlessly integrated with the entire process.

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Martin Hieslmair, vog.photo

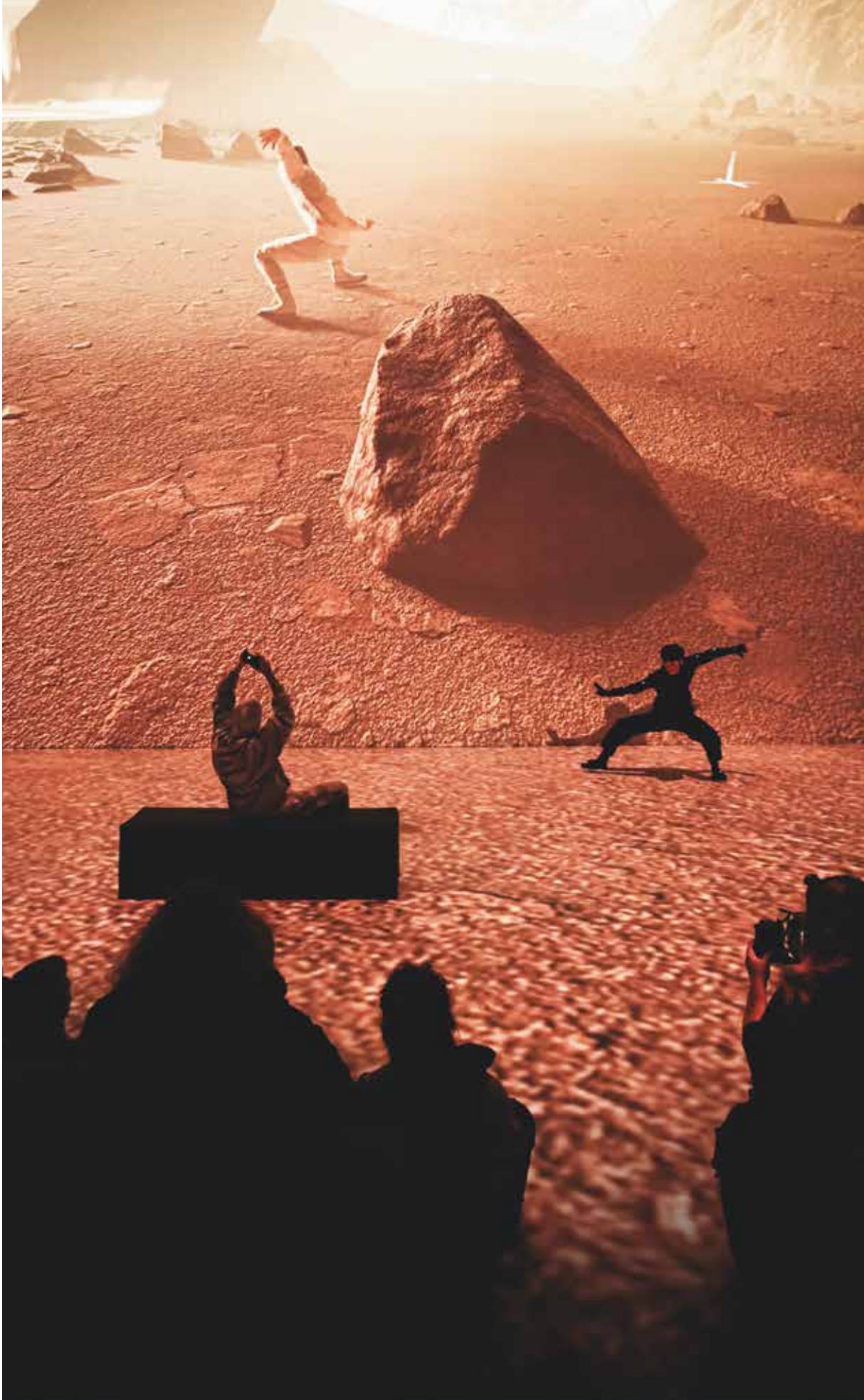
Чули? Чули.

Letta Shtohryn

In collaboration with: Julie-Michèle Morin (Player 1), Jeffrog Wang (Player 2)

The project *Чули? Чули.* is a video game demo shown as a live performance, featuring a human protagonist (the player) and a motion-capture dancer. They both navigate the boundaries between the virtual and physical realms, shifting roles and blending identities through embodied interaction.

The title translates to *Have you heard? We've heard.* which in Ukrainian also conveys *Have you felt (it)? We've felt (it).* The project is showcased as a large projection in Deep Space 8K at the Ars Electronica Center and is divided into two parts. In the first part, the player explores the game world, guided by a continuously evolving AI-created audio narration. In the second part, the player encounters another avatar in the game world and realizes that a human body controls this avatar. The dancer, wearing a motion-capture suit, enters the play area, dances around the player, and gradually approaches them. As they progressively interact, the dancer eventually gives parts of the mocap suit to the player and takes the Xbox controller from them. Conse-



quently, the player becomes an NPC (non-player character), and the dancer behind the avatar assumes control of the camera.

This work delves into questions of who serves as the protagonist and antagonist in online manipulations as it dynamically shifts perspectives between the player and the dancer, both virtually and metaphorically, challenging the traditional divide between virtuality and physicality. The project employs XR as a medium for facilitating cross-realm encounters, resulting in a storyline unattainable without technological augmentation.

The project utilizes a video game format to metaphorically engage with manipulative online narratives created by troll farms, AI systems, and propagated by human agents. These narratives often involve spreading false or misleading information with the intent of manipulating or deceiving the audience. However, this project adopts a unique approach, capturing the experience through an AI-assisted shapeshifting of a different narrative, narrated by a woman who once witnessed giants. A central theme is the fragility of the physical realm under the influence of its digital counterpart.

Drawing from extensive PhD research on posthuman embodiment with technology, sensory maps, and intuitive epistemologies through XR and MR, this project undertakes a science-fiction exploration of the contemporary human condition, shaped by the interplay between online and offline realms. The primary focus during development of the work encompassed interactivity, virtual-physical codependency, presence across virtual modalities, speculative storytelling, and audio narration as gameplay guidance.

The somewhat novel aspect is the combination of media, the dance performance inside a video game but also a physical interaction between a player and the dancer, as well as his avatar. This allowed us to explore video game tropes, such as platform jumps and fantasy outfits, but also facilitated more conceptual immersion into the game world, which is built according to my PhD research into sensor mapping. The exploration of the role of the player and the NPC and its reversal is probably not a novel aspect, as myself and a number of artists have engaged with it, but it is novel for the context of the work and the mix of methods it is projected through.

Martin Heslmair, vog.photo

Process Reflection

By Letta Shtohryn

The project is driven by several interconnected themes—a reflection on truth, belief, propaganda, and online interaction, exploring their consequences in the physical world; and an exploration of our extended sensorium, enhanced and triggered by technologies, leading to speculative experiences that blur the boundaries between fact and fiction. These concepts were addressed through a fusion of media, blending a playable video game with live motion-capture performance and with a physical performance within a mixed-reality setting.

The interdisciplinary process of the project bridges (post)human theories, game studies, journalistic enquiry, media literacy, open-source investigations, performance and dance studies, AI co-creation, as well as visual art.

The process has somewhat evolved from the original gameplay idea, which involved a more passive player interacting with a number of NPCs, and later the dancer would arrive in the performance space, altering the dynamic with their presence. The original concept involving NPCs, where the player meets them and decides their path via in-game dialogue, was removed. For the purpose of this demo, the player's agency and physical interactivity, suggested by my collaborators, took center stage. Working with Jeffrog Wang as a dancer and excellent improviser, and Julie-Michèle Morin as a player, but also an experienced dramaturg and theater-versed scholar, allowed me to delve deeper into the physicality of each role and the meaningful exchange of control and camera between them during the performance.

For the performance to materialize, I used a suite of software such as Marvelous Designer to create avatar clothes, MetaHuman to create avatars, Blender and Maya for rigging and mesh fixing, and, of course, Unreal Engine, where the live motion capture data was fed via Live Link app from Axis Studio motion capture software. The most unpredictable element was the motion capture suit itself, as it is prone to magnetic interference.

During the process, we learned that we need to adapt our expectations to technology. The dancer was using a motion capture suit that was gradually losing connection to the receiver at the performance space—Deep Space 8K exhibits high magnetic interference due to the metallic surfaces on its walls and floor. Realizing that the magnetic interference was unavoidable, the dancer Jeffrog decided to work with the collapsing avatar body. This made the act of passing the motion capture sensor to Julie (the player) more intriguing, as the avatar appeared as a body with shared control but also like an abandoned shell. The head seemed controlled by an NPC while the damaged body retained control of the world and camera. The surprises of technological failure and their exploration shaped the work to its current form, making it more fitting to the original concept than what I had in mind at the beginning of the process.

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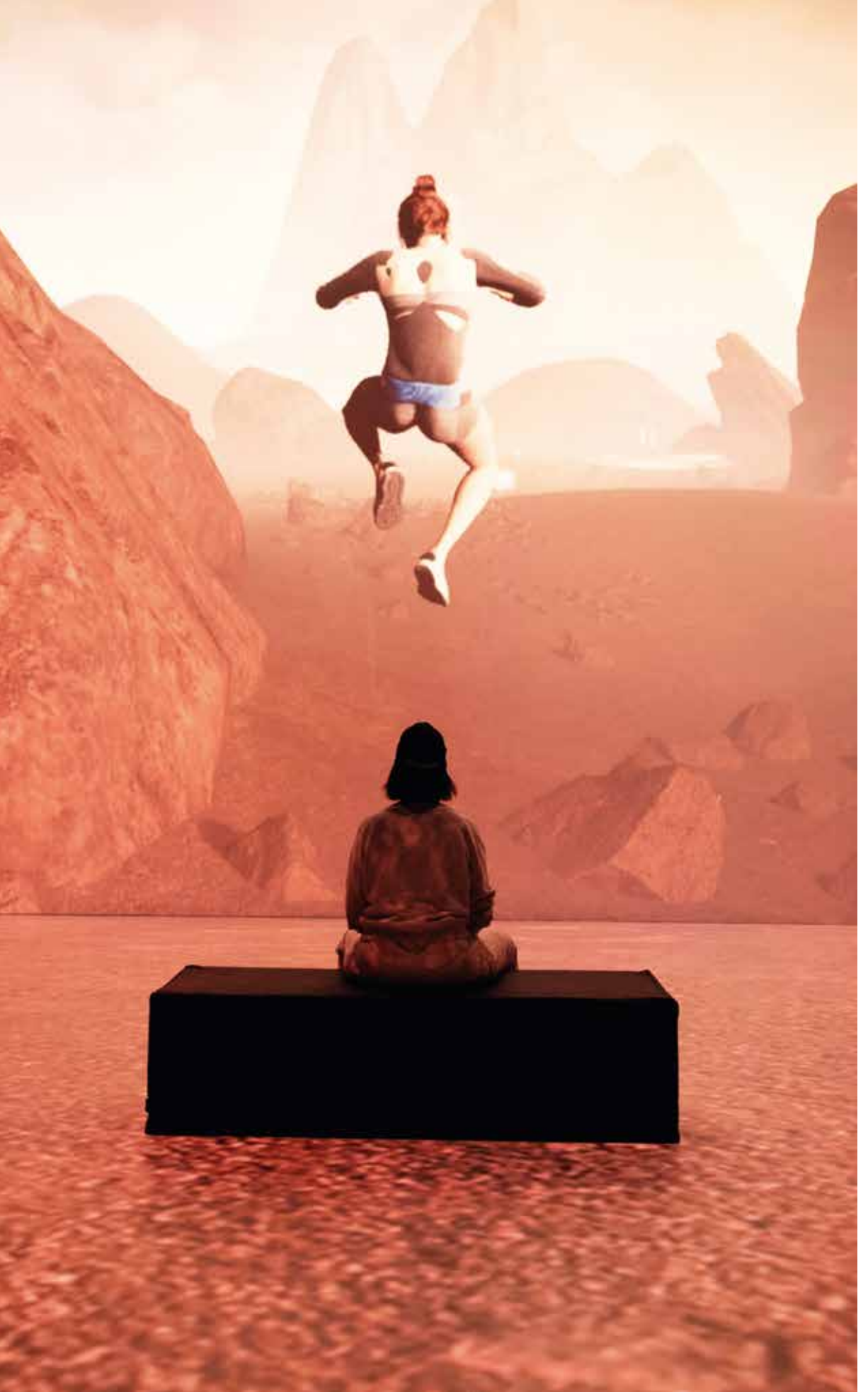

IT:U
x
Ars Electronica
FOUNDING
LAB

Fall
Term

Event

The FOUNDING LAB Event marked the conclusion of the IT:U x Ars Electronica FOUNDING LAB Fall Term, which was full of challenges and personal growth.

On January 25, 2024, the students' Fall Term projects and processes went public in the **FOUNDING LAB Event**. At IT:U's Open House, visitors could explore projects and gain insights through talks moderated by IT:U president Stefanie Lindstaedt, founding members Katja Schechtner and Christopher Lindinger, and Ars Electronica's artistic director, Gerfried Stocker. In the evening at the Ars Electronica Center, student performances took place in Deep Space 8K.

One key element of this interdisciplinary project-based program format were the students' semester projects. The Master and PhD Students brought their own ideas inspired by their different backgrounds, fields of study, and areas of interest. Their projects could take all formats and be developed either individually or in groups. The fine-tuning happened in the overarching collaborations that aimed for mutual support and collective growth, as the students emphasized themselves in their keynote at the conference during the Ars Electronica Festival.

Martin Hieslmair

The discussions of the diverse issues surrounding digital transformation were accompanied and guided by the experienced Fellows and the Facilitators. During the process presentations, the students also shared their insights into a university for the 21st century.

Unveiling the Power of Interdisciplinarity: Student Insights and Innovations

In this Process Presentation, Students from the FOUNDING LAB shared their experiences and discoveries in the realm of interdisciplinary research. The discussion featured diverse Fall Term projects, ranging from exploring the very essence of interdisciplinarity to groundbreaking collaborations between nature and music, and the creation of immersive virtual reality dreamscapes utilizing generative AI. They delved into the challenges and opportunities that arise when boundaries between disciplines blur and talked about the insights they gained about the transformative potential of interdisciplinary approaches.

Digital Empowerment: Navigating Ownership in the Modern Era

In this Process Presentation, the FOUNDING LAB Students engaged in an exploration of digital empowerment that redefines ownership in the digital age through the lens of their projects. This session delved into the ways digital technologies empower individuals to take charge of their lives, health, and self-expression. Topics touched upon in the discussion included the transformative potential of the quantified self, the correlation between gut movements and intuition, the artistic personalization of DNA ink, the reclamation of terms in discussions on gender identity and sexuality, and the democratization of scientific knowledge. This was an opportunity to reflect on the evolving dynamics of empowerment and ownership in the modern era of digital innovation.

Beyond Boundaries: Exploring Humanity in the Digital Age

In this Process Presentation, the FOUNDING LAB Students delved into the core of human existence in the digital era, where their diverse projects converge to challenge and redefine the essence of being human, and the connection humans have with their environment. This session delved into the transformative aspects of our digital identity, exploring the intricate dance between humanity and technology. The panel navigated the realms of biological hybrids, digital interactions, human-robot collaboration, societal gamification, inclusive XR technology, and the profound connection between nature and humanity.

Exploring the Power of Narrative: Student Insights and Innovations

In this Process Presentation, the FOUNDING LAB Students shared their experience in exploring the profound impact of narrative in the process of shaping their Fall Term projects. We discovered how narratives serve as the cohesive force, seamlessly weaving together insights from various disciplines, times, and places. The engaging discussions on the transformative power of storytelling lead to the exploration of human connections, the challenge of shifting perspectives, and the transformative potential when interdisciplinary research is driven by a compelling narrative.

Martin Hieslmair

The **FOUNDING LAB Event** marked the conclusion of the IT:U x Ars Electronica FOUNDING LAB Fall Term, which was full of challenges and personal growth.

Interdisciplinarity: Better Than a Master of One?

Regina Sipos

As humanity faces increasingly wicked problems which cannot be resolved by technology or science alone[1], calls for an exchange between disciplines have become more and more frequent. The apparent uptake in terms like inter- and transdisciplinarity shows that the world is ready to move on from the notion of an "expert", however, this development is accompanied by the need for new frameworks enabling cross-disciplinary collaboration.

The FOUNDING LAB has been a prototype, an experiment. As we outlined earlier, this program has not yet been evaluated. However, on the last day of the FOUNDING LAB Fall Term Program, we invited all students to join panel discussions[2]. These panel discussions were moderated by members of the Founding Convention of the IT:U and Ars Electronica and were organized around four key topics: interdisciplinarity, narratives, humanity in the digital age, and ownership. The students were also invited to share detailed summaries and key learnings from their semester projects, and the program in general. As with most of this book, it was important for us to center and echo the voices of the students. We are building this final section on the same principle. As equal contributors and shapers of the program, we briefly summarize key points from their experiences and attempt to summarize for the reader what worked and what did not.

As many students already had a multidisciplinary background, they were able to recap the difficulty of balancing between disciplines. Speaking of directions in which the semester projects could develop, it was highlighted that potential artistic, scientific and entrepreneurial pathways opened, rendering it difficult to define which hat one is wearing at any given time. For future higher education programs, this is an important and desirable dilemma, as moving away from siloed disciplines such as art, science or entrepreneurship allows for students to branch out and offer a variety of potential contributions to the world. It was also mentioned that having the possibility to access broader perspectives, the students can situate and position themselves in novel ways. For example, in some art schools, there is access to science and technology, however, more complex issues should be discussed through the history of technology or philosophy of science, shedding light on critical considerations, which are needed beyond mere innovative capabilities. Of course, an innovative mindset is important, but a critical mindset is needed to avoid techno-solutionism and the unintended negative consequences it brings with itself.

Another interesting insight shared in a panel discussion was how surprising the outcomes of interdisciplinary collaboration can be. When different disciplines come together in a combination of different perspectives, existing ideas are being shaped in novel ways that were not foreseeable. The program allowed students to grow into a new stage, beyond the disciplines and understanding they started out with. This was achieved not by basing the work on a problem-solution axis, dividing the work based on existing skills (such as one contributor focusing on programming and another on social sciences or art), but instead approaching the creative part of research as a melting pot of disciplines, working together to understand each other's competencies and methods to develop something new. When interdisciplinarity is not merely a new method to pursue research but is employed to enrich the possible list of findings, it becomes possible to move beyond disciplinary boundaries.

What awaits us beyond those disciplinary boundaries might even be more than interdisciplinarity. It was speculated that it becomes possible to explore technological normative developments, which we often see already, through a lens of humanity in the digital age. In this age, one project found, the coin flips. While researchers used to see themselves as neutral, objective outsiders, we can now allow ourselves to create dif-

ferent power dynamics. Instead of pushing technology as a solution "onto" people, asking what technologies they might need or, in some cases, canceling the original research plan. This learning is truly inspiring: when building for people (in this case, for people with disabilities), instead of treating them as a problem, the researcher can step out of the framework their discipline dictates and explore how a different way of embodiment might bring fundamental changes to the project and the technology developed. Research with and for communities becomes possible.

While some explored external communities, many student projects stayed within the frameworks of the experimental program. Taking a closer look at their experience allows us to better understand what the prerequisites of interdisciplinary collaboration might be.

However obvious this might sound, collaboration begins with getting to know each other. The Summer School hosted 75 students, the Fall Term a third of them. This means that over a longer period, the students had the opportunity to find their places according to their backgrounds and build on the trajectories they had already explored as individuals. Previous experiences also informed how confident they felt to express themselves and, through expression and exchange, to start building a feeling of belonging. Belonging also allowed for people to shed the normative known as the "objectivity of science", which is often against the values a person might represent. As a student highlighted, part of creating the space for open discussions through belonging was also an exploration of what interdisciplinary meant for each of them: a way of doing science, a way of creating knowledge, a way of contributing to society? In this context, it might not even matter that much to have a clear scientific definition agreed upon by all participants, but having some sort of a shared understanding is still important.

The diversity of the group was also mentioned as an important factor. Diversity can mean shared life experiences and how we navigate the world, allowing for higher levels of empathy, and therefore, easier communication of emotions. It also allows for preliminary confirmation whether, for example, the biases explored in technology are similarly relevant in different contexts. Furthermore, diversity allows for a sharing of different understandings of the same technology: different disciplinary or cultural backgrounds might "revamp" or "reshape" how we think about the usability of, for example, a VR headset. Which type, or what kinds of use cases one is exposed to might completely change how the person thinks about the same device, and how they proceed towards solutions that might emerge from its usage.

Both belonging and diversity were important building blocks to achieve interdisciplinary collaboration. Highlighting the open-mindedness of the students, one of them pointed out how open they also were to share their resources. While in the academic world, competition might stifle collaboration. In this utopian bubble, personal interests were put aside in favor of collaboration instead. Horizontal (or peer-to-peer) learning spaces during different points of the program allowed for the projects, as well as the individuals, to evolve.

In addition to the community, the students highlighted some key resources they received. As the program prototype was being built, we weren't quite sure which tools might be truly helpful for the students, and which ones might be completely unnecessary. I would refrain from giving the reader a checklist here, but for this particular group of students, the following approaches worked. Moving away from the notion of the traditional teacher/supervisor–student dynamics, we aimed to balance the relationship between Fellows, Facilitators, and students with masters degrees and in PhD programs. We attempted to give space to existing knowledge, to build upon it, both in the lectures and in peer-to-peer facilitation sessions. While not always successful, the students realized that they have the

right to contribute as much as anyone else. The work put into creating a community was also recognized, the treatment and care from the team was highlighted as essential to succeeding. The students' input being considered, respected, and implemented was mentioned as a fundamental principle to feel comfortable in this new space. In addition, the program was praised for giving enough resources for students to be able to develop the semester projects without having to worry about where to work or how to fund their projects, as studio spaces were provided and they had a budget at their disposal. Finally, having the freedom to choose a project the students themselves were interested in and being able to spend the semester working on it as well as achieving self-defined goals was highlighted as a unique and particularly enabling opportunity.

The picture would not be complete without mentioning some difficulties the students encountered. As people from different disciplines started collaborating, they had to negotiate the frameworks they would work with. Not only were language barriers apparent, as English was not the first language of most of the students, but also various disciplines have their own language or specialized terminology, and words or expressions might mean something completely different in different disciplines. Similarly, the program asked the students for several deliverables but did not define the benchmarks of "success". As a student highlighted, when pursuing research in their own domain, the rules are clear, and they can keep hitting the predefined benchmarks. In an interdisciplinary collaboration, all participants will bring their own benchmarks, which then need to be communicated in detail, and negotiated. This requires a high level of self-awareness, as the students needed to dissect the systems they were taught to think in.

I started this contribution with a provocative thought: moving away from the notion of experts. The paper I referred to (Rittel and Webber, 1973) highlights the issue with single-discipline experts: they were trained to think in a linear way. If two houses are not connected, we build a road, problem solved. Living in times of global societal, geopolitical and environmental wicked problems, we know that most of the issues we face are much complex than that. Of course, we need experts, i.e. people who focus on one discipline and gather in-depth knowledge in a particular field. What we cannot allow or rather afford to happen is that the disciplines remain in siloes. The saying "a jack of all trades is a master of none" was originally a compliment and continues with "but oftentimes better than a master of one".

What we learned from this program is how single-disciplinary and multidisciplinary people collaborate over longer periods of time, share resources and knowledge, develop a common language, trust, a community, and find their distinctive benchmarks. We have also seen how this enables novel, interdisciplinary research questions and semester projects. Looking at the project summaries, it is remarkable how much could be achieved over the timespan of only four months.

As the new IT:U PhD program is set to start in the Fall Term of 2024, one can't help but look forward to what impactful interdisciplinary transformation will look like on a much broader academic scale.

1 Rittel, Horst W J, and Webber M. M, 1973. "Dilemmas in a General Theory of Planning." Policy Sciences 4: 155–69.

2 The recordings of the panel discussions are available online https://youtu.be/pv5J8rlD8x0

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Starting a University

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