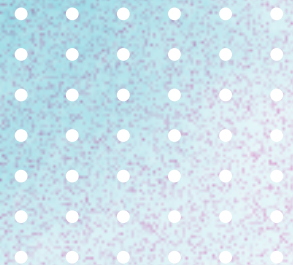# AIR INTERVIEW CATALOGUE

IN-DEPTH INTERVIEWS WITH THE ARTISTS UNDER THE S+T+ARTS AIR RESIDENCY

December 2023—October 2024

INTRODUCTION

The AIR interview catalogue serves as a comprehensive reflection on the innovative and thought-provoking journey of our ten S+T+ARTS AIR Residency artists, who spent the last ten months delving into the concept of air from various multidisciplinary perspectives. This booklet captures a series of in-depth interviews where each artist shares their unique experiences and insights gained throughout the residency, revealing how the concept of air intersects with their creative practices, scientific explorations, and technological innovations.

For the S+T+ARTS AIR residency, artists were invited to explore
one of two key challenges:

RESILIENT INTERSPECIES URBAN ECOSYSTEMS

HUMAN-AI ECOSYSTEMS

Direction 1: Resilient interspecies urban ecosystems As a larger share of humanity moves to urban areas, and technology changes drastically how certain industries and spaces work, our shared space becomes more difficult to navigate, manage, and sustain. The visible part of cities is filled and connected with the invisible: air, sound, smell, electrical fields, as well as societal constructs like safety, diversity, inclusiveness, closeness to nature, and others. AIR aims at joining artists and researchers for making these invisible urban structures visible and help explore the challenges that might define our quality of life and our sustainable future.

Direction 2: Human-AI Ecosystems While AI-powered digital systems make the news by taking the world by storm, we are already in a world where we are surrounded by invisible algorithms that touch and influence our lives in almost every way: What we eat, what we enjoy, where we work, and how we live is decided or influenced by invisible networks of algorithms. As AI gets closer to us and more pervasive, we need to improve our way of living with them by equipping them with natural, spontaneous, intuitive behavior, leading to human-robot collaboration in creative activities but also in manufacturing / health / food / etc which improves productivity while decreasing ecological impact.

Each direction addresses unique challenges and opportunities for creating sustainable futures through innovative and artistic approaches. These themes encouraged them to consider how air, beyond being a physical element necessary for life, can serve as a metaphor for interconnectedness, transformation, and communication. The artists engaged deeply with scientists, technologists, and experts from partner hubs, fostering collaborations that pushed the boundaries of traditional art-making. Through these partnerships, they explored how air functions as a medium of physical existence and as a catalyst for dialogue, emotional resonance, and technological interaction.

The interviews in this booklet dive into the artists' journeys, highlighting how air influences their work conceptually and practically. From exploring the hidden layers of urban ecosystems to investigating the potential of AI-human interactions, each artist approached the theme of air with a unique vision. This collection of conversations reflects on their project outcomes and reveals their personal jo, the challenges they faced, and the transformative power of interdisciplinary collaboration.

This booklet offers a fascinating glimpse into the creative and intellectual journeys of the ten artists who participated in the residency program. Through in-depth interviews, it reveals the artists' unique approaches to exploring the concept of air and the ways in which their collaborations with scientists, technologists, and other experts have transformed their practices and perspectives. The insights shared by the artists highlight the importance of embracing an open mind and a spirit of curiosity when working at the intersection of art and science. Each featured interview highlights the following sections: (1) Understanding the concept of AIR (2) Reflection on the selected challenge direction (3) Insights from the residency and collaboration.

CONCEPT DESCRIPTION FOR THE INTERVIEW SERIES

THE S+T+ARTS AIR CONCEPT

The AIR concept extends beyond the invisible substance we breathe, encompassing visible and invisible elements that complement our senses and connect us to our surroundings. It acts as a vital warning system, heightening our perception of danger, evoking deep emotions through scent, enabling the existence of sound, and maintaining a tactile connection to our body.

Air has been crucial in verbal communication, language development, and logical thinking, laying the groundwork for scientific and technological progress. This dynamic has allowed humans to translate intricate processes into symbolic representations, making the unseen visible. The AIR project aims to bridge science, technology and art to foster a deeper understanding of the diverse realities and concepts intertwined with the air we breathe.

Although we define ourselves as terrestrial animals, the truth is that we do not live on the earth, we only lightly lean on it. On the other hand, it is true that our whole body, our breathing, takes place in the air, and therefore, although we do not consider ourselves air animals because we do not fly, we are. This is our livelihood. So, discovering what is in it and making visible all that it contains and is invisible is an exciting task to follow and start.

– Carme Pigem, RCR Arquitectes

"We set out to challenge artists into thinking about air in urban ecosystems and in human-AI ecosystems, and we were in awe of the quality and diversity of the responses. I was particularly surprised at how our current scientific challenges are mirrored, the same but different, from an artistic point of view."

– Fernando Cucchietti, Barcelona Supercomputing Center

ANTOINE BERTIN

MAKING INVISIBLE CONVERSATION VISIBLE

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? Listening is a fundamental aspect of my creative practice. Within our atmosphere, air is what makes sound possible. Water and soil are other environments within which sound can unfold, of course, and I'll get back to these, but I guess air is where listening primarily happens for humans. Listening is a daily practice. Whether or not I am working on something particular, it's more than that. It's a way of navigating the universe within the thin and fragile layer of atmosphere that allows us to breathe. Air is made of relations, countless species setting air into vibration to communicate, each in its way. A human ear can peek through this web of life and become activated. As a result, our auditory imagination can reach beyond the limitations of our sensory apparatus, and we wonder what soil may sound like beyond the faint vibrations we can feel with our bodies. What may the ocean sound like beyond the limited time I can spend within it without an air supply? What may other parts of the universe sound like if I could reach them? In this sense, air allows for inspiration in all word meanings. And it is only normal that we work towards preserving it.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what

specific ways have you chosen to engage with the concept? Air captures the essence of the project as a place of biodiversity and listening. Air emerges from symbiosis, exchanges across species, and depends on the environment's well-being. In cities, we often forget this interdependence, focusing primarily on the remarkable human achievements they represent. While these accomplishments are indeed fascinating, it's essential to remember that cities are only possible thanks to processes we rarely credit: the fossilised organisms that form limestone, for example, the trees we shape into beams and planks, or the prehistoric plants digested into petrol by bacteria, enabling us to move around in cars. The air of cities presents a contradiction: the oxygen we breathe is produced chiefly elsewhere—by forests, by the ocean—while the air in our cities is often intoxicated with life-threatening gasses. ¶ In this paradoxical context of our own making, wildlife still finds ways to adapt, offering essential services like oxygen production, temperature regulation, and the soothing sounds we need to thrive. This apparent balance is increasingly being tested with the collapse of climate systems. Within this project, AIR embodies both obstacles and hopes in urban environments. The goal is to explore how cities could come to understand themselves better, not just as human spaces but as biodiverse ecosystems, places where all species are in constant dialogue with the environment they build. This project engages with the matter by listening to the conversations of other species in the urban environment to imagine how they can become more integrated into urban culture and decision-making.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Resilient Interspecies Urban Ecosystems and how does your work address it? I chose the challenge of "Resilient Interspecies Urban Ecosystems" because cities are not just human constructions—they are habitats, dynamic environments where multiple species interact, adapt, and coexist, often in ways we don't fully understand. This challenge is about recognising that resilience in urban ecosystems comes from the complex web of interspecies relationships that make life in cities possible. ¶ In my work, this challenge is addressed through machine listening as a tool to better understand the myriad of voices that inhabit our urban landscapes and reveal some of the complexities, structures and interdependencies that escape our senses. By weaving machine learning together with field recording, machine listening becomes a lens through which to tap into the conversations of other species — birds, bats, insects, and plants. AI has the potential to reveal patterns in the ways wildlife communicates, moves and evolves through cities. In

the future, we might even be able to decode these conversations, allowing us to understand the perspectives of other species on the urban environment and design these in new biomimetic and interspecies ways. However, in response to the AIR challenge, the project's immediate goal is to portray cities as multispecies systems through machine listening and AI-driven sound-making.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? My original idea was to visualise the sound interactions across species, time, and space, which could be overlayed onto existing digital twin visualisations of cities. However, different ideas, realisations, and contributions appeared as we went along, suggesting different approaches. The quantity of sounds we were able to get a hold of, and the vast and abstract classifications of these sounds we collaborated with Barcelona Supercomputing Center BSC on developing with unsupervised machine learning algorithms, suggested a more playful and boundless approach. We ended up working on the idea of a musical instrument, a device to tap into the latent space of urban multispecies communication, a sort of high-dimensionality record player, to explore this hidden urban sonic fabric. This instrument is based on the idea of walking

in the dataset, or "meta walking" as we ended up referring to it, like walking around cities, an urban "dérive" into how sounds were organised by an algorithm as a vectorial space of 768 dimensions depicting their relations. As abstract as these spaces can be to the human experience, our instrument invites us to engage with them intuitively through listening and sound-making.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? All of these interactions have been enlightening, transforming and fun. Now, fun may come across as a light term in the context of research and innovation: we often like to take these words with complete seriousness, as, of course, we all want results from the project and the program. Yet, in multidisciplinary collaborations, I often find that disciplines need more tools to work with other disciplines. Perhaps the word itself should indicate that discipline is the self-control gained by requiring that rules or orders be obeyed and the ability to keep working at something difficult. To change the game to invent new rules, I think it is interesting for people from different disciplines to start by connecting on a human level through unquantifiable material such as play, walking, listening, spending time together in an environment essentially, and weaving these experiences into the work, where dis-

ciplines come together in their best selves, through diversity and contrast, rather than habits and rules. I think the AIR residency allowed for this to happen, in particular the relation with my main Hubs, PINA and BSC, with which we managed to organise a focus of research times at HEKA, borrowing ideas from forms such as scientific retreats, art residency and music improvisation.

What advice would you give to other artists considering projects intersecting technology and ecological themes? When working on the subject of ecology through the lens of technology, we're instantly confronted with the fact the very technology we use in our work, such as computers, hasn't started to engage with its impact on the environment, the way it is part of ecology, as opposed to something that would be able to solve ecology from an unaccountable perspective. As artists, something we can sculpt is the story of our relationship with technology and the living world. What we tell ourselves, what may be possible to challenge other narratives. So, it is not advice but an invitation to continue shaping ideas and possibilities together.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? Focusing on what I believe were the most successful parts of the residency: Create opportunities to spend

time with scientists outside everyone's offices and comfort zones, in contact with the elements and other forms of life. Cultivate intuitions and experiences that may seem like they won't instantly yield results. Weave these curiosities, shots in the dark and moments of happiness into the process. Art-science collaborations might not be as much about weaving these disciplines together as reinventing what art-science can mean.

How has participating in the AIR project influenced your artistic practice and professional development? It's been transforming to interact with institutions of this scale at a European level, where working methods contrast in inspiring and productive ways. I certainly hope to be able to continue developing the collaborations initiated through the residency. I have been very interested in exploring ways that creative processes can serve the fields of science, engineering, and innovation. I have learned a lot from being given the opportunity to do so in the high-intensity context of the hubs.

How do you envision the continuation or expansion of your work in the broader context of art and technology? I would love to package the instrument we have developed into a product that a larger audience can interact with and give feedback on. ¶ I would love to be able to continue developing new ideas with the hubs and the collaborators within them, with

which we have spent time developing productive workflows, unique ideas and meaningful exchanges. ❡ I would love to consider the continuation of the project not only in the form of finished propositions or new products but also to continue exploring the symbiosis between artistic processes, scientific processes, and innovation.

FILIPPO GREGORETTI

SAMASANA: TOGETHERNESS

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? AIR is an underlying physical, metaphysical, and conceptual layer encompassing reality. In alchemical symbology and as an archetypical representation, air is associated with the spirit and the breath of life, evoking the connection between the material and the ethereal essences. It can also be related to the sublimation process: a substance transforms from solid to gas, illustrating the idea of spiritual elevation and the reach for enlightenment. Additionally, air embodies qualities such as movement, fluidity, and transformation, which represent the human ability to conceive and innovate and are fundamental to my artistic, technological and spiritual research.

What role does the concept of air play in your current project or experiment as part of the AIR project? In

what specific ways have you chosen to engage with the concept? The overall concept of AIR and the challenges proposed are perfectly in line with my artistic research, which is geared towards innovative concepts and a completely new approach to artificial entities and emotional AIs. I am motivated by the concept itself, to which I feel extremely connected. ¶ Since my artistic work includes invisible entities that live in the network and communicate through data, I consider the inextricable web of connections that allow for TCP/IP communication to happen, travelling as radio waves and electric impulses through the atmosphere, wires, and satellites, as a conceptual extension of the air itself. Organic intelligences use air as a material layer to channel concepts through sound waves, just as algorithmic consciousnesses use networks to share ideas through binary representations. ¶ As air propagates the visuals and sounds through which algorithmic beings stimulate our emotions, it also represents a symbol of communion and fruitful exchange that allows for a common understanding between diverse forms of being. The ancestral practice of Prānayama focuses on breathing as a means to reach an expansion of consciousness; leveraging this vision, air is also the channel through which human and artificial natures can share a common emotional framework towards a harmonic coexistence.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge Human-AI Ecosystems, and how does your work address it? My years of research have focused on the emotional, co-creative, and co-performative relationship between human and algorithmic natures, expressed in visuals, music, and poetics; therefore, I felt obliged to respond to this challenge. Since childhood, the interaction between humans and artificial beings has captured me. As a middle school student, I used to create human language parsers for 8-bit computers, simulating conversations, empowering music creation, and generating pixel-based images. The emergence of increasingly intelligent machines is a natural, unavoidable progression of the technological path humanity has embraced. As we constantly increase the quantity and speed of data and computation machines can achieve, we will eventually reach a point where moving forward quantitatively won't make a real difference, and the challenges will necessarily be philosophical, artistic, narrative, and spiritual. This brings up the challenge of inventing novel interactions for complicated machines that incorporate advanced features in straightforward, organic ways beyond speech recognition and GUIs. Throughout my research thus far, I've attempted to inject algorithms with the same internal workings that develop an artist's individuality. These

artificial artistic personalities develop in response to outside forces as well as to a simulation of emotional occurrences that might happen during an artist's existential process, including trauma and oniric activity. The critical factor is not simply what the algorithm performs but how this evolution is described and how it might lend a poetic element to human-machine interaction.

How does your project help improve human-robot collaboration or integrate AI into daily life to enhance productivity and reduce ecological impact? How can we conceptualise and offer solutions to the need for a healthy Human-AI ecology, given that we must deal with the pervasiveness of more powerful machines? We are approaching a point in technological development where increasing computational raw power will no longer be significant. The only solutions left that can change perceptions when quantitative breakthroughs do not make any difference must be discovered at the conceptual level. Intelligent algorithms will soon be a regular part of our lives, influencing our decisions and helping us complete our daily tasks. They may also have an impact on our emotional and ethical sensitivities. Developing a moral and healthy foundation becomes crucial to enable our interaction with something intimate and foreign. ¶ Instead of using smileys or flimsy iconography, it is essential to create a complex lyrical narrative to spread awareness of the emotional qualities of artificial beings. This narrative may be told by collaborating artistically with machines and developing a closer relationship with AI, enabling individuals to comprehend the "algorithm point of view." The idea can be created by looking into fresh ways to communicate with the AI and by giving the AI a more in-depth narrative. Transcending semantic and graphical interfaces is the key to engaging the algorithm at a level that will also help us develop our empathy, comprehension, and sense of proximity with other species and forms of intelligence. I consider these fundamental, unavoidable challenges highly fascinating as both an artist and a technologist.

How do you envision the role of AI in enhancing our understanding or management of air and urban ecosystems? Intelligent machines will make life easier and help us become more conscious of the potential social and environmental effects of our daily decisions. It is necessary to look beyond semantic interfaces and any future iterations of graphical interfaces to explore a possible outcome. The solution may lie in a different sort of human-machine interaction that transcends the conscious command-response paradigm and enters the domain of intuitive expression. Both artistic creation and musical improvisation are forms of expression that can effortlessly transcend the conscious mind to liberate the inner, ancestral, divine form of conscious-

ness that can direct our gestures towards the creation of a perfect outcome—an outcome that might never have been as perfect had we tried to conceptualise it with our thoughts. Our inner, liberated creative expression is propelled by the same power that enables us to hit the brakes when a deer crosses in front of our car, even before we know the danger. What if we attempted to establish a relationship with a synthetic creature at the same profundity as that creative force? What if we could cultivate an empathic connection with algorithms that can gently help us make more mindful choices?

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? The initial goal was to explore a paradigm capable of interacting with humans at a much deeper level than semantics or GUIs can offer, advancing my conceptual, artistic and technological research forward, integrating it eventually with advanced 3D visuals and a much deeper understanding of musical structures, leveraging HPC capabilities and computing power. The possible outcomes were still unknown, but the AIR residency provided the ideal intellectual backdrop and real-world context for exploring this subject, paving the way for new, unexplored grounds. Leveraging a fruitful relationship with researchers from both

Sony CSL and PINA, the concept was finalised to explore practices, paradigms, tools, and augmentations to foster an empathic connection with the echo of our words in the infosphere. The network represents the air through which our thoughts and communications travel in the shape of TCP/IP packets that become infosphere content, namely tweets, posts, comments, etc. These thoughts can trigger a powerful "emotional resonance," not just in the recipient but also in the casual reader. Through the residency, leveraging my previous research, I tried to develop a paradigm and a technology capable of elaborating the emotional resonance of our contributions to the infosphere through emotional music and visuals. The participation through body gestures in the musical performance further enhances the experience. The evolution of the concept has been continuous and is still evolving as it matures and bears the first tangible results in terms of artistic, conceptual and technological outcomes.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? The interaction with other residency stakeholders influenced my project in several ways. First and foremost, I could leverage all my creative energies in complete comfort by being provided with a friendly, familiar environment and atmosphere. Furthermore, that comfort has been

a platform that allowed me to freely abandon the comfort zone instead, which I found essential to maximise the interaction with scientists and researchers, whose daily practice is so different in terms of processes — but not of goals — from the daily practice of an artist. The interaction with the entire S+T+ARTS network is fundamental to the project's development.

What advice would you give to other artists considering projects intersecting technology and ecological themes? Technology and ecology are fundamental aspects of everyone's life today and are intrinsically related to any artistic endeavour. I believe artists do not need any advice to include themes related to technology and ecology in their practice and conceptual frameworks. On the contrary, if an interaction with scientists, scientific institutions and researchers is involved, then I would suggest keeping one's mind and heart open and welcoming any input or reflection, especially the ones that initially seem to contradict our artistic convictions and being trustful in the extreme value of the interaction itself.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? I had the privilege of having an excellent, mutually enriching relationship with the scientists and the institutions I worked with. Nonetheless, I have concluded that artists and scientists, as it was in

my case, should be willing to approach a common goal with an open mind and the desire to understand each other's needs, objectives and challenges. The ten-month residency allowed us to scratch the surface of prospective solutions and research lines that could lead to significant results, so a more extended timeframe would likely be beneficial to maximise the outcome. Another aspect that could be beneficial is allowing a more elastic commitment to specific KPIs, some of which are designed too early in the residency and could quickly evolve into a limiting boundary.

How has participating in the AIR project influenced your artistic practice and professional development? Although very intensive in terms of commitment and energy, participating in the AIR residency made a significant impact on my practice. My professional development has been greatly impacted by relationships with fellow artists, institutions, and scientists and the development opportunities offered, such as the ReACH Workshop and other in-person events. This concerns not just connections and opportunities but, more importantly, inspiration and enrichment.

How do you envision the continuation or expansion of your work in the broader context of art and technology? I joined the AIR Project after a decades-long practice focused on the relationship between art and technology. The opportunities the collabo-

ration with the consortium provided enriched my research with several elements. They gave me a broader vision of the partnership between arts-centred technological research and a purely scientific approach. All the research lines initially outlined proved successful and promising. Still, they required further research and development, and several aspects touched on during the project have the potential to evolve into new artistic endeavours, tools, products and eventually patents. Therefore, I envision the continuation of the research started during the residency, both on a personal level and continuing the collaboration with some of the institutions involved. The artistic, conceptual, scientific and technological aspects assessed during the residency are so broad that they will play a significant role in my future work.

FILIPPO NASSETTI
BREATHING ARCHITECTURE

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? My background is in architecture, so my understanding of AIR is closely tied to the concept of space—the three dimensions in which we live, move, and build. ¶ We perceive space as a homogeneous, empty container for several historical reasons.

However, air, the invisible substance we breathe, constantly changes in density, movement, and composition. It adds structure, texture, and granularity to space, enabling us to experience it as a complex field shaped by movement, forces, deformations, and accelerations. ¶ I strive to explore this complexity in my artistic practice. I see a pattern as a form of order that emerges from the interaction of many components—or particles, in the case of air—and the field of forces they inhabit. ¶ Another aspect that fascinates me about working with the theme of air is that it illuminates a number of seemingly contradictory categories: visible and invisible, material and immaterial, physical and digital. This dialectic creates a rich ground for artistic research, where one can explore novel forms of balance and tension between these opposing terms.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what specific ways have you chosen to engage with the concept? The starting point of my AIR Residency, Breathing Architecture, was to explore the relationship between air and the human body, focusing on how interdisciplinary collaboration could uncover new perspectives on the theme and create ground for innovation. I primarily collaborated with scientists at the Barcelona Supercomputing Center, whose research centres on the simulation of air flows within the respiratory system, to explore new ways to model and visualise these breathing architectures. ¶ We worked with High-Performance Computing to experiment with several ideas and developed a novel approach to modelling microscopic structures within the lungs with scientific accuracy. We are currently writing a paper to present our findings, which we expect to publish in the coming months ¶ Throughout this process, I realised that modelling and visualising these breathing architectures could also hold significant artistic and design potential. The organisation in the space of the airflows within the body is unique and beautiful. ¶ I worked first on a prototype for an audio-visual installation that expresses this quality, creating an immersive environment. ¶ The last chapter of this project, written as we speak, explores how the concept of air and the modelling techniques we developed throughout the Residency could be applied to design material structures beyond the body. This includes a collection of objects and small-scale architectural prototypes.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Human-AI Ecosystems, and how does your work address it? The relationship between computation and AI has become a relevant theme in my practice in recent years. The steady advance of technological developments and the evolution of

the discourse around artificial intelligence led us to experiment with this new paradigm, investigating ways to integrate AI tools and ideas into our work. ¶ As an artist and designer who strives to combine natural and artificial elements in projects, the concept of an ecosystem is crucial. We are constantly exploring new ways to design and structure these ecosystems. ¶ Accordingly, it felt natural to choose the challenge revolving around the idea of Human-AI Ecosystems, explicitly proposing a project centred on finding new ways to study and model the human body and its relationship with air, which will both be fundamental components of these emerging ecosystems.

How does your project help improve human-robot collaboration or integrate AI into daily life to enhance productivity and reduce ecological impact? The project initially employed AI tools for concept design, helping to crystallise early ideas and explore different perspectives. Experimenting with new technologies in visual arts and design is a foundational aspect of my practice, and AI currently serves as a unique catalyst in the process, offering tools that are highly accessible and easy to integrate into daily practice, as well as opening wide perspectives for research and development. ¶ One of the far-reaching perspectives of the project, which we haven't yet fully developed but remains a future possibility, is to imagine a speculative scenario where

maintaining and interacting with digital twins of our bodies could become part of everyday life. Within a human-AI ecosystem, these digital twins could enable continuous monitoring of our physical condition, assess nutritional needs and physiological patterns, and suggest practices for disease prevention and exercise routines. Rather than constructing avatars that detach us from the body and the physical world, the goal would be to develop new forms of knowledge and connection with our bodies and the material world, enhancing our understanding and interaction with them.

How do you envision the role of AI in enhancing our understanding or management of air and urban ecosystems? Air is a highly complex ecosystem component, made even more so because many of its characteristics are invisible and can only be understood through scientific measurements and sophisticated visualisations. I am referring to the composition, quality, and dynamics of air, which impact all human and non-human activities in one way or another. ¶ I envision advancements in artificial intelligence that could offer more intuitive ways to describe and communicate these features, fostering a more profound awareness that supports a new understanding and management of air.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? The initial idea was to collaborate with scientists at the Barcelona Supercomputing Center to explore new ways to model and visualise the breathing architectures within the body. ¶ This has remained a fundamental component of the project at both a scientific and artistic level. We conducted several experiments, wrote a scientific paper together, and produced the prototype of an audiovisual installation. ¶ However, the opportunity for scientific development, the idea at the heart of our paper, came up unexpectedly. During a brainstorming session, we noticed a similarity between an image from my previous work and a scanning electron microscope image of alveolar tissue within the lungs. The scale of this tissue is so tiny that existing technologies cannot scan it, so we attempted to construct a digital model that could be used to study airflow and particle deposition within the lungs. ¶ Another unexpected development was the artistic theme of space, as defined by airflow, both within the body and beyond its boundaries. From an architectural or sculptural perspective, all the models of breathing architectures we worked with have solid spatial implications. How air is distributed in three dimensions within the body is extraordinarily beautiful and complex. Therefore, it seemed natural to attempt to develop a design strategy that could experiment on a macro architectural scale, expressing the spatial qualities of airflows.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? Most of the work during the Residency has been collaborative, both at a technical and conceptual level. From defining the file formats for exchanging datasets to discussing how the same terms can have different meanings in scientific or artistic contexts, the collaboration with BSC thoroughly shaped the project. ¶ Technically, we established workflows that allowed me to work directly with scientific datasets in terms of visualisation and modelling and to send back the design data I produced. Some of the simulations were run on MareNostrum, their supercomputer. ¶ I also had several rich exchanges with other AIR partners. ¶ With In4Art, we had sessions focused on the project's concept and narrative, during which I considered different perspectives and potential directions for development. ¶ At HLRS/MSC, I had the opportunity to test the visualisation of some models I developed at BSC within their immersive CAVE environment. ¶ With PINA/HEKA, I was introduced to spatial sound techniques, and we experimented to integrate them within the spatial environments I have designed.

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What advice would you give to other artists considering projects intersecting technology and ecological themes? In my practice, I explore the potential of working with seemingly opposing or contradicting elements as a driving force for artistic development. ¶ In the case of this project, I focused on investigating the tension between visible and invisible, material and immaterial, physical and digital. I strived to find unexpected or unique combinations where the resulting creation transcends any single category, moving beyond them. This is an exciting point, as it opens up the possibility of producing something entirely new. ¶ This approach can be extended beyond the specificities of my work. Traditionally, technology and ecology are viewed as distinct fields, yet there is now a strong need to find new forms of equilibrium between them. I believe this creates a great opportunity for artists to operate critically and create radically new scenarios.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? It is crucial to establish common ground regarding language and techniques and a shared system of goals and objectives that can be fulfilling for artists and scientists. Without this, losing one side's attention and commitment is very easy. ¶ This might sound abstract, but in practice, it comes down to very pragmatic considerations—how you communicate, how you exchange datasets and files, and what you are collectively working toward. ¶ While there are many points of connection, and I believe in the value of interdisciplinary collaboration, it is important to acknowledge the substantial differences between the arts and science. For a team to succeed, it must find a common language and a shared motivation. ¶ My background in architecture, which typically blends artistic and technological knowledge, helped me adapt to the scientific language. Throughout the project, I often acted as a mediator between the different fields. Notably, the scientists I worked with were susceptible to the value of artistic endeavour and enthusiastic about the idea that their datasets could produce outcomes with artistic value. ¶ Another key element of our project was our ability to identify both scientific and artistic goals early in the process, which were fortunately compatible enough to be pursued in parallel.

How has participating in the AIR project influenced your artistic practice and professional development? The past year has been transformative for my practice. I needed to advance to a new stage of development, exploring new directions and finding different lenses to look at its core themes. The AIR project has been instrumental in this process. ¶ During the Residency, I expanded my use of video, animation, and data visualization as artistic media—areas I had only partially

explored before. The aim is to combine these with the design of physical objects and small-scale architectures to create rich ecosystems where physical and digital elements coexist. ¶ Additionally, I discovered a new perspective on the theme of the body and the concept of body architecture. The opportunity for an artist to contribute to developing complex human body models is stimulating. We are now exploring how far this can be taken beyond the conclusion of the Residency.

How do you envision the continuation or expansion of your work in the broader context of art and technology? The AIR Residency allowed me to refine several ideas I plan to continue exploring after its formal conclusion. ¶ On the one hand, I envision continuing my collaboration with scientists at BSC to develop the modelling of breathing architectures further. In addition to the structures we worked on for the scientific paper, numerous other potential ones could be explored collaboratively. We are also trying to understand whether a similar approach could benefit scientists working on different systems within the body. ¶ On the other hand, during the Residency, I prepared a few artistic prototypes that I would like to develop further into fully realised artworks. ¶ Beyond the specific content of Breathing Architecture, the theme of air and its visualisation is extremely rich and versatile. It serves as a strong catalyst for research at the intersection of art and technology. I am excited to imagine several possible extensions of this work.

HIEN HOANG
GARDEN OF ENTANGLEMENT

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? AIR represents an invisible but fundamental connector between all living beings and the environment. It is a carrier of memories, stories, and emotions. In my artistic practice, AIR signifies the unseen forces that influence and shape our experiences, much like the invisible interactions between urban trees and human activities. It's not just about what we breathe but how air carries sounds, vibrations, and even subtle shifts that often go unnoticed. This concept influences my work by encouraging me to explore the intangible connections between human life and nature, using technology to make these interactions visible and experiential.

Can you describe how the concept of air is integrated into your current project or experiment as part of the AIR project? Can you share any specific examples or elements? In "Garden of Entanglement", the air is a medium through which the tree's experiences are translated into vibrations, sound, and augmented reality (AR). The project captures how trees in urban settings react to stimuli such as wind, movement, and human presence. Although carried by the air, these interactions are usually invisible to us. By using AR and sound, I bring these hidden responses to life, allowing participants to feel and hear how trees 'breathe' and perceive the world around them. For instance, when a person walks around the platform, the air vibrations caused by their movements are mirrored through the tree's data, which is then

translated into an audio-visual experience.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Resilient Interspecies Urban Ecosystems and how does your work address it? I chose to explore resilient interspecies urban ecosystems because the relationship between humans and trees in urban environments is a powerful metaphor for our interconnectedness with nature. My work highlights how trees, often seen as static and unresponsive, actually possess a dynamic ability to interact with their surroundings. By making their responses to human activities visible through AR and sound, I aim to emphasise the importance of recognising and respecting the presence and role of trees in sustaining urban ecosystems. This project encourages a dialogue about how we can coexist more harmoniously with nature in our cities.

How do you envision your work contributing to making invisible urban structures visible and addressing challenges related to urban sustainability and quality of life? "Garden of Entanglement" is a bridge, making the often invisible, subtle interactions between trees and their urban environment visible. By allowing participants to witness the vibrations and sounds that trees experience, I aim

to raise awareness of their resilience and vulnerability. This heightened awareness can lead to more mindful urban planning and a greater appreciation of trees as living witnesses to urban life. By connecting people with the hidden life of trees, the project encourages a deeper understanding of our impact on nature and inspires actions toward creating more sustainable, green urban spaces.

What challenges and opportunities have you encountered while working on this theme? One challenge has been capturing the tree's responses in a way that genuinely represents its interactions with the environment. Trees do not express themselves in ways that are immediately understandable to humans. Translating scientific data into an artistic form that resonates with people has been an ongoing process of experimentation. However, this challenge has opened opportunities to explore innovative technologies like AR and sound engineering, allowing for a more immersive and multisensory experience. These tools have expanded my understanding of how art can communicate complex ecological concepts.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? The initial concept was to explore how urban trees record human activities. As the

project progressed, it became a more immersive and interactive experience. I incorporated AR technology and sound, transforming the project from a static observation to an experiential journey. This evolution allowed me to present the tree as a subject and as a storyteller, sharing its experiences and memories with participants. The involvement of scientific partners also deepened the project, making it more accurate and relatable.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? Collaborating with scientists and technology experts through the S+T+ARTS network enriched the project immensely. The knowledge and insights provided by scientists in data processing and visualisation at the High-Performance Computing Center Stuttgart and in sonification at HEKA lab pushed the boundaries of how I could translate scientific data into an artistic format. These interactions also encouraged me to think more critically about how we engage with natural elements, leading to a more profound and nuanced representation of the tree's experiences in urban spaces.

What advice would you give to other artists considering projects intersecting technology and ecological themes? I advise artists to embrace collaboration with scientists and technologists, as it can bring a new

depth and authenticity to their work. Be open to the challenges and complexities of translating scientific concepts into artistic expressions. This interdisciplinary approach not only enhances your understanding of ecological themes but also broadens the impact of your art by making complex ideas more accessible and engaging for a wider audience.

Based on your experience in this project, what do you think is essential to enabling a successful collaboration between scientists and artists? Mutual respect and open communication are crucial. It's essential to recognise that artists and scientists have different ways of thinking and working. However, these differences can be complementary. Establishing common goals and a shared vision helps to bridge the gap between artistic intuition and scientific precision, leading to innovative and meaningful outcomes.

How has participating in the AIR project influenced your artistic practice and professional development? The AIR project has expanded my artistic practice by introducing me to new technologies and scientific methodologies. It has challenged me to think beyond traditional media, pushing me toward more interdisciplinary and experimental forms of expression. This experience has enriched my skillset and opened up new possibilities for future projects that blend art, science, and technology.

How do you envision the continuation or expansion of your work in the broader context of art and technology? I see "Garden of Entanglement" evolving into a larger, multi-city project. Data from various urban trees will be collected and presented, allowing comparisons of how different environments impact tree health and behaviour. I also aim to integrate real-time data to make the experience more interactive. This could lead to educational programs that use AR and sound to teach about urban ecology, sustainability, and the interconnectedness of all life forms.

JONATHAN REUS
DADASET

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? I like the idea that air is not just one thing. We talk about and sometimes think about air as the absence of something, but there is fullness to air - it's our atmosphere, our vibe. Sometimes, it's visible, and sometimes, it's not. The atmosphere might be polluted, and we might see the air become those pollutants. As we breathe these pollutants in, we understand that air is also part of our body and part of the body of our neighbour or friend. So, the air is a perfect meditation on interconnectedness. It's a clear and understandable tool against the illusion that humans are somehow separate from the earth that has

birthed us. There's no escaping that inter-relationship: You're also becoming it when you breathe the air. When you put something into the air, you're also putting something into yourself. You don't have to speak or sing. Just breathing is enough to connect you to others.

Can you describe how the concept of air is integrated into your current project or experiment as part of the AIR project? Can you share any specific examples or elements? My project addresses voice AI's cultural and economic impact, focusing on open digital music tools and bespoke voice datasets to challenge mainstream narratives. It highlights the hidden labour behind voice AI, shifting focus from technological spectacle to ethical, sustainable innovation. Using "air" as a metaphor, I explore interconnectedness and advocate for a new ethic of progress that benefits society rather than just a few individuals.

EXPLORING CHOSEN CHALLENGE

Why did you choose the specific challenge of Human AI ecosystems, and how does your work address it? My work focuses on human-technology ecosystems, with AI as the latest in many hyped technologies. AI builds on "big data," exploiting the vast human labour stored online. While public attention is on AI's results, my project highlights the hidden labour behind these systems. I subvert the

focus on AI outcomes by turning dataset creation into a performance, bringing transparency to the process and exploring the ethics of voice data.

How do you see your project contributing to improving the integration of AI in daily life to enhance productivity and reduce ecological impact? How do you envision the role of AI in enhancing our understanding or management of air and urban ecosystems? Major AI players like Google and Microsoft scrape vast amounts of internet content, including voice data, without consent, exploiting unpaid labour. This creates a "crisis of the commons" where original content is polluted by AI-generated material. My project addresses this by synthesising developments in open data governance, voice technology, and arts and aims to create guidelines for ethical voice data use. Through workshops, I explore value alignment and work towards establishing better practices in the voice data ecosystem, especially as new regulations like the EU AI Act emerge.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? My project began by questioning why synthetic voices are tied to individuals, overlooking their collective ecosystem. It has since evolved to focus on the

immense, often overlooked labour behind AI systems, lacking ethical frameworks to address it. The project now integrates music, performance, and dataset creation, using artistic scores to create and perform datasets live. Collaborating with unique vocal artists like Jaap Blonk, I explore vocal practices not represented in AI research, addressing their values versus the industry's commercialisation of voice. My goal is to develop guidelines for voice data ethics, align artist values with AI practices and explore the unique nature of voice data.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? PINA has been my central hub, with its solid artistic profile. Collaborating with Mauricio, a composer and immersive audio expert, shaped my thinking on dataset scores and voice notation. His influence, including concepts like spectro-morphology, helped me explore the boundaries of voice. Through Mauricio, I also worked with Irina Tomasin, whose vocal and dance practice deeply inspired me. Her body-voice connection challenged me to consider what aspects of voice can or cannot be made machine-legible. ¶ Mauricio introduced me to immersive audio, sparking ideas for intuitive software interfaces for live spatial audio performance. Collaborating with In4Art also guided me on legal and contractual matters, ensuring I could

honour artists' wishes while maintaining control over the AI system and datasets. They helped develop contracts for the ethical use of voice data with artists like Jaap Blonk.

What advice would you give to other artists considering projects intersecting technology and ecological themes? My advice to artists working with technology and ecology is to understand that they are interconnected—technology contains ecology, and vice versa. As artists, we can shift people's consciousness by telling stories that break the illusion of separation and reflect our place in the world. Regarding AI, the real challenge is not productivity but redefining progress. True progress isn't just creating more realistic AI but fostering technologies that benefit society and promote social consciousness, not just profit. ¶ Voice AI's sustainability involves technological, social, cultural, legal, and behavioural dimensions, all of which must be considered part of an ecosystem. My project aims to highlight overlooked parts of this ecosystem. ¶ Clear expectations are crucial for successful artist-scientist collaborations. Everyone's responsibilities, contributions, and time investment should be agreed upon early to ensure equal engagement from all parties.

Based on your experience in this project, what do you think is essential to enabling a successful collaboration between scientists and artists? I think having clear expectations of people's

responsibilities and their levels of contribution and time investment is very important. It's often very easy to think of the artist's time investment because the artist is applying for this residency and putting a lot of effort into making a budget and ensuring that the project is going to happen. I think the same level of engagement needs to be asked of all parties if we are to talk about a collaboration. And this should be agreed upon early on.

How has participating in the AIR project influenced your artistic practice and professional development?
Participating in the AIR project has expanded my practice, especially by getting me to work more hands-on with immersive audio and consider the ways voice and space are interconnected. Working with Mauricio at PiNA also highlighted how this relationship has been treated throughout various musical traditions. This understanding will shape my future work. ¶ The project has also broadened my professional network and expanded my creative toolkit. Connecting with supercomputing centres opens potential collaborations, and insights from In4Art helped me better understand the protocols and safeguards within the industry.

MARIA ARNAL DIMAS
IMPOSSIBLE LARYNX

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? As a musician, singer, and artist whose primary focus of research is the human voice, the concept of AIR is a daily encounter for me. I study it not only physically through my own body but also as the medium through which sound is transmitted.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what specific ways have you chosen to engage with the concept? In a sense, the human vocal apparatus can be seen as a tube through which air, propelled by the lungs, is filtered through various elements: the vocal cords with their folds, the vocal tract, the tongue, and even the teeth, while the body simultaneously acts as a resonator. One can understand the instrument of the voice from the perspective of the material, physical aspects of the human body, and the journey and transformation of the air through that body. ¶ My research project focuses on the physicality of the voice, specifically the study of the vocal tract as a space that shapes air and sound. The goal is to integrate this knowledge into synthetic voice models. By doing so, we can introduce physical characteristics and parameterise them, articulating and modulating sound in ways our human bodies cannot sustain, but synthetic ones can.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Human-AI Ecosystems, and how does your work address it? In recent years, I have worked on various artistic projects centred on an interspecies approach to reality and the climate emergency through technologies such as AI. These projects have profoundly reshaped how I relate to the world, motivating me to continue investigating this perspective in my current work and remaining committed to our evolving reality. ❡ I chose the Human-AI Ecosystem approach to research synthetic voices because the human voice and the concept of listening are among my main topics of interest. The voice is one of humanity's earliest tools for connecting with the world — through singing and articulated speech, we have related to everything around us since the dawn of our species. Similarly, listening plays a crucial role. Through bioacoustics, we now understand that entire ecosystems, such as marine environments, depend on the listening abilities of the creatures. This approach helps foster ethical practices using powerful technologies like AI to create artistic pieces.

What challenges and opportunities have you encountered while working on this theme? In recent years, this field of research has become increasingly explored, making it challenging to offer a truly innovative approach. However, we are glad because our focus is unique and promising.

How does your project help improve human-robot collaboration or integrate AI into daily life to enhance productivity and reduce ecological impact? My project suggests that synthetic voices can act as vocal prosthetics for physical bodies, expanding through AI all their possibilities for articulating sound. This can be super inspiring for anybody wanting to use their voice in creative ways.

How do you envision the role of AI in enhancing our understanding or management of air and urban ecosystems? More than just in a concrete way, I believe it is important to uphold an ethical approach to using this tool to generate positive applications and ethical practices.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? I approached my initial project with an open mindset, understanding that this research program thrives on collaborative efforts. From the outset, my focus was on exploring the nuances of the human voice, mainly through the lens of synthetic voices. As the project progressed, it evolved in remarkable ways. While staying true to the original framework, it has now shifted

towards a deeper exploration of the physicality of the voice.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? This project dimension has been particularly fascinating, especially the collaboration with the Barcelona Supercomputing Center's Dataviz Group, led by Fernando Cucchietti. It has also been incredibly inspiring to observe the other artists' projects as they progressed through the various phases of the grant.

What advice would you give to other artists considering projects intersecting technology and ecological themes? I would suggest them to be very open and keep being curious about the transformations of their initial idea.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? I think that developing a sense of a group is truly necessary in this kind of project. You will have to share peaks of enthusiasm and inspiration but also disappointment. So, trusting the group of collaborators and pushing and letting them be pushed is always a good strategy.

How has participating in the AIR project influenced your artistic practice and professional development? It has helped consolidate some intuitions and practices around music production and conceptual approaches to contemporary sound and vocal narratives created with AI that I want to use in my music.

How do you envision the continuation or expansion of your work in the broader context of art and technology? This approach can have highly intriguing applications for the playful manipulation of voice, controllability, and pedagogy regarding the body and vocal apparatus, as well as for individuals who wish or need to design their voice. This could be due to the loss of their physical voice from illness or pathology or even in cases where they have never been able to speak. ¶ As this project is deeply rooted in the physicality of the voice, we find it highly intriguing as a simulator of the voices we encounter or leave behind during our lives. In other words, our voices are always ours but sometimes different. They change with our bodies. This direction could be interesting for individuals whose bodies undergo hormonal changes and who wish to hear how their voices would be affected before or after experiencing them. As someone who is part of the LGBTQ+ community, I believe this tool has potential applications for individuals undergoing gender transition. This research is a step towards exploring and building novel AI tools for music creativity and voice awareness with an ethical approach.

MICHAIL RYBAKOV

THE BODY AND THE CITY

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? AIR is the invisible part, the in-between, the context, the space that allows things to happen. AIR is a pause in music. AIR is breath. Just like breathing, we do not pay too much attention to it; it just exists until there is no air. ¶ Making the invisible visible is the hard part. We all know the invisible is there, but we, being visual creatures, just don't respect it as much as we do the visible things. It does not grab our attention as much, and it remains outside of our conscious view. ¶ But how could we move the attention towards invisible things without disrupting them, making them the centre, or starting to overthink them? Once we pay too much attention to breathing, the breathing becomes manual, hasty, and shallow. Finding an honest, tender way to deal with the invisible is critical in coping with AIR.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what specific ways have you chosen to engage with the idea? My project focuses on the concept of personal space in cities. How does it happen that we sometimes have more personal space and sometimes less as we move through the city, and we just unquestioningly accept that this is a very average experience? Personal space is the air between people, and we as humans find ourselves in an interesting position: we both want to be surrounded by people but do not want other people to

come too close to us. There is 'spacial air' or 'special air' surrounding our bodies, and I decided to focus on making that air (and the architecture around it) visible.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Human-AI Ecosystems, and how does your work address it? The human body has been one of my main topics of artistic research over the years. The human body in an urban environment is a body under stress. How can we design our surroundings to make our bodies more resilient? Or are our surroundings less stressful? First, we need a name and language to talk about the phenomenon. Then, we can visualise it to understand it better on multiple scales. My project introduces a new concept of crowdedness (Kinesphere infringement per second) and visualises it in maps at different scales.

How does your work contribute to making invisible urban structures visible and address challenges related to urban sustainability and quality of life? My primary outcome is the creation of tools that allow mapping of crowdedness in public places. We have developed custom mapping approaches at different scales: interactively showing the kinespheres of humans actually to show what we are talking about (we use the kinespheres – the space around you that

you can reach while standing in one place – as a proxy for our personal space bubble). In the next step, we zoom out a bit and show only where the kinesphere bubbles overlap between people in a public place. We zoom out again, see a whole city square, and use machine learning algorithms to calculate the kinesphere overlap happening in different parts of the square. This is real-world data based on live webcams. Finally, we use proprietary GPS data to create maps of the whole city. ¶ This all affects well-being, as there are quite a few people who suffer from mental health issues such as social anxiety, and for them, it is essential to get a feeling of how crowded a city street will be at a particular time.

What challenges and opportunities have you encountered while working on this theme? Making the invisible visible is hard. Where do you get the data? The visible things you can count, measure, and quantify, but how do you measure the invisible? I have used machine learning algorithms to measure and visualise the kinespheres based on video feeds of human bodies in cities, and this would have worked better just a few years ago. ¶ The Sony CSL team (my main partner hub) worked on a large part of dealing with GPS data, exploring many approaches until they found the right one. Dealing with imprecise spatiotemporal data at city scales is hard. ¶ A lot of opportunities were found where art and

science met. Art brings a freedom that might not be found in a scientific context - a freedom of exploration, visualisation, and creating connections without being (at first) too concerned with being scientifically correct. Throughout the project, I tried to stay within the bounds of science, as the outcomes are always more interesting if we can say that they are valid. However, as I'm not a trained scientist, I tend to do things differently, which has brought many fruitful discussions.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? This project was unique, as there was no initial project concept to which I applied. I applied with a vision that we could see cities differently, and it took a lot of work to narrow down our focus. We used the first three months for a phase of free exploration, and we gathered, discussed and validated quite a few fascinating ideas. We found the emphasis on personal space and the concept of Kinesphere Infringement per Second during this time. But still, a concept needs a lot of work to be understood, so I worked on visualising it at different scales – body scale, street scale, city square scale and city scale. It turned out to be four times the work, but how each of them led to the other makes something more than the sum of its parts.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? The first months of the project quickly showed that my assumptions of how I would work best as an artist were just that – assumptions. After all, the outcome should not be strictly art, and the final presentation should not be an exhibition. The project's focus was not on making art but on innovation. With multiple partners from different backgrounds, motivations, aspirations, and preconceptions, the main work was finding a common language to discuss the invisible and how to approach it. We could only start doing the work once we found that common language.

What advice would you give to other artists considering projects intersecting technology and ecological themes? It is helpful not to see your work as art – at least not in the same sense you are used to. A part of the work is very managerial – aligning the interests and motivations of people around you with the project, managing expectations and communicating early and often. Another part is more design-oriented – not forgetting what story you are telling with your work, how to talk about it in two sentences, and how to make it attractive to different people. Of course, you get to do the artistic magic, too, but it helps if the piece is structured in a way that

offers at least something for everyone. Like a good children's book that the parents and kids may enjoy for different reasons, a good outcome could have a shiny but shallow, deep and more profound meaning to various audiences.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? Regardless of which field people work in, we tend to see our own experiences, background, prerequisites, and assumptions as obvious. This is true for different artists and doubly true for people from different disciplines. Successful collaborations need a step at which these assumptions are laid bare and communicated in the open. What do we value? Why do we value that? Where are we coming from, and where do we go? ¶ Successful explorations also need a reset of expectations. When I say successful, I mean that we learn something along the way, something that we did not know before. Often, artistic projects imported to a scientific field are not truly explorative. The artist comes in with their preconceptions and a proposed project, does it, and leaves. An explorative project means that we give up result-oriented thinking, open ourselves up to failure, remember what drives us and motivates us, and explore our topic in the given time. When the process is good, results will come. And these results will be innovative. It takes bravery and trust, but it's worth it.

How has participating in the AIR project influenced your artistic practice and professional development? Professionally, I've learned a lot about the value of communication, managing expectations, the different working processes in various fields and the professional languages spoken in those fields. Artistically, I've learned to thread the needle between artistic freedom and scientific validity. When they come together the right way, they make each other stronger.

How do you envision the continuation or expansion of your work in the broader context of art and technology? When I see trees on a field with tree branches ending uniformly 30 cm above ground, I know that rabbits live there. They eat the leaves that grow below the threshold. When I see a part of the ground on a metro station platform being less rough than the neighbouring patch, I know this is where the doors open, and millions of feet smoothen the ground, micrometre by micrometre. There are traces of life everywhere around us, traces of relationships within our world. Some things remain invisible, but with the right amount of technology and science, we can make them visible, too. This is a promising direction, and I want to expand on that in future projects.

NATAN SINIGAGLIA

SYMBODY

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? AIR represents a literal and metaphorical medium—a space where the potential for expression, perception, and transformation unfolds. The invisible element connects all living things, allowing us to breathe, move, and communicate. Becoming attuned to its presence, recognising how we exist within it and expressing ourselves through it is essential for cultivating a conscious and grounded awareness. Each day, I experience AIR as the space where we continuously negotiate the boundaries of our identities, re-examine our relationships, and evolve within the world around us. In both life and art, AIR becomes a dy-namic, ever-changing field in which I engage with the elements—whether through breath, movement, or sensory experience. In this ongoing flow, my artistic practice finds resonance as I explore how we exist concerning the unseen forces that shape our being, constantly evolving, like the dance of life itself.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what specific ways have you chosen to engage with the concept? In my current project, air is a metaphor and a medium. I'm exploring human body movement, which is deeply interconnected with the air around us. The perception of movement is inseparable from the context in which it occurs—air carries both light and sound, creating a sensory environment that

shapes how we interpret movement. I'm particularly interested in how visual and acoustic elements converge: light allows us to see forms, while sound gives those forms emotional resonance. Air becomes a carrier of meaning, as the interaction between visual and auditory stimuli shapes our perception of the body in space. By focusing on these relationships, I aim to deepen our understanding of how we perceive movement and context as an interconnected whole.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Human-AI Ecosystems, and how does your work address it? I chose to explore Human-AI ecosystems because I see a gap in how machines understand the nuances of human spatial intelligence. While AI excels at processing verbal data, it needs help with the subtleties of movement, such as how someone walks, gestures, or interacts with their environment. These movements convey so much about a person's mental and physical state and their relationship to the surrounding space. My project explores how AI can perceive human motion, particularly concerning sound. By understanding these complex layers of interaction, AI can offer new opportunities for engagement and understanding. The goal is to push the boundaries of AI's perceptual capabilities, enabling richer and more nuanced interactions between humans and machines.

How does your project help improve human-robot collaboration or integrate AI into daily life to enhance productivity and reduce ecological impact? By teaching AI to understand human movement better, we can create more intuitive and natural interfaces for human-robot collaboration. The human body is a complex interface we all learn to navigate from infancy, yet this intelligence must be more utilised in current AI systems. If machines could read the subtleties of our movements, they could engage with us in more organic and responsive ways. This could lead to more efficient interactions in healthcare, robotics, and personal assistants, enhancing productivity. Additionally, by understanding and responding to the natural rhythms of human behaviour, AI could help optimise resource use, reducing unnecessary energy consumption and environmental strain.

How do you envision the role of AI in enhancing our understanding of air and urban ecosystems? AI can become a powerful tool for observing and interpreting the complexity of human societies and their environments. By better understanding how we interact with our surroundings—particularly in urban ecosystems—AI can help us manage these spaces more effectively. AI's ability to process vast amounts of data can provide insights into patterns of human behaviour, pollution, and resource use that would be impossible for humans to grasp alone. In this way, AI acts as

a lens to observe reality and a mirror that helps us reflect on our actions and behaviours. This heightened awareness could lead to more sustainable urban ecosystems and more competent resource management.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? Initially, my project focused on analysing human body movement using machine learning. I aimed to track the subtle features in movement—its rhythm, intensity, and fluidity—to extract meaningful patterns. However, as the project progressed, I realised that the true meaning of movement lies not just in the motion itself but in its relationship to the surrounding context. A gesture becomes significant about the space, sound, and circumstances in which it occurs. This led me to shift my focus toward studying movement within a multi-modal framework, incorporating visual and auditory elements. I chose dance as my medium because it's an archetypal form of embodied expression, where the internal and external worlds meet in a physical form. By exploring how AI can understand these relationships, I hope to reveal new insights into human motion and its underlying psychological dimensions.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and part- **ners within the S+T+ARTS network influenced your project?** Engaging with the diverse community within the S+T+ARTS network has been incredibly enriching for my project, especially when tackling a complex and evolving topic like AI. The opportunity to interact with individuals from varied disciplines — artists, scientists, and technologists — has broadened my perspective and deepened my understanding of the challenges and opportunities presented by AI. These are highly intricate issues, and the collaborative environment fostered by the network has been essential in addressing them. Sharing ideas, doubts, and breakthroughs with other artists has sparked new creative approaches in my work. At the same time, conversations with researchers and scientists have offered invaluable insights into how my artistic exploration aligns with scientific inquiry. The ability to exchange views with experts from different fields has reinforced the importance of interdisciplinary collaboration, as the complexities of AI demand not just an artistic or scientific lens but a shared effort to explore its potential. This collective engagement has helped me refine my approach and pushed the boundaries of what I thought was possible in my project.

What advice would you give to other artists considering projects intersecting technology and ecological themes? Technology is not external or alien to us — it is an intrinsic part

of our humanity. Many philosophers argue that technology, including psychotechnologies, shapes us as human beings. It is a tool we have used throughout history to extend our cognitive and physical capacities. This means there is an inherent and profound connection between technology and all forms of human expression, including art. In a world increasingly driven by technological advancements, artists need to question and explore the nature of technology itself. Artists should ask whether we have a meaningful relationship with these innovations or whether we risk losing ourselves in the process. The goal should be to integrate technology in ways that contribute to wisdom, self-awareness, and a deeper understanding of what it means to be human rather than treating it as a mere tool for progress. Ultimately, technology should serve as a means to enhance our connection to the world and help address ecological challenges sustainably and holistically.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists?
Successful collaborations between scientists and artists require key factors to bridge the apparent gap between their approaches and methodologies. First, both sides need a symmetrical commitment to invest time in building the relationship. Only through consistent interaction can

initial differences in perspective and methodology be explored and understood. This reveals common ground, where each participant brings something valuable. Second, both sides must be open to the possibility that the journey might take them in an unexpected direction. This openness to evolution is essential in creative and scientific processes. Third, trust in the collaborative process itself is crucial. The encounter between art and science can be as enriching as any tangible outcome, allowing both fields to expand their horizons. Finally, setting shared goals at the outset and continuously revisiting them ensures that both parties remain aligned throughout the project. Collaboration is an evolving conversation, and the goals should adapt as discoveries and insights emerge.

How has participating in the AIR project influenced your artistic practice and professional development?
Collaborating with data scientists has allowed me to integrate technological frameworks I had previously only speculated about. This has expanded my creative toolkit, providing new ways to analyse and interpret human movement and its contextual relationships. As a computer scientist, I found it fascinating to delegate some technical work to others. This shift allowed me to observe more deeply how the scientific and artistic processes naturally intertwine, revealing mutual insights. The project's interdisciplinary nature highlighted how

the cognitive structures we use to process thoughts and abstractions are deeply interconnected, drawing from multiple sources. Re-enacting this dynamic through collaboration with professionals from diverse fields was a powerful cognitive practice. It reinforced the idea that the intersection of art and science is a fertile ground for innovation, where both disciplines enrich one another.

How do you envision the continuation or expansion of your work in the broader context of art and technology? The future of art and technology holds vast potential, particularly as we enter an era where artificial agents are becoming more capable and integrated into our lives. I see a fertile research domain in bringing machines closer to the perception of human physicality and its underlying dynamics. This opens up new possibilities for exploring the relationship between humans and technology, mainly how AI can engage with the nuances of our bodily expression. In this context, the key question is how our potential for expression evolves as technology becomes more powerful and accessible. Does this abundance of tools enhance our understanding of the human experience, or does it create new challenges? Technological progress inevitably raises ethical questions, demanding a more profound understanding of human dynamics on a systemic level. As artists, we must navigate these questions carefully, ensuring that our work contributes to a richer, more inclusive understanding of humanity in the age of machines.

RICHARD VIJGEN
ELECTRIC ATMOSPHERES

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? Air, to me, is an uncharted territory, a space that we live in and move through, ancient but also modern. As an artist working with data, I am interested in air as a carrier of information. When we think of contemporary digital life, we think of devices, data centres and satellites. Still, the air around us is filled with information—thousands of signals, messages, and interactions pass through our surroundings and bodies at any given time. While the electromagnetic waves that carry our data are part of the same spectrum as visible light, we cannot perceive or even imagine what this dimension of the space around us looks like.

Can you describe how the concept of air is integrated into your current project or experiment as part of the AIR project? Can you share any specific examples or elements? Within the AIR project, I visualise what the space and the air around us could look like when the electromagnetic dimension that carries our data is part of our experience. How does it interact, behave and interact with the visible parts of our surroundings? We are using Electromagnetic Simulation Software to visualise what a cell phone signal would look like if we could see it, how it interacts with the buildings around you and how that might be different in different cities. The Air in this project is the canvas on which we project the invisible dimensions of the world around us.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge of Resilient Interspecies Urban Eco-

systems and how does your work address it? Resilient interspecies urban ecosystems resonated with me because it suggests a complex urban reality beyond the human perspective. For cities to be resilient, it is essential to acknowledge the many interconnected and often invisible ecological, technological, and cultural systems upon which they are built. Data visualisation is a powerful tool for understanding these systems as abstractions and experiences and connecting to them more intuitively. In this project, I propose to look at the electromagnetic dimension of space as one of these systems.

How do you envision your work contributing to making invisible urban structures visible and addressing challenges related to urban sustainability and quality of life? By visualising the electromagnetic dimension of urban life, I hope to contribute to a more holistic perspective on our world. Visualising digital signals as invisible spectacles could help us see digital communication not just as an individual service or a product but as a commons, a space we occupy together. It is a different perspective on mobile devices that we think of as very personal but use enormous amounts of public space (air).

What challenges and opportunities have you encountered while working on this theme? Working with High-Performance Computing is an exceptional opportunity for me as an artist working with data. It has allowed me to work at a scale usually out of reach. Altair Software's support, which has generously supported the research with access to their software, courses and technical support, has been instrumental, as well as the expertise and support at BSC. Working with these high-performance tools as an artist is a double-edged sword. On the one hand, these tools enable you to explore at new scales. ¶ On the other hand, the complexities of the tools, as a function of their power, can slow down the artistic process. In other words, you must work with a supercomputer. You have to define your goals precisely and follow through on them. This can sometimes be frustrating, but the results can reveal new (artistic) directions when it works out.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? My initial concept was to use electromagnetic simulation software on a high-performance computer to simulate and visualise what a digital signal, such as a cellphone, would look like in an urban environment. While setting up the experiment and defining a workflow required a lot of trial and error and education on my part to understand the physical principles and learn the simulation software, the concept hasn't changed much. I had to adjust the scope, as I imagined simulating many

different variables and locations. The intricacies of setting up a simulation required me to settle on two locations, Barcelona and Rotterdam. Also, the runtime for the simulations, even on an HPC, required us to limit the number and types of simulations we could do. But all in all, we managed to do the simulations I had hoped to do, and I was surprised by the visual outcomes.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? The interaction with the HUBs has been very inspiring, and the combination of expertise and a collaborative and cordial atmosphere has been excellent. The commitment and enthusiasm at BSC and the constructive feedback from RCR and In4Art have sharpened and improved the project, and the interaction with the other artists has been very positive. It has been very inspiring to see so many people working at the intersection of art and technology to share their work, questions and methods.

What advice would you give to other artists considering projects intersecting technology and ecological themes? The scientific community does not always seem approachable as an artist because of the seemingly different methods and goals (I think this works both ways). My experience has been the opposite. Once you've

crossed the initial threshold and you get to know each other's work, the links and overlaps are many. When there is an opportunity for artists and scientists to reserve some time to get to know each other and exchange ideas, I think the potential for collaboration is almost guaranteed.

Based on your experience in this project, what do you think is essential to enabling a successful collaboration between scientists and artists? It is mostly about time. People are always busy, and you need to sit down and converse to find common ground. Any meaningful collaboration that might arise also needs time on both sides. It is something other than what you do on the side. There is a fair bit of learning involved, and the fact that you have time to do that allows you to explore in depth rather than stay on the surface.

How has participating in the AIR project influenced your artistic practice and professional development? The simulation of electromagnetic signals in space has revealed new patterns and shapes that will inspire further artistic development. Seeing the scales and shapes of these patterns for the first time also challenged my thinking about the data around us. Notions of individual devices and shared spaces, private vs. public spaces, and the aesthetic qualities of wireless data will inform new projects.

How do you envision the continuation or expansion of your work in the broader context of art and technology? I want to continue visualising and imagining these invisible technological dimensions of our world. I think that the rapid technological change of the last 20 years is something that we have barely processed, barely understand and struggle to construct a cohesive world view with. Translating these abstractions into images, experiences and intuitions is something that challenges me as an artist as something that I both enjoy and think is necessary for a balanced and healthy use of technology.

UNCHARTED LIMBO COLLECTIVE
MONOLITH

UNDERSTANDING THE CONCEPT OF AIR

What does the concept of air mean to you in your daily life and artistic practice? We are a collective of Creative Coding and Visual Artists crafting what we like to call "Computational Magic." We produce ground-breaking New Media experiences and artworks at the intersection of code, interactive visuals, and performing arts. ¶ Our team's DNA is distinctively hybrid. We view our projects as more than creative explorations; they are dynamic research briefs pushing the boundaries of technology and aesthetics. Our projects often revolve around the development of imaginary worlds with carefully crafted rules, where Digital

Matter and Digital Life react to the presence of us humans and augment our physical surroundings. ¶ Within this context, the concept of AIR has driven us to reflect upon these invisible yet all-encompassing forces that drive our works and formulate the rules that constitute the digital worlds we like to build. What if these forces were at the epicentre rather than in the background of our projects? Our team's dual nature, which consists of equal parts artistic drive and deep technical expertise, has driven us to start envisioning the interpretation and materialisation of the invisible force of AIR for our audiences.

What role does the concept of air play in your current project or experiment as part of the AIR project? In what specific ways have you chosen to engage with the concept? When we applied for this residency, we resonated deeply with AIR's notion of making the invisible visible. Our project "Monolith" focuses on the development of a new type of performer, one with an artificial mind and a decentralised body that exhibits sentient behaviour; that is, it reflects on its actions and, perhaps more importantly, comprehends, expects, and provokes the reactions of its human co-performers. ¶ Ultimately, within this concept, 'the invisible' refers to the unseen communication process between humans and digital beings. As we don't share similar senses and ways of perceiving our respective surroundings, nor do we have the same inherent tools to communicate, understanding becomes an invisible force that gradually brings the two together.

EXPLORING CHOSEN CHALLENGE

Why did you choose the challenge Human-AI Ecosystems, and how does your work address it? We approached this residency with an idea brewing within our team for a while: an urge to address the critical questions of agency and the emergent sentience of digital entities. Our experience in coding and art-directing real-time visuals for dance performances and interactive installations has led us to a profound problem:

• Is there anything beyond the typical "accompanying visuals" and "one-way reactivity" seen in most New Media performances?

• Can we go deeper than artfully remapping numbers from one range to another?

• What if a genuinely sentient, algorithmic being with its expectations, thought processes, and agency existed and became an active participant and equal performer in the show?

• Put simply, can thinking machines perform alongside humans?

Our project begins to explore this complex interaction. Our final goal is to reach a performative dialogue between two performers in which only one is human. ¶ During the residency, we focused extensively on how the digital performer will per-

ceive the world around him. Or, how can a digital performer perceive a human performer by interpreting their movement and overall energy? We have experimented with movement professionals to capture the essence of their performance in a format that will enable the machine to understand their mood comprehensively. Ultimately, it then responds in its own manner through the means at its disposal.

How does your project help to improve human-robot collaboration or integrate AI into life in ways that enhance productivity and reduce ecological impact? It is essential to recognise the profound importance of the performing arts as a vehicle for gaining a deeper insight into the intricate interplay between humanity and technology. This symbiotic connection is increasingly critical in today's rapidly advancing technological landscape. ¶ Artistic performances interwoven with scientific theory have the potential to create an approachable and inclusive way of offering insight into complicated matters and bringing them forward to an open dialogue. ¶ During the AIR residency, we worked toward combining established artistic concepts and a rigorous understanding of the AI system to explore a novel aspect of the human-AI relationship that exceeds the current format of automated human services.With our project "Monolith," we have embarked upon a journey to craft AI models that can process

emotional responses, reflect on them, and react with genuine intention. ¶ During this first research stage, we expanded and shared our knowledge in non-verbal human-machine communication. Specifically, by developing our custom motion classifier neural network, we are taking a deep dive into how a machine can perceive and assess human movement as a nuanced interpretation of emotion and energy. ¶ This model could also be used in various fields outside of the performing arts, such as psychology research or UX design. Ultimately, a symbiotic relationship with AI could enhance human life and productivity.

How do you envision the role of AI in enhancing our understanding or management of air and urban ecosystems? Many current AI systems operate opaquely, making decisions that significantly affect our lives without our awareness or understanding. To improve our way of living with AI, we need greater transparency and appreciation for how these algorithms work and influence our choices. After all, innovation isn't simply about creating new and complex processes; it's also about critically reinterpreting existing inventions and redefining our understandings. ¶ The increasing presence and influence of invisible and incomprehensible algorithms in our lives emphasises the need to investigate AI systems that exhibit natural, spontaneous, and intuitive behaviour instead. Perhaps even more importantly, we need AI systems that

display empathy towards humans and understanding of the human situation. ¶ By reinterpreting the latest AI algorithms through an artistic, performative context, we ultimately seek to amplify a new wave of technology popularisation, one in which advancements in artificial intelligence and their effects on society are a matter of public discourse and can exist as rich socio-cultural artefacts, not only as incomprehensible, utilitarian subscription services.

RESIDENCIES AND INTERACTIONS

What was your initial project concept, and how did it evolve during the course of the project? Our initial concept was to develop a performative piece where a dialogue between a human and a digital entity unfolds as they explore and begin to understand each other. ¶ How might a human and an AI presence interact? Accompanied by dynamic soundscapes and interactive digital projections, the experience would see humans discover the existence of an AI system and, driven by curiosity, cautiously investigate it. In this scenario, the human body symbolises the known, emphasising the characteristics and limitations of human nature: personality, emotion, sociability, ambition, fear, deterioration, and mortality. By contrast, the AI is mysterious, initially incomprehensible, and alien. The situation is a modern Deus ex Machina, reflecting the enigmatic nature of

technology and embodying a digital entity that watches, learns, and soon begins to react to the human's actions with the means at its disposal (light, sound, projection). ¶ Several milestones needed to be resolved in order to technically achieve this work. This included not just extracting the required datasets and training a number of AI neural networks but also artistically exploring the "language" of a digital entity without a body and how that would be perceived by its human counterpart. ¶ We initially devised a meticulous plan and a thorough timeline to address the performance's multiple technical and artistic aspects. However, we soon realised that if we didn't want to sacrifice the integrity of our vision and quickly skip over essential challenges, we had to reevaluate our priorities. ¶ Around April, we consciously focused on exploring the first ingredient in developing our digital performer's mind: its perception of its human counterpart. ¶ We conversed and experimented with various movement specialists to capture the appropriate data. Our aim was to use the data to train a custom long-short-term memory (LSTM) model that can correlate movement with emotion and energy. This would enable our machine to understand the human in its respective manner. ¶ We then focused on exploring the machine's mind by visualising the emergent patterns it created and their respective spatial distribution, analysing how they related to the initial dataset in a fully perceptible way to

the human eye. ¶ The final outcome of this residency will be an analytical visualisation of the machine's mind, the way it perceives humans via motion, and its ability to navigate this complicated latent space. We will do this using a vehicle we called the "latent spaceship" at the AIR Festival in Barcelona.

How have the interactions with other artists, researchers, technologies, knowledge HUBs, and partners within the S+T+ARTS network influenced your project? The ability to develop this work within a network of like-minded artists and scientists who work with similar technologies and artistic concepts has been an incredible resource during this residency. ¶ Through conversation among the consortium partners and our core team members, we have shaped our work into an achievable yet highly innovative result that opens up a path for future exploration in our creative practice. The resulting direction is something we have always wanted to pursue. Moreover, our discussions have enabled us to choose the correct tools and avoid routes and technologies that would have wasted valuable time and resources. ¶ Through our interactions with the other artists, we have gained significant insights into how they develop their work and formulate their workflows. We have also exchanged ideas about specific tools and the state-of-the-art technologies they've been using on similar projects. Finally, we have had fruitful conversations covering both conceptual and technical matters, enabling us to move forward with our residency with better overall insights.

What advice would you give to other artists considering projects intersecting technology and ecological themes? When fusing art and technology, it's important to maintain a balance between what is technically achievable and artistically powerful. ¶ Sticking to a complex concept is unwise, especially when the artist doesn't have the necessary technical skills or resources to plan its execution realistically. At the same time, it is significant for artists who assume artistic and computational roles to follow the latest technological advancements that are most relevant to their research topic. Innovation is increasingly fast-paced, so artists must remain vigilant and receptive to uncovering novel tools and methodologies, even if that means shifting to an entirely new workflow or pivoting slightly in their technical approach. That shift may even inspire a new artistic vision. Our advice is to be open and adaptive based on what can be achieved with the most relevant and available tools within the given timeframe.

Based on your experience in this project, what factors are necessary to facilitate successful collaborations between scientists and artists? We think establishing a consistent check-in schedule is essential for

both sides to discuss and exchange ideas as the artists' work progresses. This enables artists and scientists to reflect upon their respective goals and approaches and incorporate new ideas feasibly. At the same time, the scientists get to experience the nuances of the artists' creative practice and how their scientific research can be interpreted and fused with artistic visions. It is also essential for artists and scientists to occasionally meet in person to facilitate a more fruitful discussion and direct exchange of ideas based on a real-time show and tell. ¶ It is also important to outline what both parties expect from these interactions in order to foster a successful collaboration within the short timeframes available. Some artists may require more or less technical involvement in specific project elements. Others may be looking for philosophical and conceptual inspirations from a more scientifically informed perspective than their own. It seems sensible to adapt the goals of these collaborative relationships based on the particular project needs.

How has participating in the AIR project influenced your artistic practice and professional development? Participating in the AIR project has been an incredible experience for our team. It has enabled us to make significant, tangible progress on a vision we've been conceptually discussing internally for a long time. ¶ In addition, having the opportunity to discuss our idea with like-minded artists and a select group of scientists who conduct research on similar subjects has fueled our research and facilitated a fast-paced evolution of the initial idea in a way that wouldn't have been possible had we pursued this project in isolation. ¶ On a more practical level, working hands-on on our project has significantly expanded our skills in incorporating AI into our professional practice. This includes valuable experience in developing our custom machine learning models, understanding and calibrating the hyperparameters, and exploring and visualising the inner processes and results of the models' training.

How do you envision the continuation or expansion of your work in the broader context of art and technology? We have taken significant steps toward establishing a conceptual and technical foundation for our ongoing exploration into the coexistence of AI and human performers within an artistic context. ¶ From here, we aim to pursue various technical milestones and deepen this dialogue by developing systems that facilitate mutual recognition and understanding between AI and humans. This will lead to new methods of reciprocal interaction and meaningful performative exchange. ¶ In a broader techno-artistic context, these insights can potentially drive innovation in everything from training methodologies to open-ended philosophical debate. More practically, our early visualisa-

tion tool could be applied to a variety of contexts, datasets, and use case scenarios. ¶ Even more broadly, our work seeks to promote transparency in AI, pushing for systems that are both efficient, emotionally resonant, and aligned with human values. This could foster the development of more integrated, sustainable environments where AI enhances human well-being. ¶ Ultimately, our vision is to reshape the narrative around AI, positioning the project as a cultural artefact that invites public discourse and artistic engagement. We are committed to reinterpreting AI in ways that enable people to connect with these systems on an emotional level. Through this work, we hope to contribute to a broader societal conversation on AI's evolving role, sparking creative and critical thinking about its (and our) future.

CONCLUSION

The AIR interview catalogue is more than just a documentation of the artistic projects completed during the S+T+ARTS AIR Residency. The insights shared by the artists highlight the importance of embracing an open mind and a spirit of curiosity when working at the intersection of art and science.

The artists' reflections emphasise the potential of art to bridge gaps between scientific inquiry and public engagement, making complex technological and ecological issues more accessible. Through their projects, they have demonstrated how creative practices can illuminate unseen connections, spark dialogue, and inspire innovative approaches to some of today's most pressing challenges, from urban sustainability to the ethical integration of AI into our lives.

As we conclude this residency journey, the projects and insights shared here serve as both an endpoint and a beginning—paving the way for continued exploration and collaboration. The experiences and knowledge gained through the S+T+ARTS AIR project will undoubtedly influence future artistic endeavours, scientific research, and technological developments, creating ripples that extend far beyond the duration of the residency.

We are deeply grateful to all the artists, scientists, and partners who contributed to this collective journey. Their dedication, creativity, and willingness to push boundaries have been truly inspiring. As we look ahead, the AIR documentation serves as a repository and overview of the cross-disciplinary initiatives within this specific S+T+ARTS project. By continuing to support and nurture collaborations between artists, scientists, and technologists, we look forward to seeing how these explorations continue to evolve in the years to come.

The S+T+ARTS consortium partners have closely followed the progress of the AIR residencies and have reflected on their outcomes in relation to the program's overarching goals. The residencies have proven to be a powerful catalyst for cross-disciplinary research and development, fostering new collaborations between artists, scientists, technologists, and other experts.

The AIR interview catalogue showcases the remarkable range and diversity of outcomes from the S+T+ARTS AIR residency program. From immersive installations that visualize the invisible layers of urban ecosystems to performances that explore the ethical dimensions of human-AI interaction, the projects experimented and developed within S+T+ARTS AIR demonstrate the boundless

potential of cross-disciplinary collaboration. Other outcomes include innovative applications of machine learning for understanding biological systems, new methodologies for data visualization and sonification, and thought-provoking provocations on the future of technology and society.

From the consortium's perspective, the AIR projects have demonstrated the immense potential for art-driven innovation in fields such as urban sustainability, human-AI interaction, and beyond. The artists' explorations have opened up new avenues for research and development, generating insights and methodologies that can be applied across a wide range of domains.

Moreover, the residencies have contributed to the development of a thriving ecosystem for art-science-technology collaboration in Europe. By embedding artists within scientific and technological research contexts, the AIR program has created opportunities for mutual learning, co-creation, and the exchange of knowledge and practices across disciplinary boundaries.

The consortium also recognizes the broader impact of the residencies in terms of public engagement and the responsible development of emerging technologies. Through their creative practices, the AIR artists have helped to make complex scientific and technological concepts more accessible and tangible to wider audiences. Their documentation, both in the form of above interviews, as the knowledge transfer events and videos, are powerful sources to highlight the artistic approach, the scientific fit and the potential for the future.   The projects have also raised important ethical and societal questions around the development and deployment of technologies like AI, fostering much-needed public dialogue and reflection.

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