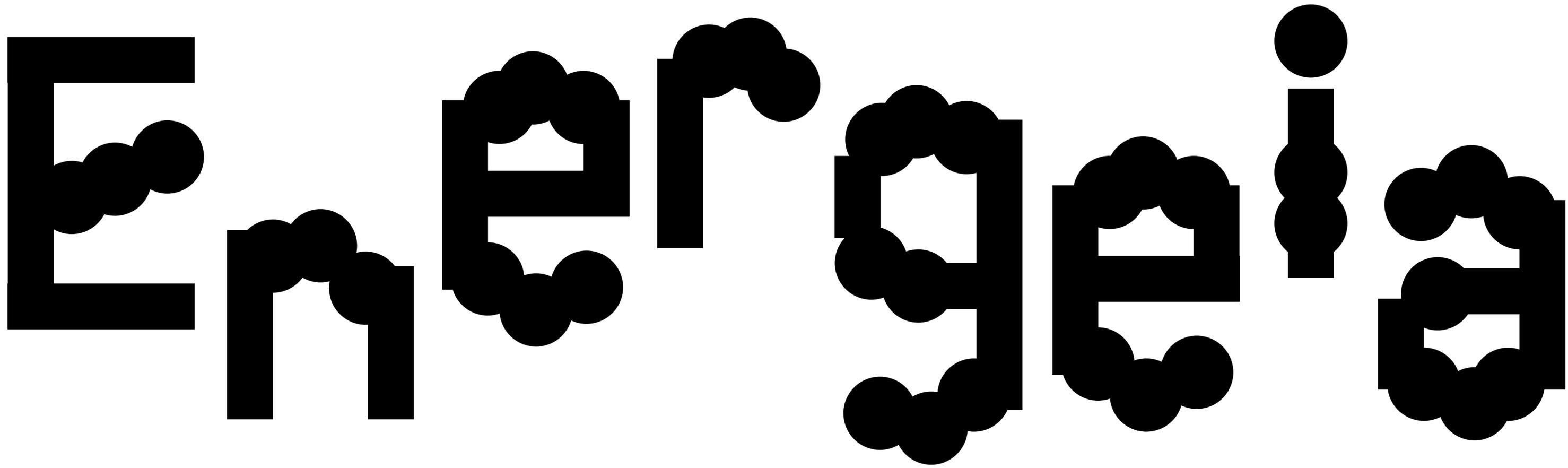


etopia\_ 10 años



Group Exhibition  
March 2 to June 17, 2023

etopia\_  
Av. de la Cdad. de Soria, 8,  
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Spain  
T+ 34 976 72 66 27

etopia.es

“Effectiveness, power, the virtue of acting”. The ἐνέργεια / Enérgeia has been fundamental to the development of humanity. The engine of the universe, since the beginning of time, human beings have needed to harness it to survive and advance. However, until Aristotle (384-322 b.c.e.), humans did not conceptualise this fundamental physical phenomenon.

A term usually translated as “act” -given that it derives from the Greek ἔργον- and that appears etymologically related to other words such as work (English) or werk (German). The great Greek philosopher stressed the two possible meanings of ἔργον: on the one hand, the result of a “doing” -the work produced-; on the other, the act itself in which that work is performed. In metaphysical terms, one could say that Enérgeia is the path of an entity toward its finality. It is, precisely, the purpose of the artists who embarked on the work of artistic creation under which we want to present Enérgeia.

The evolution of the concept of energy enriches the Enérgeia exhibition in the light of modern history. The 19th century was a time of social, economic, and technological transformations resulting from the enormous impact of the Industrial Revolution in many areas. Nor was the concept of art itself, and therefore its aesthetic, technical, and formal qualities, unaffected by these changes, which profoundly impacted the artists of the time. These transformations were expressed through avant-garde movements that shifted the focus from form to the engine of artistic creation: energy. A concept that, from then on and derived from technological advances, began to take on a unique role in art.

Enérgeia is an exhibition of art and new media about energy, its uses, and the construction of possible alternatives focused on people’s needs. We propose to the visitor an artistic journey through the different energy sources. Fourteen artists of different nationalities reflect on three interrelated themes. First, on energy sources, natural resources, their representation and beauty. Secondly, on energy extraction, its consumption, the energy crisis, and the environmental implications. Finally, its relation to our digital and hyper-technological era: quantum computing -which requires a huge supply of energy to cool matter to near absolute zero to minimise calculation errors-, Artificial Intelligence -training an algorithm can consume as much energy as five cars over its lifetime- or NFTs -a single sale of a digital artwork can consume the equivalent of a household for two days-.

Based on a verse by British poet Willam Blake - “Energy, eternal delight”-, Enérgeia proposes to value the ephemeral nature of social stability built on energy abundance.

Fourteen artists and 22 works with the aim of helping to consider yesterday, rethink today, and invent tomorrow.

# Eugenio Tardón (Spain, 1979)

Video artist and cinematographer Eugenio Tardón is a member of the AEC (Spanish Association of Directors of Photography). His work in experimental video explores a spectrum of light not visible to the human eye. The concern for the existing world that we do not see, but perceive, leads him to search for formats that alter the vision of the human eye. To do so, he uses apparent technological errors that he exports and recycles as valid points of view.

Among his works, we can find documentaries, feature films, music videos, and advertising, such as *Geometría del Esplendor* and *Hijas de Cynisca*. In fiction, he was the director of photography for the feature film *Maquis y el Silencio (Coda)* in 2021, both awarded in the photography section in several international festivals. His works have been exhibited in Spain, Italy, Mexico, the USA, and China.

<https://www.eugeniotardon.com/>

## Ehoon Sol y Luna [New technologies and energy]

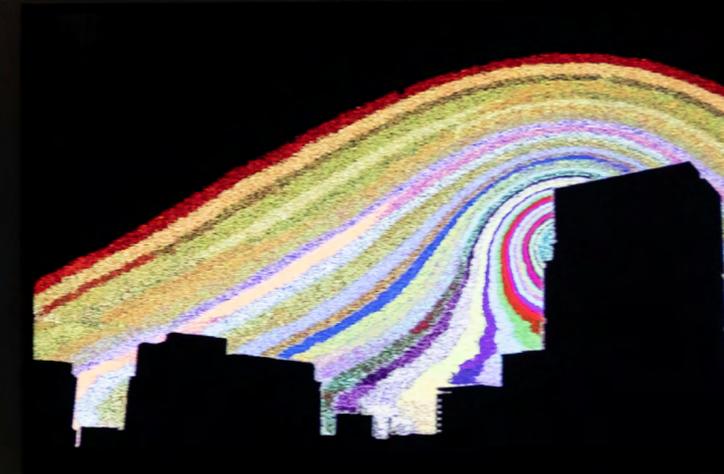
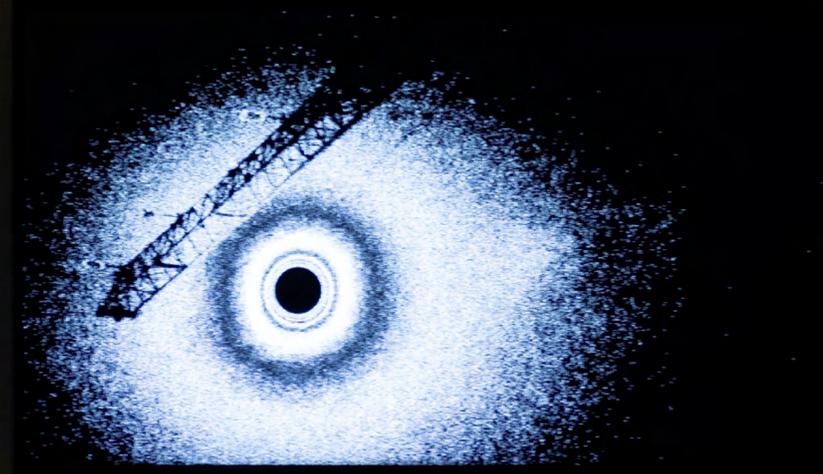
NFT. Digital video with software alterations

Ehoon Moon, Orio 2023, HD

Ehoon Sun, Tokio 2023, HD

1920x1080, 16/9

Starting from the quote expressed by the artist, “energy emanates from everywhere, but our limited and poorly educated eye does not let us see a parallel reality that technology oriented to this end helps us to perceive”, we look at Ehoon Sun and Moon in the act of delicate contemplation in which our visual sense is enriched in a lysergic state. The language of the moving image is an ode to the pixel, to energy, and its expressive and formal characteristics. Eugenio Tardón makes use of machines that help us to capture and collect the reality in which we live. These are mostly designed to translate reality in the image and likeness of what the eye is capable of seeing. Different and fortunate errors in the design of capture and reproduction lead us to perceive in an alternative way. The Ehoon series explores the energetic code of a particular spectrum of non-visible light. In the first video, a lunar pilgrimage guides us towards the full moon -that which happens when our planet is located between the sun and the moon, almost aligned-and in the other, towards the dawn, showing us the beauty of the only star in our solar system.



# Julia Puyo (Spain, 1988)

Julia is a multimedia artist and digital project manager, born in Zaragoza, Spain, and lives in Barcelona. She graduated in Fine Arts at the Polytechnic University of Valencia and later completed a master's degree in Visual Arts and Multimedia. Her work is very close to conceptual art, and among the issues she deals with, her focus on the gap between analogue and digitalisation processes is of particular interest.

Her work has been mainly exhibited in public and private spaces in Spain and France. She has participated in collective exhibitions and festivals of interactive art in Holland, Scotland, the Czech Republic, Brazil, and Japan. He has also won numerous awards, including the European Design Awards, the AACAA Award, the Lumen Prize, and the Premio Arte y Diseño Fundación CajaMurcia.

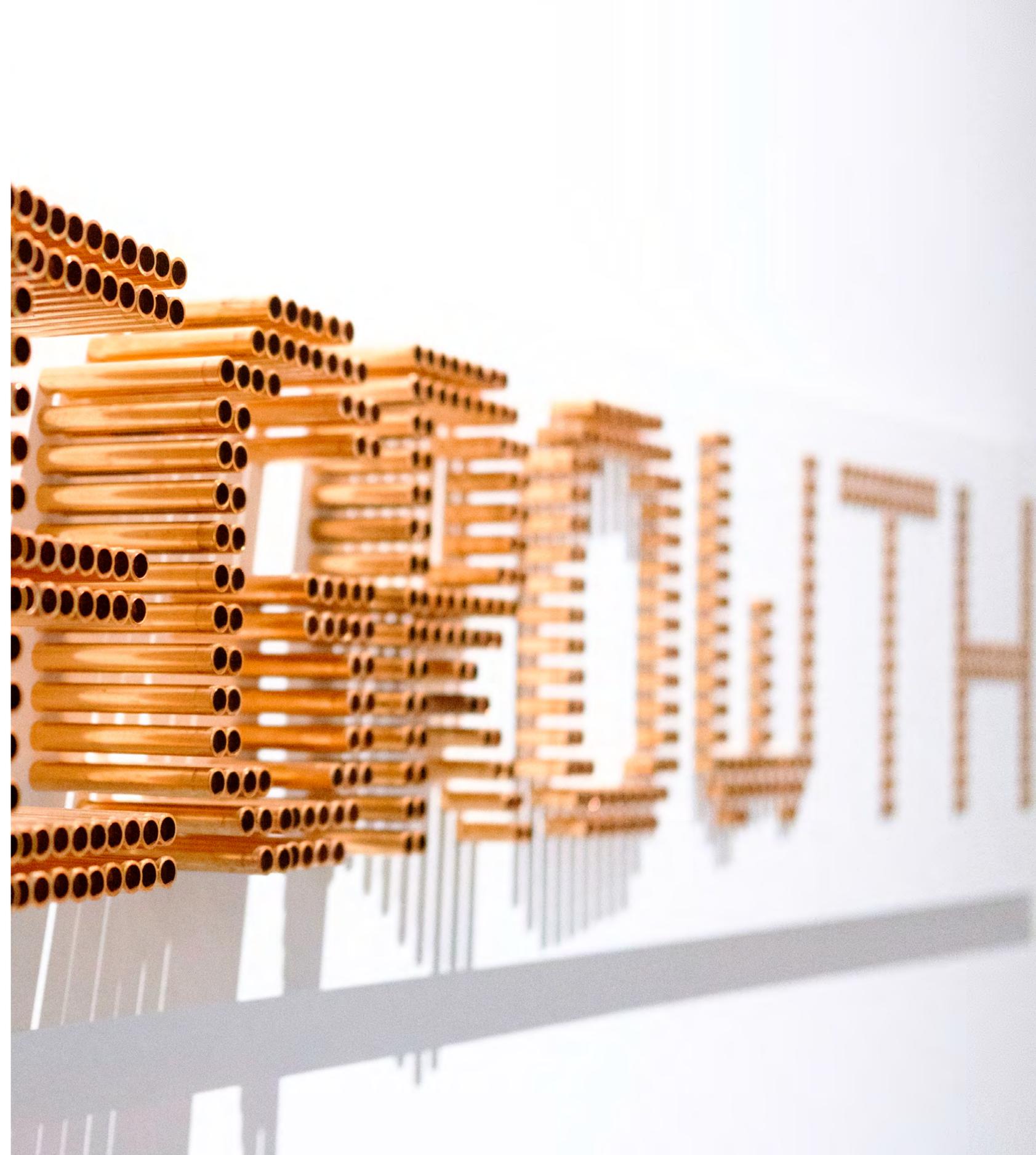
<http://juliapuyo.com/>

## Degrowth [Energy crisis]

Copper pipes, DM board  
178x34cm.  
2022

Are we aware of the abundance of resources used in our daily lives? The Degrowth sculpture gives physical form - through copper tubes - to the amount of copper needed to transmit a message through the internet network. As a transition metal, copper is one of the best conductors of energy, essential for electricity, telecommunications, and transportation. In a world where the demand for such services is growing, it is difficult to maintain the material and social balance that our planet demands.

Alicia Valero Delgado, PhD in chemical engineering and researcher in resource efficiency solutions, explained in several media how in only two decades of the new century, we have been able to consume as much copper as in the entire history of humanity. To control this situation, should we advocate radical degrowth? Because of this, the artist Julia Puyo, following the conceptual tone that prevails in her creations -works that challenge and question the public- makes the viewer aware in a tangible way of the actual consumption of copper that we generate. The piece is an alert, a declaration of intentions, a last chance, a reflection that cannot be delayed, a here and now. Will we be able to avoid collapse?



# Claire Williams (Bélgica, 1986)

She graduated from the Ecole Supérieure des Arts Visuels de La Cambre in Brussels and Le Fresnoy National Studio of Contemporary Arts in Tourcoing (France). She later specialised in textile design. Hence her works are at a crossroads between the worlds of textile, sound, and electronics. The artist creates works in which she combines the handmade with the electronic, intending to make visible the movements of our electromagnetic spectrum, an issue that, for some years now, has been the basis of her work.

Her work has been exhibited individually and collectively in Belgium, France, Spain, Denmark, and Taiwan. She also teaches workshops related to electronic textiles using open-source technologies. She investigates the place of women in her contributions to experimental sciences at festivals, museums, cultural organisations, and art colleges.

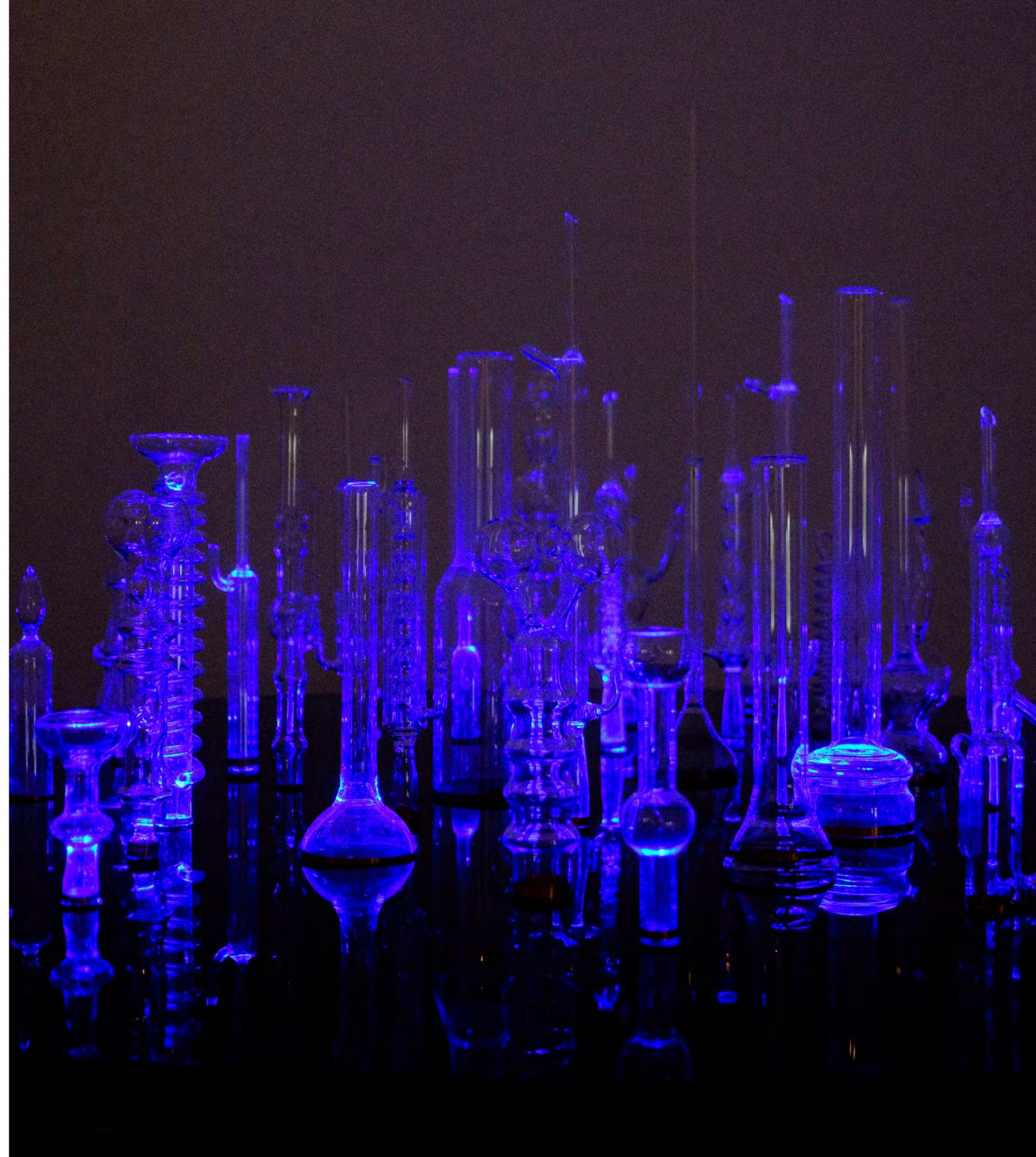
<http://www.xxx-clairewilliams-xxx.com/>

## Les Télépathes [New technologies and energy]

Electromechanical installation, glass, magnets, copper, light, and electronics.  
2 m. diameter  
2021/22

The journey through the subconscious begins when we enter a state of drowsiness, hypnosis, or coma. Les Télépathes materialises the neuronal activity of people in a deep coma through a “telepathic device” where their electrical activity radiates and navigates in the form of waves and sounds. Inspired by studies on the transmission of thought by telepathy since the mid-nineteenth century and experiments related to the science of dreams, the work offers a kind of parallel collective consciousness, a spectral world formed by our electromagnetic and psychic activities.

Technology makes it possible to detect the activity of our consciousness when our brain produces electrical and magnetic activity. These are waves emitted by our body to be picked up by small antennas made of copper wires. Thus, neuroscientists are trying to detect whether people in a deep coma persist in full consciousness or semi-consciousness once their body no longer allows them to express themselves. This device consists of a large hand-woven electronic network: about 50 elements of scientific glassware, copper wire, and magnetic balls placed at the bottom of each glass container. Data from the brain activity of people in deep comas - waves oscillating in the spectrum between 0 and 100 Hz - are translated here into sound waves of the same frequency by transmitting the electrical waves to the network of copper wires, which in turn are shaped to create handcrafted electro-magnets that activate the magnetic balls. Thus, changes in the frequency of brain activity cause the movements of the magnetic balls to vary. In synchronisation with the sound, each container is accompanied by an LED that illuminates it from the base and flashes according to the brain activity of people in a deep coma. This project was carried out in collaboration with the Neuroscience Research Center of Liège (Belgium), known as the “Global Consciousness Group”.



# Hanako Murakami (Japón, 1984)

She graduated in Literature from the University of Tokyo and held a master's degree in New Media from the Faculty of Fine Arts of the same institution. She later trained at the Ecole Supérieure des Arts Visuels de La Cambre in Brussels and Le Fresnoy National Studio of Contemporary Arts in Tourcoing. She currently lives and works in Paris.

She has been interested in alternative photographic techniques or letterpress printing throughout her career. Murakami's works use disused photographic materials manufactured in the late 19th and early 20th centuries. Over the years, factors such as chemical reactions, temperature, and humidity, which affect photographic materials and reveal unexpected colours and shapes, have been her source of inspiration. In addition, the author often accompanies her works with poetic texts, thus combining her two passions.

Her work has been shown both in her native country and in Europe in solo and group exhibitions. Her work has been recognised with awards such as the Nomura Foundation for Arts and Culture or the Pola Art Foundation.

<https://www.hanakomurakami.net/>

## EXPOSURE - le regard qui brûle [Energy physics]

Interactive multimedia facility.  
27-inch digital screen, eye-tracking camera, computer, programming: Laetitia Nanni  
2021

Collection of the Centre National des Arts Plastiques (CNAP), Paris. Photography as a technique was born in the heart of contemporary culture, which means it was always linked to an industrial and consumerist society. Over the years, photographers and curators of this medium have expressed concern about its tendency to degrade. However, artist Hanako Murakami takes advantage of the changes brought about by deterioration - due to environmental conditions, among other causes - to bring out the abstract beauty that emanates from the passage of time.

The visualisation of a photograph entails the presence of light. While light is necessary for our eye to see, it is also harmful to its conservation -since the accumulation of electromagnetic radiation damages the work-. This interactive installation is activated by contact with the gaze: a surface moves on the screen, and the part that the person looking at the device begins to burn, making visible to the viewer the consequences to which this medium is subjected by its nature. In the words of the curator of the Photographic Collections of the CNAP in Paris: "the epistemology of photography [...], a scopic journey - a term from psychoanalysis meaning visual" or "with the gaze" - into the depths of the physical truth of the matter with a poetic evocation". This work was carried out thanks to an initiative of the Ministry of Culture and the National Center of Plastic Arts in collaboration with the Jeu de Paume (both in Paris), within the framework of the national photographic commission entitled "Image 3.0".



# Jorge Isla (Spain, 1992)

Graduated in Audiovisual Communication from the Universidad San Jorge, a Master in Artistic Production from the Universidad Politécnica de Valencia, and a Master in Author Photographic Projects from the Escuela Lens in Madrid. He currently lives in Bilbao.

His work has been exhibited in cities such as Madrid, Valencia, Cordoba, and Oporto, and he has participated in various group exhibitions and fairs, both nationally and internationally.

He has also received numerous grants and awards. In recent times some of them have been: the Production grant of the Bilbaoarte Foundation (2021), the Immaterial award of Tabakalera (Donosti, 2022), the Scroll award of Las Cigarreras (Alicante, 2022), the Ramón Acín grant of the Diputación de Huesca (2022), the INJUVE production grants (2022) or the IX Mardel Award (Valencia, 2022).

<https://jorgeisla.com/>

## Le Reflet. [Energy crisis]

Le Reflet,  
Mobile screens on Dibond aluminium with the wooden frame back paravuelo.  
66x100cm. (2 pieces)  
2022

Le Reflet 4,  
Mobile screen assembly on wood.  
54x46cm.  
2021

Le Reflet 13,  
Mobile screen assembly on wood.  
60x60cm.  
2021

These two works belong to Le Reflet (The Reflection) series, a set of two-dimensional sculptures formed by accumulating cell phone screens installed on Dibond as a patchwork. The black and shiny surface they generate creates the sensation of being in front of a mirror, specifically, of a black mirror. Charlie Brooker, creator of the British television series of the same name (Black Mirror, Black Mirror) in 2011 explained that this title was due to what we found every day “on every wall, on every desk, in the palm of every hand: the cold and bright screen of a TV, a monitor, a smartphone...”.

The artist from Huesca makes use of these materials (waste) and their aesthetics to reflect, on the one hand, on those mirrors (screens) in which we look obsessively and compulsively every day, as well as on what they suggest: the “dark side” of the technological era. On the other hand, Isla wonders about the current forms of consumption, which are posing a threat to natural resources (minerals essential for technological devices), geological and labour risks in the extraction of these raw materials, or all the technological waste that we are generating, either by its obsolescence or breakage.

Jorge Isla stated: “Le Reflet is a digital black hole, trapping and fragmenting the viewer’s reflection inside, dispossessing it of its essence. The accumulation of screens evidences that, like waste, they have an unlimited character”, or not?



# Akiko Nakayama (Japan, 1988)

The multidisciplinary artist graduated in Fine Arts from Zokei University in Tokyo and obtained a Master of Arts degree. She considers herself a painter since all her artistic works originate through this discipline, although she later uses other tools and, among them, technology for the final result. In recent years, she has mainly focused on the 'Alive painting' show, in which she represents the beauty of the metamorphosis of energy transmitted through various media, such as installations, photographs, and performances.

She has exhibited internationally both individually and collectively and has participated in events such as LAB30 FESTIVAL (2018) USA Augsburg, Biennale Nemo (2018) Paris, MUTEK Montreal (2019), ARS ELECTRONIC (2019) Austria Linz, Closing Ceremony of the Olympic Games Tokyo 2020 or MUTEK Montreal 2019 and Japan 2021 or JAX art Festival in Saudi Arabia, among others.

<http://akiko.co.jp>

## Alive Painting: The Morphology of Freely Rising Deformable Bubbles [Physics of energy]

Alive Painting: The Morphology of Freely Rising Deformable Bubbles [Physics of energy]

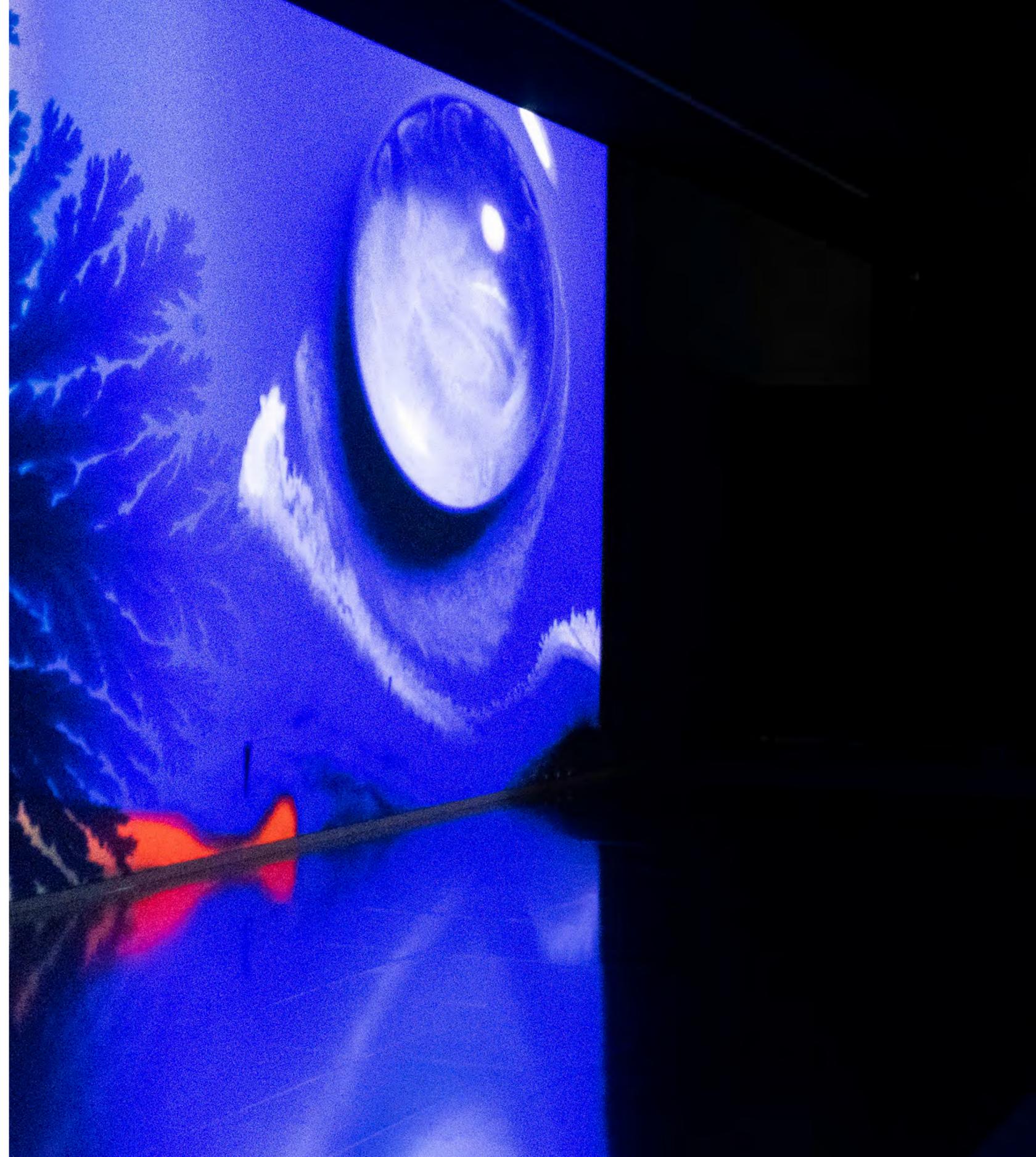
Video projection

10'10"

2022

This video projection allows us to experience in first person the metamorphosis of the painting as if it were a living being. The existing barriers between the different artistic disciplines have been diluting recently. Moreover, the irruption of technology and other sciences crossing synergies with the different artistic proposals allows us to delve into other types of experiences. This is how the Alive Painting series arises: generally, painting has been presented in a solid and dry physical state, but could we find it alive, as if it were a living being whose transformation we witness? Moreover, considering that in Shintoism (an animist religion originating in Japan), elements have a soul and consciousness, we can understand the reason for this intention.

Thus, from a meticulous work, as if it were a laboratory researcher, the artist arranges the materials in coverslips -a thin sheet made of a transparent material to be seen through a microscope- and take this surface from the micro to the macro, from matter to the universe that surrounds us, shifting the scale of things. The different materials merge, and other external factors such as wind, sound, humidity, gravity, or time configure these abstract images presented here as a metaphor for various aspects of nature. Through colours, fluidity, and resonance between forms and different textures, Nakayama celebrates the beauty of life and its transience.



# Stéphane Bissières (France, 1976)

With a degree in Mathematics from the University of Toulouse, Stéphane Bissières is also a composer and New Media artist. He currently lives and works between Paris and Bordeaux. His creation reflects our relationship with technology and how it hybridises with the living. His works seek to show the data concretely, and, more generally, he duels in the materialisation of virtuality, translating the deep and often brutal transformations that society is undergoing. He seeks to provoke astonishment and questioning in the observer, giving visitors the feeling of being a witness.

His works have been exhibited in different countries: the United Kingdom, Canada, USA, China, Russia, Belgium, Lebanon, and France. He has also received numerous artistic residencies throughout his career and has been awarded several prizes, including Paris Jeunes Talents, SACEM de composition, or IMEB de composition électroacoustique.

## Effet de champ [Physics of energy]

Installation: ferrofluids, magnets, software  
150x55x130cm.  
2021/2023

This mesmerising installation directly alludes to the effect caused by the magnetic field in which the ferromagnetic particles are arranged and suspended in a fluid in each of these flasks. The installation explores the idea of animating matter through virtual data to evoke artificial life; through an experiment on nanofluids, electromagnetism, and kinetic art. The choreography reflects a form of hybridisation. Bissières keeps moving between mechanics and living beings to develop a writing of movement highlighting the link between data and kinetics.

These ferrofluids can be “choreographed” to give a feel of a set of captive organisms. In this way, they create an illusion of artificial life by constructing a dynamic system capable of generating infinite variations with a recognisable common character, like a genetic code. Likewise, the author intends to provoke the astonishment and questioning of the observer and make him wonder.

This work synthesises Bissières’ interests, where mathematics, music, and technology are combined to generate a partiture of algorithms instead of scores. In the words of the historian Dominique Moulon: “The uninterrupted ballet of moving black matter contained in the jars is due to nothing other than the invisible forces that animate them. The alignment of these jars evokes a choir’s choreography, while the fluids’ extreme vivacity summons the supernatural. Without having time to grasp the signs that follow one another in rapid succession, one guesses that they are musical phrases addressed only to the eye.” All this is through an invisible, magical, or scientific aspect: energy.



# Miguel Aparicio (España, 1973)

Graduated in Information Sciences at the University of Seville, Master in Creative Documentary at the Pompeu Fabra University, and Master in Electroacoustic Composition at the Katerina Gurska School of Music Education. His works move between audiovisual and experimental cinema.

His work has been exhibited in numerous national and international exhibitions: Musac de León, Artium, Arteleku, Sitges Film Festival, Málaga Spanish Film Festival, Injuve Audiovisual Arts Award, Museo Carmen Thyssen Málaga, Canal+, Versión Española TVE Short Film Contest, Navarra Film Festival, Festival Cinema Jove, Alcalá de Henares Film Festival, Madrid Experimental Film Week, Indielisboa Festival, L'Alternativa in Barcelona, in New York, Montevideo, Strasbourg, Santiago de Chile, Moscow, Srebrenica.

## Fonópteros [Energy crisis]

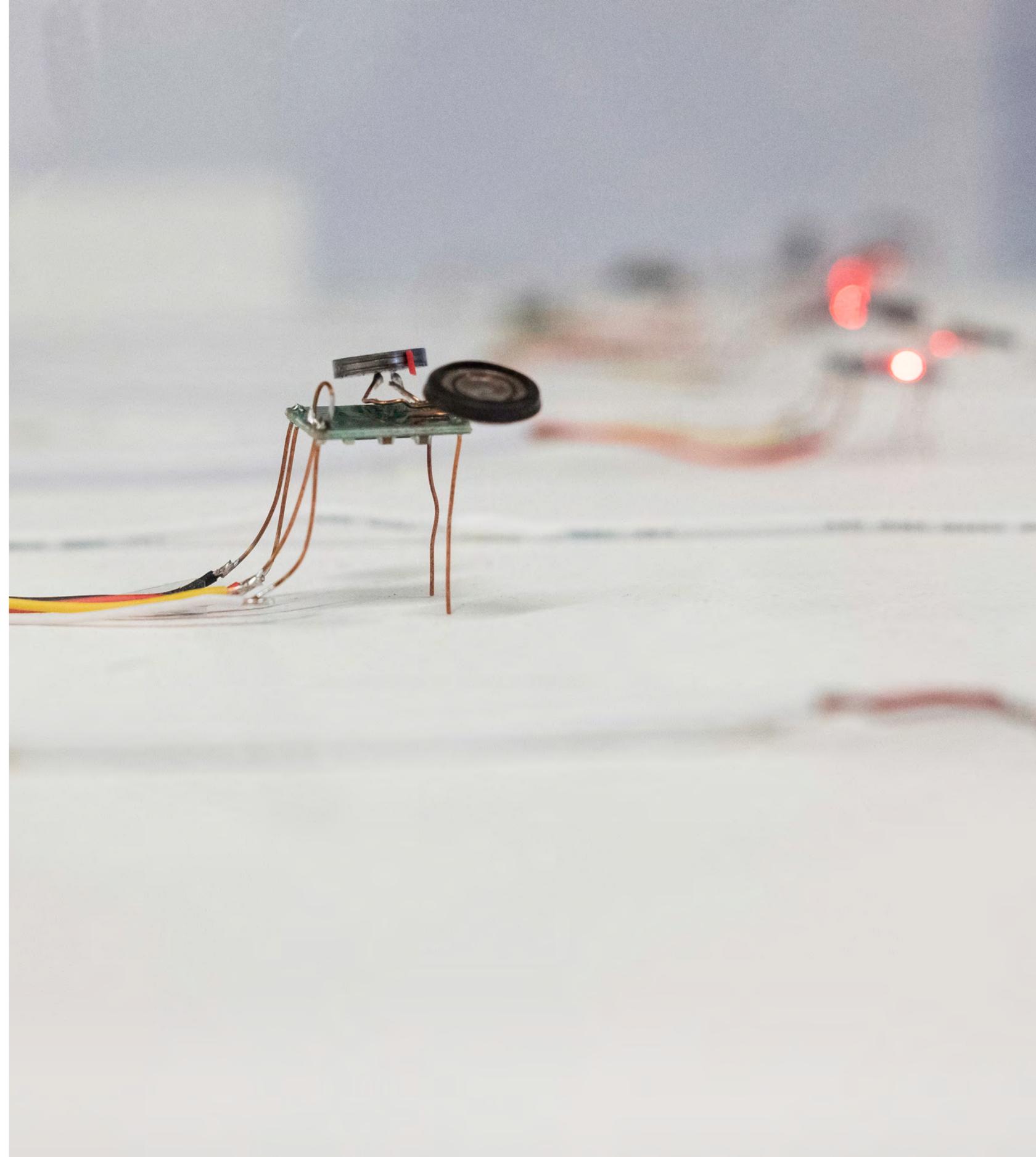
Five robotic insect sculptures  
Electronics and programming  
10x10x5 cm.  
2023

Phonopter refers, on the one hand, to the sounds of speech 'phono'; on the other hand, 'ptero' is a prefixal and suffixal element that means "wing". Thus, the installation proposed by Miguel Aparicio is a possible and deplorable ecosystem of the future, a set of different robotic insects. These have been created from obsolete and already discarded technology; assembled with cell phone speakers, they emit a buzzing sound artificially created by a computer; others that move, composed of the battery of a cell phone and the vibration motor on the head of two used toothbrushes; and, other more complex pieces require more precision welding and programming, such as a dragonfly that moves its wings in an illusion of flight, on a base of reused hangers.

The fundamental issue is to alert society about consumption patterns and their repercussions on nature.

What will happen when there are no more insects? Will we make use of the same technology that has exterminated them? However, this installation is a commitment to play and reuse, with the intention that the viewer sets in motion the transformation of an object into something new that we had not foreseen.

This installation is the result of Miguel's 2mont residency at Etopia under the Permanent residency program of the centre.



# Sofia Crespo (Argentina, 1992) & Feileacan McCormick (Norway, 1987) AKA Entangled others

Sofía Crespo and Feileacan McCormick form entangled others. She has a degree in Literature and Philosophy from the Universidad del Salvador in Buenos Aires. Her work focuses on visualising artificial life and generative life forms, all of which she does through applied computation. He is a multidisciplinary artist focused on ecology, nature, and generative arts. All this is with an approach that seeks to encourage the emergence and connection of new non-human presence and life in digital space.

As a collective, both founded the Entangled others studio and are currently based in Portugal. Their work has been exhibited in Istanbul, Lisbon, Dublin, Paris, Rome, Milan, and Barcelona, including one of their last New York Times Square appearances.

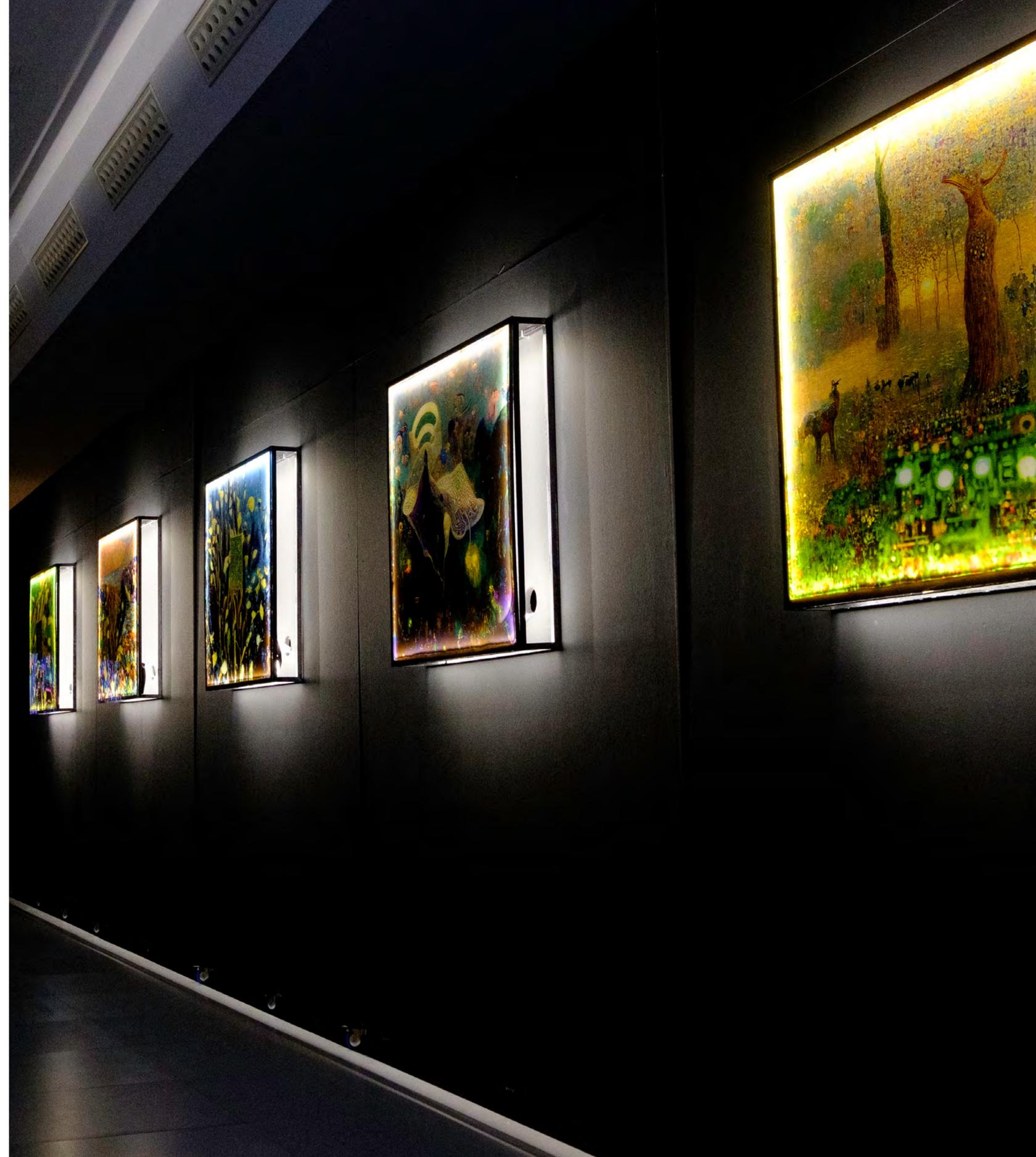
<https://entangledothers.studio/hybrid-ecosystems/>

## Hybrid Echosytems [Nuevas tecnologías y energía]

Five AI-generated images were mounted on LED light boxes and printed on acetate.  
80x80 cm.  
2021/2023

These images belong to the Hybrid Ecosystems series, a continuation of the work that Sofia and Feileacan have been developing for some time. Some images in this series have been coined as NFT. The physical and digital worlds seem separate at first glance, occupying different layers of reality that interact without great success. This is further reinforced by the way digital interfaces are designed. However, the reality is that these two layers are closely intertwined, influencing, interacting, shaping and reshaping, consuming and acting constantly. Our inherited tendency to see the artificial as distinct from the natural world further obscures how digital agents (software and hardware) behave and interact as an ecosystem, also with the natural world.

The artists propose a new way of appreciating the biodiversity that enriches our planet, in which artificial mechanisms (AI), together with our planet's large sample of our planet, give form to these new speculative species. Hybrid Ecosystems offer the possibility of a world of harmonious artificial and physical interaction and invite us to dream of other possible futures built with nature and not against it.



# SMACK (Netherlands, 2005)

SMACK is the name of the art collective formed by Ton Meijdam, Thom Snels, and Béla Zsigmond. These three artists studied together at the School of Fine Arts and Design (AKV) St. Joost in Breda before founding Studio Smack in 2005. Their first work, KAPITAAL (2006), won first prize at three different festivals; Pimp My Planet (2010) was recognised at the Dutch Design Awards and European Design Awards; and Witch Doctor (2016), by Dutch rock band De Staat, has received fifteen different awards, including Best Animation in a Video at the UK Music Video Awards.

In their works, they use computer and 3D animation, constructing figurative video works and generative art to explore themes such as digital identity, surveillance culture, and mass behaviour.

They are currently represented by Onkaos.

<https://www.studiosmack.nl/>

## Tribe City [Energy crisis]

Triptych  
4K digital animation  
7' 27"  
2022

Tribe City is a portrait of mass society. A seven-minute video in which different characters created by SMACK and belonging to the Tribe project -about 300 hybrid beings to whom different deeply recognisable social attitudes have been attributed- populate a grey (and urban) landscape dominated by a pillar/obelisk. The atmosphere generated around the central figure radiates magnetic energy, with a particular mystical character, an element that we intuit but cannot fully see, a force that, in the same way as Tribe's characters, captivates us and transports us to a dreamlike and dystopian landscape. Members of the crowd initially avoid each other, then choose to walk and worship the totem before panicking and fleeing. Crowd behaviour, violence, impassivity, and our perception of ourselves are put under a microscope in SMACK's works. We see ourselves reflected in the metaphor of herd culture and under the eye of the one who controls our lives. This masterpiece constitutes an uncanny and unflattering mirror upon which the artists reflect our society.

This work has been developed as a generative work within a game engine. Tribe City is built from individually programmed characters that react to each other according to established parameters.



# Libby Heaney (United Kingdom, 1983)

The British artist holds a PhD in Quantum Information Science from the University of Leeds. Her artistic practice connects this theory with machine learning and everyday life through virtual reality and user participation. She uses technologies linked to Artificial Intelligence to question machine categorisation models and expand that technology beyond its initial purpose. Many of his works aim to destabilise the standardised conception of “truth”. Her work has been exhibited internationally in Dublin, Barcelona, Berlin, Linz, and Lima, as well as in his native country. She received several project grants from Arts Council England to support his work and awards, such as the Omni Artist Award or the Winner Lumen Prize Immersive Environments in 2022. Heaney also works with machine learning, computer game software, and virtual reality.

<http://libbyheaney.co.uk/>

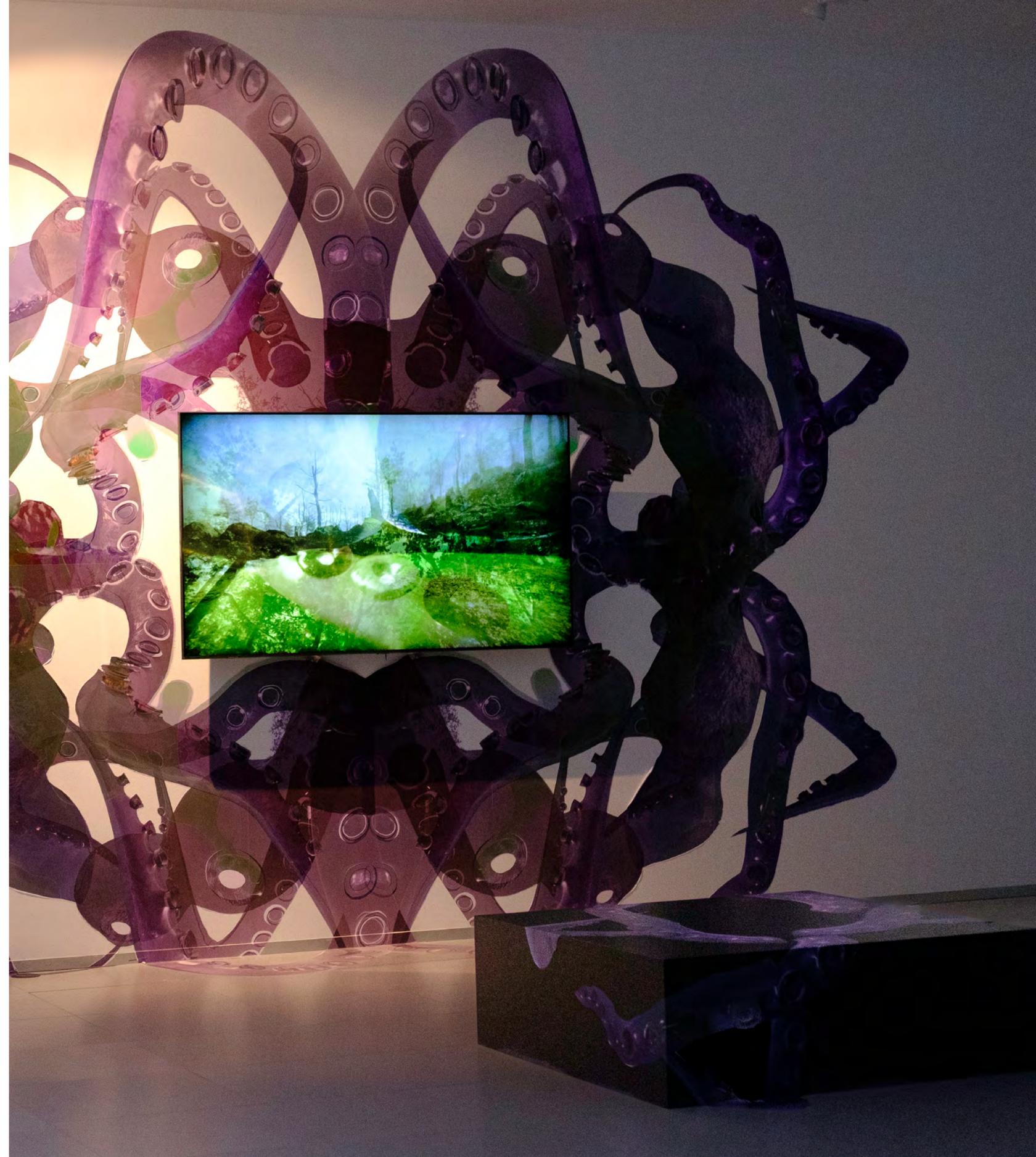
## Q is for Climate [New technologies and energy]

Video installation  
7m56'  
2023

Q is for Climate is a body of research revolving around quantum computing, i.e. a computing paradigm different from classical computing as we know it. The installation is a commission from Etopia for this exhibition.

Quantum technologies have the potential to significantly change our computing power, both for better and for worse, as it is feared that quantum computers will affect climate change. Such computers will be entirely new devices, and although they are not yet fully developed, major technology companies and governments have invested heavily in their progress.

Libby Heaney’s work aims to highlight the effect they will generate, as the immense computing power will undoubtedly change the world: they will break all known digital cyphers, simulate the deepest components of reality, give rise to new materials and energy solutions, and collect and analyse data at currently unimaginable scales. However, at the moment, there needs to be more public awareness of quantum computing and very little critical debate about future social and ecological impacts in the scientific and technological communities. Therefore, through this video installation, the author immerses us in this question through a work in which speculative forms give rise to creatures belonging to a new panorama; post-human feminism. Viscous beings that relate to their environment -where time is not linear-abduct us by presenting a new quantum alternative. Following the line of other of the author’s works, a reflection on the relationships between humans and non-humans, capitalism and alternatives, subjectivity, truth, and perceptions of reality. Multiple dichotomies, analogical and digital, reveal a network of relationships that are often overlooked to expose their drawbacks and dangers.



# Artists statement Libby Heaney

What is a quantum computer?

Quantum computers are an entirely different type of computer that processes information following the weird laws of quantum physics (a theory of atoms and molecules and how they interact). This means quantum computers process information in parallel, layered ways rather than sequentially, like on digital devices.

Full-scale quantum computers do not exist yet but are being intensely pursued by big tech and governments. When fully developed, they can solve problems that no digital computer can and ever will. They will undoubtedly change the world, allowing humans to peer into nature deeper than ever before.

Q is for Climate (?); therefore, it questions how the power of quantum computers will impact the climate crisis.

Research

Based on academic research into quantum computing and climate change, as well as (sadly confidential) interviews with scientists and directors of quantum computing companies and my own speculations around the often overlooked radical potential of reimagining natural and social systems & perspectives through the lens of quantum entanglement.

Big tech companies like IBM and Honeywell are working with oil companies to speed up oil exploration, drilling and optimisation. Others like PsiQuantum are pledging time on their forthcoming full-scale quantum computers to help develop new types of lithium batteries, green hydrogen processes and ammonia. However, these processes are still within the linear regime of extractive capitalism. This is represented in the visuals by the oil cascading down the hill and dripping over a rotating quantum computer.

What do the objects in the video represent?

In the video, the yellow and blue lakes represent the hidden dark side of our rapidly electrifying world. They are my interpretation of lithium mines like those found in Chile. Lithium mining for batteries is already causing huge pollution and conflict over water in the countries where it is pursued. Quantum computers will help bring in a new generation of lithium-oxygen batteries, which will help move away from gas but comes at a cost.

Quantum computers will also be used to make ammonia in a more efficient way. Again this will save lots of carbon dioxide from being released into the atmosphere. However, ammonia is used as fertiliser in intensive farming, which massively diminishes the soil and is very unsustainable. With more and more land needed to feed the world's growing population. This is represented through the depleted landscape.

How is quantum computing used in the artwork, and what this means?

Proposing another way entirely, this video work encapsulates a myriad of human and non-human perspectives, ghostly glitches and a quest for an idyllic environment. To emphasise the radical potential of quantum computing for reimagining climate change and how we approach it, I include quantum computing generative video editing and sound, reinforcing the concept through the form.

The final two parts of the video were generated using data from entanglement from my own code for one of IBM's five qubit quantum computers, which I access via the cloud. Instead of just one thing happening like in digital computers, all possibilities exist simultaneously, coming into relation with each other in all possible ways.

Does this plurality inherent in quantum physics help us to this, like the Climate itself, holding multiple effects and entanglements simultaneously?

By embracing all possibilities, even the destructive ones, can we learn to (as Donna Haraway puts it) "live with the trouble" and create new relations and unexpected collaborations necessary to find a way through the present degradation of the earth and its systems?

Time

The start of the film is linear time as the different viewpoints appear one after the other - sequentially, which mirrors how information is processed on a digital computer, but also how time is seen from a renaissance & modernist perspective (i.e. the idea of progress and the great universal history - usually written by rich white men).

At the end of the film, when the videos are all layered up, time is non-linear, all times are happening at once, and there's a flow of information forward and backwards simultaneously. This represents time in a quantum computer but also indigenous time and subjective time so that one has access to all possible choices and timelines.

Tentacled creature

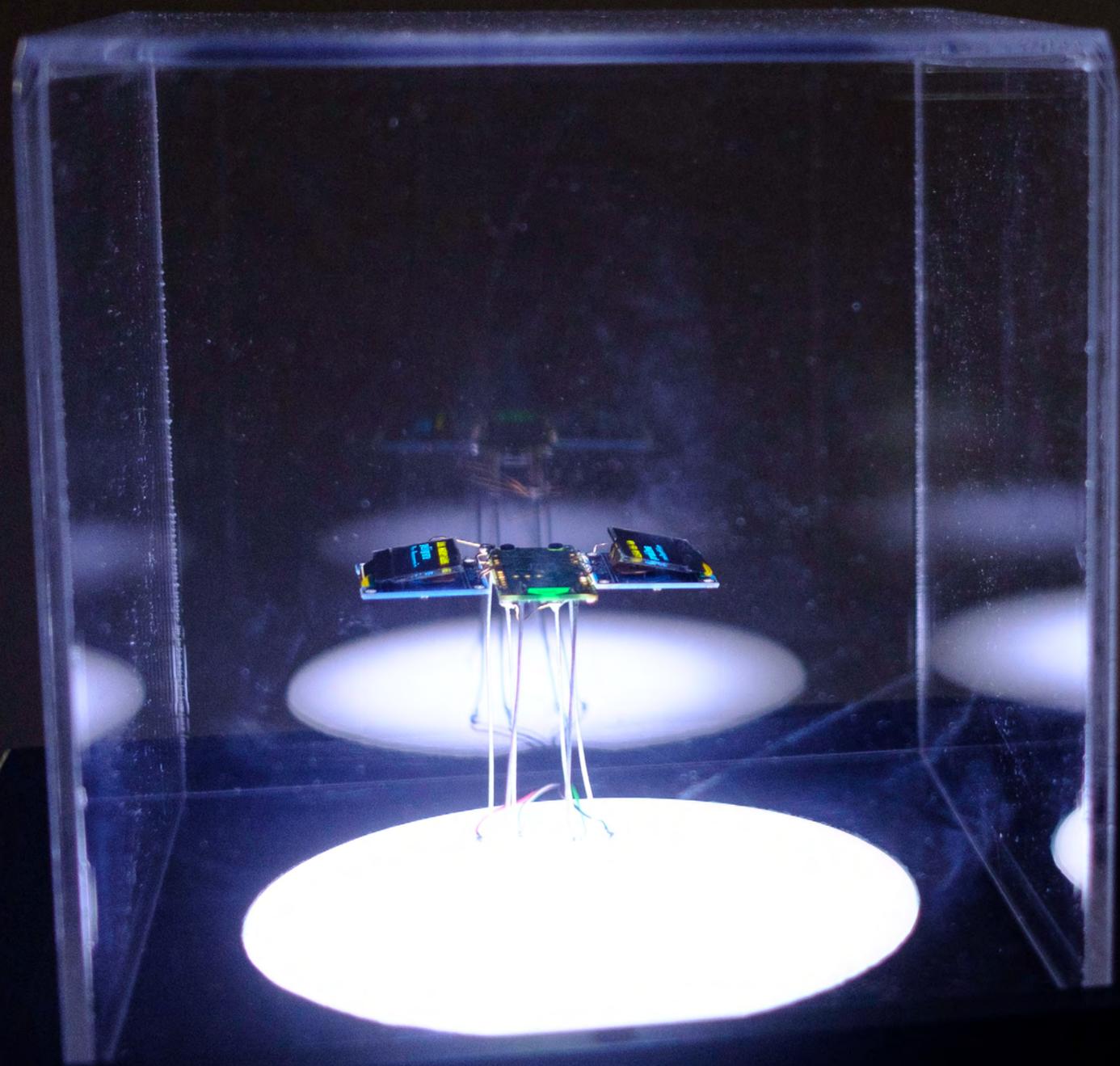
The tentacled creature that haunts the work comes from one of my free drawings and a series of 32 paintings I'm currently making. It is based on my inner world - my rage, Tina Turner's dancing - symbolic of feminist power, Donna Haraway's tentacular thinking.

"Tentacularity is about a life lived along lines—and such a wealth of lines—not at points, not in spheres. "The inhabitants of the world, creatures of all kinds, human and non-human, are wayfarers"; generations are like "a series of inter-laced trails." String figures all."

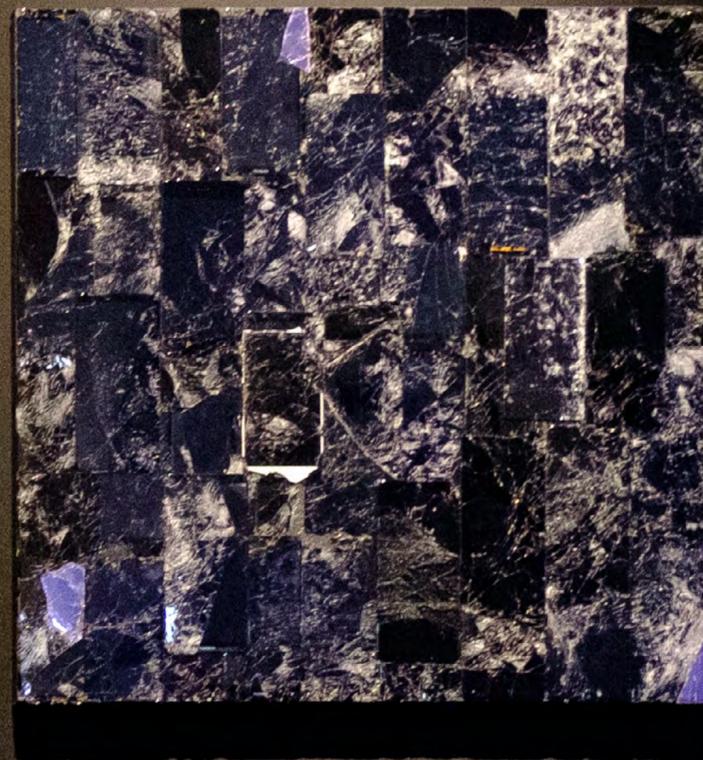
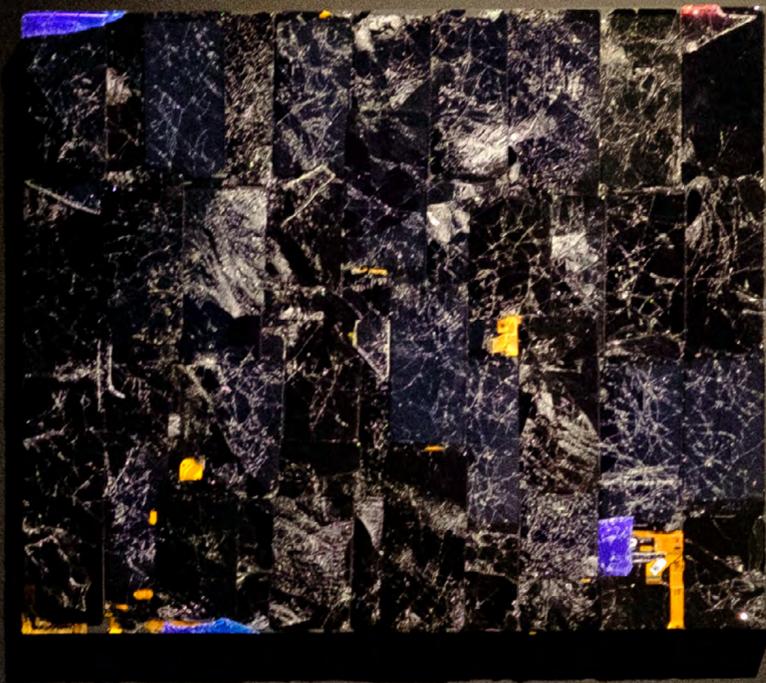
The creature is a hybrid, a quantum superposition, entangled across time, a partially concealed embodiment of the radical power of quantum to move us away from techno-solutions to climate change and to a deep entanglement with ourselves and others (peoples, non-humans) across space and time.











## Credits

Artists: Akiko Nakayama (JP), Claire Williams (BE), Eugenio Tardón (SP), Hanako Murakami (JP-FR), Jorge Isla (SP), Julia Puyó (SP), Libby Heaney (UK), Miguel Aparicio (SP), SMACK (NL), Sofia Crespo (AR) and Feileacan McCormick (NO) AKA Entangled Others, Stéphane Bissières (FR).

Curated by Alejandra Rodríguez (University of Zaragoza) and Blanca Pérez Ferrer (FZC).

Exhibition design and graphics: Vamos Estudio.

Executive production and coordination: Trazacultura, S.L.

Exhibition set up: Municipal brigades and Etopia maintenance officers.

Technical production: Guillermo Malón and Néstor Lizalde (FZC).

Mediation: Noray Collective.

Educational programme : Pilar Martín (FZC).

Communication: Laura Montañés and Raquel Povar (FZC).

Responsible for Contents: Elena Giner (Zaragoza City Council).

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# ARTECHO ENERGEIA ASSOCIATED PROGRAM

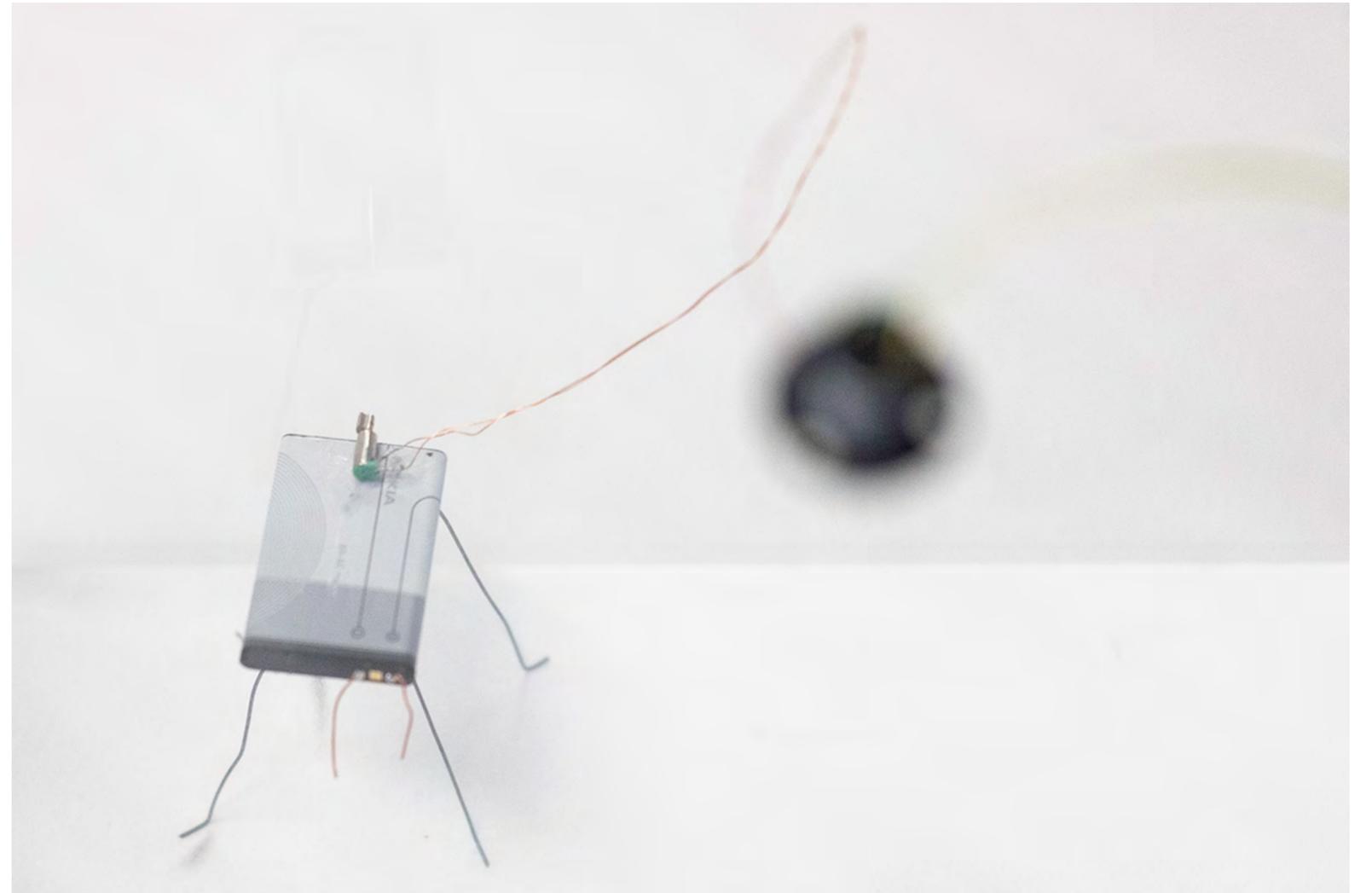
Guided visit of exhibition Saturdays 11 to 13h30 from 4th of March to 17th of June

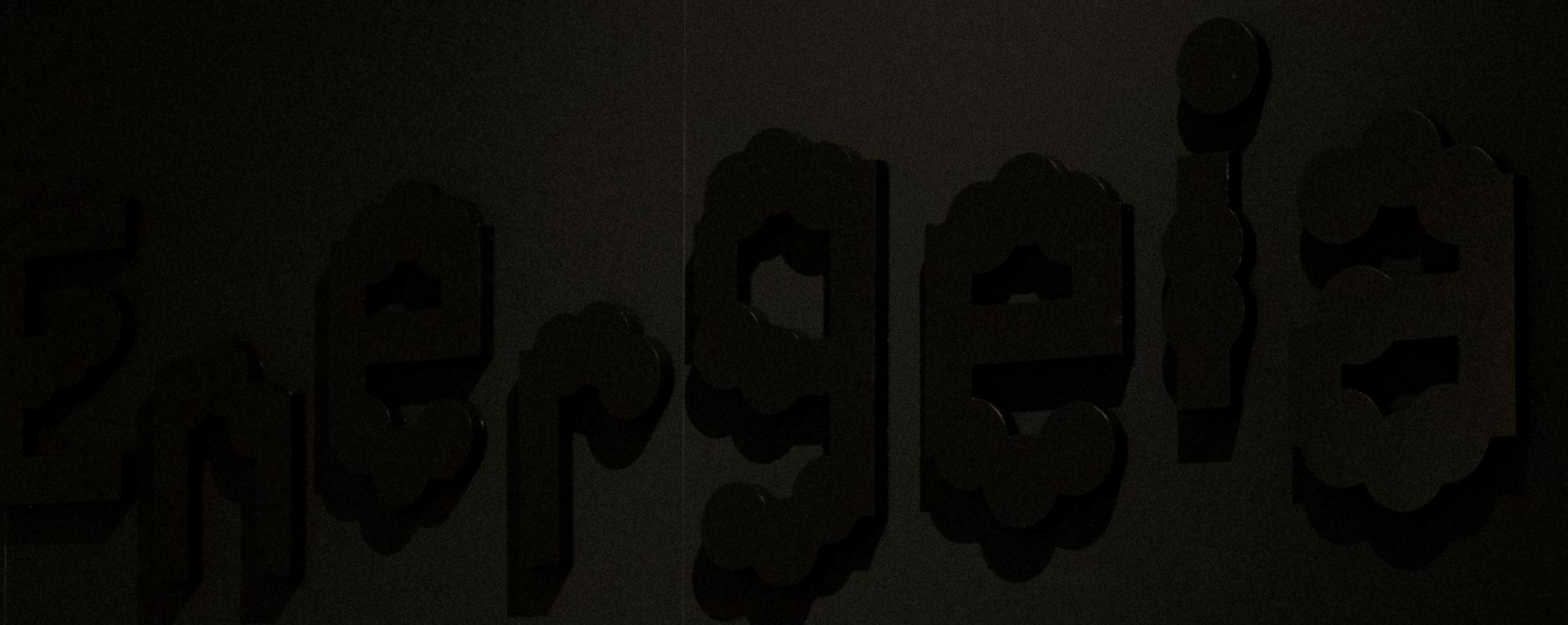
Saturday 4th of March exhibition tour with the curators. Blanca Perez Ferrer and Alejandra Rodriguez.

Saturday 17th of June 11h30 to 14h00 Special guest visit with Professor Alicia Valero

Discover with Alicia Valero a world class specialist in mining and rare minerals the ecological impact of technology and how the ecological transition needs to address the elephant in the room. Degrowth.

Friday Fonopteros a workshop to build robotic insects from old phones with artist Miguel Aparicio. A hands on way to reflect on robotics, recycling and the role of insects in our world.





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