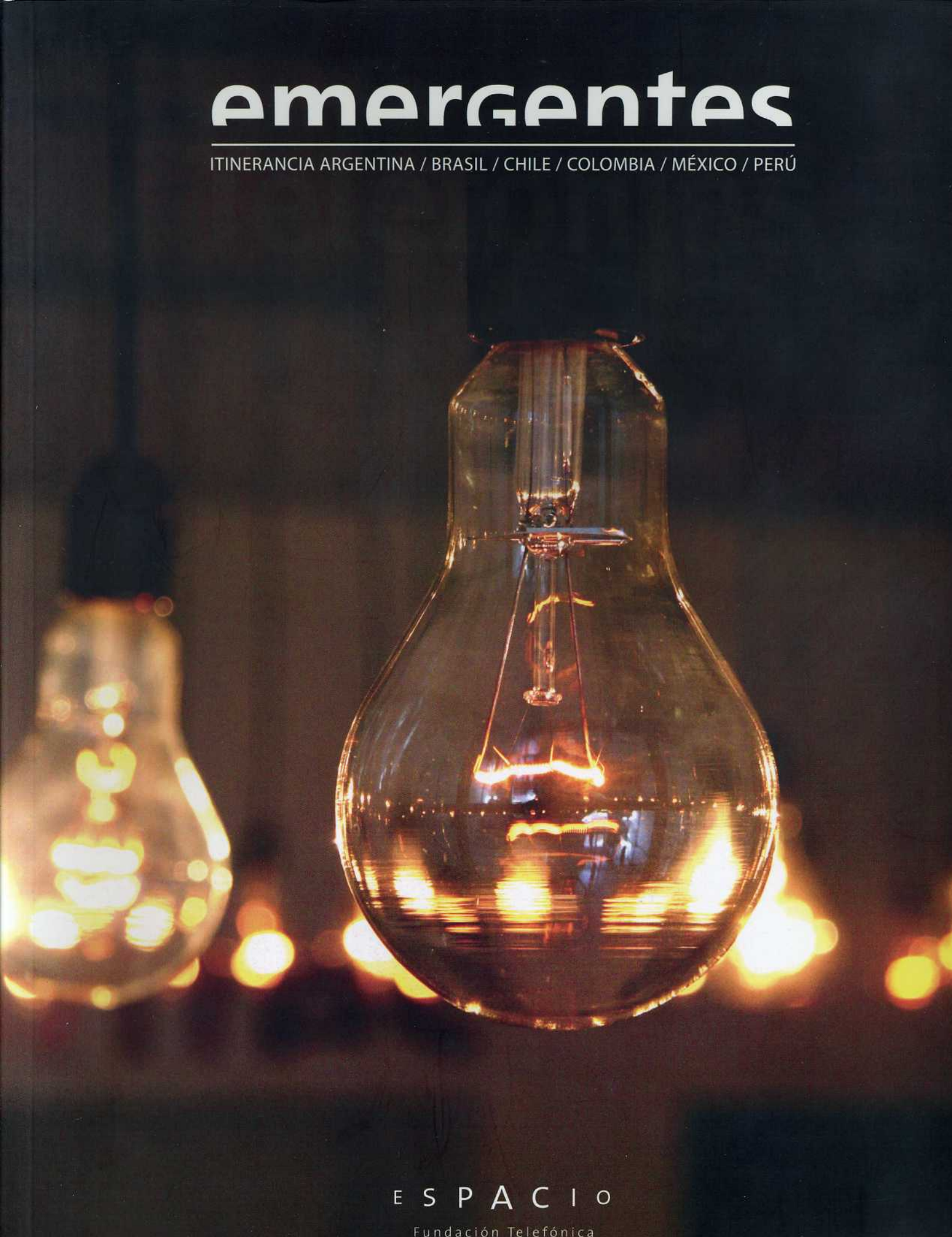
emergentes

ITINERANCIA ARGENTINA / BRASIL / CHILE / COLOMBIA / MÉXICO / PERÚ



ESPACIO

Fundación Telefónica

EMERGENTES: Process-Based Works

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Curator of *Emergentes*

CONCEIVING THE TECHNOLOGICAL ARTEFACT

There are two different meanings to 'emergent'. In the field of complexity studies it embraces all qualitative changes spontaneously generated by a system. The properties of this behaviour are rooted in interactions between the various compositional elements of a system, which cannot be treated as individual components. An emergent behaviour is more than the sum of its constitutive parts. The concept can also be co-opted from a socio-cultural perspective when referring to new knowledge making a radical entry into our contextual surroundings. For instance, when regions or areas that were not in the Western cultural cartography start to glitter in the map, these regions are defined as 'emergent'.

As a project, *Emergentes* co-opts both meanings in the understanding that these are not contrasting but can in fact be potentially structured together; particularly if we are referring to cultural advances where science and technology are used to thread together connections in the investigation of social interactions. One of the most recurrent situations arises when the use of a specific technology seems to 'emerge' in forms other than those initially conceived. Many researchers claim that this process arises from the malleability or 'interpretative flexivity' of the technological artefact (Bijker, Hughes et al. 1987; Orlikowski 2000). Nevertheless, the composition of the technological artefact and its limits (ranging from the technology used to the functional specifications of hardware or software) avoids a simple interpretative analysis. If the interaction is simplified to social interpretation of the forms of interaction or use then the possibilities are not being opened up and, in fact, could be quite the opposite. The process that gave rise to the formation of the artefact may, *prima facie*, be blocked.

On the contrary, if we associate the interaction with the very nature of the artifact (including its technical limits), then the process of production can be made clearly visible.

Making visible the limits and composition of the technological artefact opens up a better understanding of the process. Explaining the process is also a subtle way of revealing the influence of an idea in the materiality of a technological artefact.

In the case of electronic art, specifically interactive installations, not all works lay bare their processes. Furthermore, many works now considered as historical milestones largely consisted of 'black boxes': technologically sophisticated equipment which, with the passing of time, limited the work to the reach of its technological capacity. Therefore, over the years, the weak conceptual underpinnings of many interactive pieces relying on the use of sophisticated technology were uncovered, reducing them to little more that technological scrap. In its beginnings, interactive art leant too heavily on 'technological determinism', in contradiction with what today we could characterize as a more critical and cutting-edge vision of the limits of technology as well as its impact on society. This connection with the social fabric came about through a series of factors, mainly tied in with the extended use of computers in all sectors of society and their function as a means of communication, even more so today with the extensive use of Internet.

This has led to a new phenomenon of digital information growth and therefore the exploration of forms in which it can be manipulated to create new meanings, making unquestionable, as Gregory Bateson said, that 'information is the difference that makes the difference' (Bateson 2000). We could not be much closer to this statement by the celebrated British anthropologist and cyberneticist. To understand information it is crucial to create spaces of rupture with the daily consumption of the media which we are accustomed to and which instigate standardized as well as inflexible habits and attitudes. These standardized attitudes are sophisticated forms of the technological determinism we mentioned earlier which prevent us from seeing the possibilities or the limits existing in information technologies. Recombining existing information to create new information is a latent condition today. This potentiality for recombination should suggest or make visible what everyday life does not help us envision.

The technological artefact is associated with progress, in other words, with the history and evolution of mankind. For this reason, in foregrounding the process one discovers the difficulties as well as the potentialities of technology. This, in turn, allows us to generate new knowledge. Particular creative forms in the use of technology enable novel proposals, both on a conceptual level as well as in the convergence of media where vision, sound and touch produce particular behaviours and new ways of understanding interaction. These novel

approaches to interaction facilitate, as we will see later, a profound understanding of the process that occur in interactive installations.

FROM THE 'PACKAGED' WORK TO INTERACTION AS PROCESS

In recent decades there has been a radical change in the way in which we consume and understand technology.
An example of this change is evidenced if we compare video with interactive art. Video in all its forms (including video art, computer animation or experimental video) is a process which solely leads to the visualisation of a final product on a screen. All the technology used to produce the audiovisual work is not visible, rather it is embedded or 'packaged' in the final product. We might say that the work and all its comprising functions are already specified.

Unlike video, in interactive installations the process is made visible in the very complexity of its form. Like peeling away the layers of an onion, as one becomes involved in the interaction one manages to reason and question the comprising operations. Taking on the example of video, given that it is a stabilized medium, the technical concerns are no longer preponderant, unlike what happened decades earlier with works based on computer-based special effects. What we wish to underscore is that many of the effects which had such an impact almost 30 years ago (in films such as *Tron*) would now seem like beginners' work. This has also led today to consider other elements more tightly associated with visual languages as a way to interpret audiovisual works.

Similarly, at the beginning of the 1980s, when referring to the results of scientific work, Karin Knorr-Cetina argued that a diagram could be questioned due to the fact that multiple interpretations may be possible (Knorr-Cetina 1981), and claimed that these 'inscriptions' are an exaggeration of the power of semiotics. This may also confirm the reasons why we have increasingly better forms of visualization of information. During that period this somewhat rationalist approach towards the search for the pristine image made computer graphics the most innovative forms of visualization. From thereon many artists began to use them. Nonetheless, like in the case of scientific work, searching for ever improved forms of visualization in computer-mediated artistic work leads also to new improved forms of technology. This supposes not only better and more sophisticated forms of visualization, but also more profound ways of interpretation.

Returning to the case of interactive installations, packaging and showing only the final product would hide the intentions of the work and deny many of their approaches or attempts. Further still, if the conceptual process is associated with the form in which one interacts with the piece, it makes this process more complex.
A solution to this problem is to make the functions visible, in other words, to show its technical complexity and associate it with the aims of the work.

In interactive art there are works that initially tried to embed these functions in order to simply show the final result. This result is achieved thanks to a technology that vanishes little by little with the obsolescence of the artefact that utilized it. On the contrary, the way in which we can incorporate technologies today and make them visible allows us to infer, over and beyond the technology itself, the existence of a process or open program where the latter becomes a temporal medium. In this case, content and its ways of malleability become key components. In this regard, the work can adapt to new technologies that enable its interpretation. These works might be better identified as works in process, given that the work as result is not finished, but is rather part of an ongoing investigation to breach the limits imposed by technology. When the limits and the evolution of a technology are known, it is more feasible to extract the purely empiricist element of the conceptual base of human knowledge. Technology can evidence this process at a certain moment to fulfil a function, yet it is only if we analyse the evolution of the technologies that we can arrive at more advanced conclusions that will explain us why we use one technology and not the other. Technology does not lead to a lineal evolution, and in fact the opposite is true, it explores untrodden and often adverse paths (Ciborra 2000).

Technology is not infinitely malleable; its degree of flexibility depends on the degree of interconnectivity and the configuration of the technological artefact (Kallinikos 2002). The great challenge of interactive art is then to make the process evident. When we refer to the process we are not referring to a perfect process but, on the contrary, to a perfectible one as it happens in a laboratory, where trial and error are an integral part of the work.

For this reason, an interactive installation as an artistic process makes the exploration of emergent processes much more valid, allowing one to discard some functionalities and include others. However, it is not until the work enters into contact with the public that one can ascertain whether it actually functions as expected. It is then not just a question of the author's understanding as it now involves a complex arrangement of interpretations associated with the use of technology that potentially modify or alter its composition.

INFORMATION GROWTH IN THE DIGITAL UNIVERSE

Recent times have seen the appearance of a field of investigation which, up until a few decades ago, was primarily connected with the use of monitoring systems in industrial plants (Zuboff 1984) and the analysis of man-machine interaction through the use of interfaces (Turkle 1996). As Manovich suggests, 'the human-computer interface is cultural language that offers its own ways of representing human memory and human experience' (Manovich 2002). Meaningful information in new media can therefore be understood as the

interface to a database that brings meaning to data by ways of a contextual representation. A basic feature of post-industrial society is its dependence on symbols and standardised content to make the results more predictable. Following the explosion of the Internet, the forms of interaction with information have become much more palpable in our everyday life. Recently, researchers have endeavoured to approach this field in order to analyse its social consequences. For Jannis Kallinikos there are features intrinsic to information in the era of Internet, like self-referentiality, interoperability and disposability (Kallinikos 2006). The first of these characteristics explains that in order to manipulate information we need to create more information. This is particularly the case of metadata, in short, information out of information.
A second characteristic is the potentiality for information to become interoperable with other types of information, creating new hybrids based on previously unrelated sources of information. Finally, possibly the most noteworthy of these new characteristics is associated with the short life of information, in other words, its social conformation as a highly disposable product. Financial, real-time monitoring or traffic information are particularly sensitive to this short life span.

In contemporary electronic art, the manipulation of information has been a recurrent subject. Mariano Sardón's work deals with the order and disorder of texts, drawing on one of the main characteristics of digital information: its interoperability. Sardón's work also responds to the mix of information generated by the user. Most of our current knowledge is organized through the codification of technical writing, both printed and electronic. Interacting with text is, therefore, the foremost form of interoperating information, which Sardón defines as maps due to the fact that their dynamic in terms of movement, structures and forms designs the way in which we will read and perceive them visually. For Sardón, like many other researchers, the human experience is translated into an experience of addressing the 'topology' of text: paths and forms of texts which are woven by circumstances external to anybody's control. In the case of text there is a structure, such as its linear way to read it, which also reinforces information (Flusser 2002).

When we refer to interaction we often think of a system which responds automatically and precisely to a physical setting through pre-programmed algorithms. Algorithms are executed independently of any phenomenon that emerges in the context. One of the problems of modern computing is that there is an expectation to automate processes which, by their very nature, are dependent on a certain context and cannot be rationalised. Any form of contextual interaction transforms those closed systems into open ones, allowing them to express situations beyond the functions computable by algorithms (Wegner 1997).

One of the circumstances that has unquestionably promoted the growth of information has been the automated processing of data using algorithms. This information loses its validity with the passing of time, being transformed into dead texts, imprecise data and even false narratives. The projects by José Carlos Martinat and Enrique Mayorga over recent years address forms of interaction with the public in ambiences that cannot be fully controlled, where there exists a parallelism or concurrence of distributed systems, mainly through the use of repositories of information coming from Internet. *Ambiente de estéreo realidad 4* conceives the text contained in the Internet as autonomous thanks to recycling and re-concatenation, in other words, to its re-contextualization. What this work is actually looking for is something between a game and a paradox, because it goes beyond the act of communication and forces to ask ourselves new questions based on the re-concatenations produced from the text available in cyberspace. The relations between the printed (flyer) and digital media confront the spectator with a whole gamut of random searches. The white cube provokes a cyber-mystical sense of order, similar to the perception of simplicity and purity when one enters Google's web site. Meanwhile, a form of denoting its impurity comes from the flyers, from their disordered configuration once they are spat out by the machine and left to drift down to the ground. Written text is still impregnated with context, and therefore it survives beyond metadata or algorithmic functions. Written text is the final motivation of information; thanks to its content, it allows us to approach our semantic horizons.

Electronic communication transgresses the relationship between the digital and real worlds by the use of technological equipment in our everyday lives. Domestic appliances re-configured by Lucas Bambozzi, like in the case of *Spio*, offer a perception of the strange interaction between informed appliances and human beings. *Spio* is an artefact massively informed about its direct surrounding environment. The conditions of the space allow it to ironically generate patterns of behaviours. *Spio* is a blatant proof of what could happen with domestic appliances as these begin to digitally represent their space of interaction and connect to information networks. The information produced by the electronic artifacts leave a 'digital shadow' that could be traced and interconnected.
As Felix Stalder stated, 'it started with the telephone, the TV and the Internet, but imagine when your fridge begins to communicate with your palm pilot, updating the shopping list as you run out of milk, and perhaps even sending a notice to the grocer for home delivery' (Stalder 2002). Bambozzi's work explores new forms of control that question notions on freedom of thinking which were initially addressed critically yet which today, as they become integrated into our domestic consumer environment, have been institutionalised and even neglected.

INTERACTING AS SEEING AND HEARING

Interactive installations are complex assemblages ruled by commands or functions that also generate processes associated with alternative forms of perceiving interaction like, for instance, observation or sound intervention.

Mariela Yeregui's work questions theories of artificial intelligence (AI). The spheres in *Proxemia* posit a corporeity that is used as an interface which allows it to configure decisions and characteristics that might well be called 'emotive'. Yeregui is interested in introducing a sensitive aspect to automatons, dissociated from the endeavours of AI to unify and formalize common sense and knowledge (Steels 2006). We might say that this only manages to generates an 'empty' yet living sensitivity in the spheres conforming the work and that is directly tied in with its corporality. This is revealed in the 'communitary' meaning of the piece and how the user models the space of action. *Proxemia* looks for another type of interaction, less grounded in interaction *per se*, and closer to a contemplative and ludic aspect of movement in space. This also generates different dimensions in the interpretations given by the participants.

For Fernando David Orellana interaction with the public is fundamental in removing some elements and simplifying or aggregating others. In many cases new interactions are produced which are no longer just a response to the relation between machines and the artist, but between machines and the public. Consequently, the observation of phenomena proves crucial in his work. Orellana models each of his works based on what it posits, like the observation of the phenomenon of the piece in an exhibition space. This has also changed the form in which works are designed today, because it associates the artist not only with the technique but with the social fabric conformed by the public. This phenomenon is one of the greatest differences in current works in the field of art and technology. That is why the work depends on a series of processes that are not only associated with expected interaction but what its use manages to achieve through simple observation.

As we have already discussed, there are many forms of interaction that make processes visible and go much further than the usual direct interaction with equipment or the physical manipulation of its functions. Among these new forms of interaction, the field of sound is currently one of the most fertile. Rejane Cantoni and Daniela Kutschat have been developing *OP_ERA* as an independent research project whose mission is to create pieces in which the participants and their bodies act as natural interfaces while they move freely in the space. In this way, the interface (the body) learns to interact naturally through preformative actions. Having said that, *OP_ERA* is not just about interaction with natural interfaces but also about how these are [illegible] to variables of systems that generate a multisensorial representation influenced by the space-time relation. In *OP_ERA: Haptics for the 5th Dimension*, the body is an obstacle for the free passage of particles which, in turn, collide in a dimension represented by sound.

Sound is thus used as a tool for the intuitive control and exploration of an informational space. Sound bears the ephemeral aspect of the information as it is intangible and disposable (in each moment a new unit of sound is produced). This instability also opens up a possibility to create ambiences with an immersive capacity and suppose a challenge when it comes to conceiving a work through the use of technology.

Sound is transformed into a way of being tied in with a context, an ambience. For Rodrigo Derteano, it is sound's ephemeral component what he bears in mind when conceiving *Recomputing Space*. In large cities sound often goes unnoticed and even in noisy cities it is generally repressed. For this reason the contemplative aspect of sound is fundamental for its proper understanding and analysis, especially when this is supported by visual components to denote the existence of sound as layers of information.

HACKING LATIN AMERICA, HACKING BIOLOGY

Emergentes also endeavours to question the generally accepted vision of Latin American art. Although electronic art from Latin America is not altogether unknown, there are still many largely invisible variations that are related to multidisciplinary research processes. There is no attempt to put forward an all-embracing or thematic view of art and technological production and its connection with Latin America. Though it is true that the majority of this kind of work comes from a small number of countries like Brazil, Argentina or Mexico, many artists develop their work outside their country of origin. The process of globalization largely affects big cities in similar ways. Nonetheless, there are basic differences of the use and assimilation of technology between consumer countries and producer/consumer countries. This assimilation is often affected by social and cultural patterns that are processed and analysed in different and complementary ways that not only allow a critical perspective but also an innovative path, however new it might be. What is crucial then is not to forget that there are many more ways of seeing than the generally accepted ones and that these are potentially re-formulated by context and experiences of production and consumption. It is undeniable that this process has proven beneficial for many artists in operating their connection with Latin America. This is particularly noteworthy in the case of artists living outside their country of origin yet maintaining a dialogue with it. Rafael Lozano-Hemmer, one of the most renowned [illegible]

Mexican on first sight. That does not prevent that many of his most significant works have been planned in Mexico-tied local contexts. *Almacén de corazonadas* was presented initially in Puebla, Mexico, and is inspired in the film *Macario* by the Mexican film director Roberto Gavaldón (1960). Soon after its first exhibition *Almacén de corazonadas* has been presented in international venues without making evident components that enunciate it as a piece of Mexican origin.

Fernando David Orellana was born in El Salvador, but when he was six years old his family moved to the United States for political reasons. While he never integrated into the context of his home country, he was influenced by Salvadorian art since childhood and believes that it had an impact on his current aesthetic conception. This can be seen in his work in painting and drawing, although not in his electronic work, which is much more influenced by engineering, pop culture and science fiction. Living in New York and working in academic environments has been crucial for his electronic art.

For others, like in the case of the Peruvian artists José Carlos Martinat and Enrique Mayorga, the working method is pretty stripped down and defined by the culture of hacking. They have managed to create works which are a sophisticated reflection of the limits of domestic technologies.

Even so, by referencing the explosion of digital information, we cannot overlook the strategic geographical location of Latin America. The countries in the Amazon basin own the biggest laboratory of biotechnology in the world, which is economically more important than the current exploitation of its natural resources. Less than 1% of tropical plants have been studied from a perspective of economic potential. Biotechnology is grounded in nature, yet it is still barely explored. Particularly worth revisiting is the work of Laymert Garcia dos Santos and the emphasis it puts on the bio-informational value in South America, particularly the Brazilian jungle, which measures almost five million square kilometres (Garcia dos Santos 2003). Nowadays, the spotlight is on digital information but the informational value of biogenetics in Latin America is largely unknown.

There are few works in this direction. Mariana Rondón's work could be defined as an enormous genetic laboratory searching for deviations. Contemporary film keeps us physically immobile in front of images from a set beginning, forcing us to see one single form in the image (Friedberg 1993). *Llegaste con la brisa 1.5* is emblematic in portraying the process of error as an esthetic form, an element particularly important in the field of genetic variability and evolution. Error is articulated in a pathetic manner through the attempts, a way of making evident the constitution of many technologies and their complexity. The imaginary of the cinema and the creation of mythological beings, like sirens and minotaurs, generates the same unsettling feeling as the direction taken by genetic research. In this way gigantic soap bubbles appear full of a life of their own that then become receptacles for the projection of hybrid organisms.

Working in the field of visualization, Santiago Ortiz addresses the recombination of digital information in order to think in genetic information. *Mitozoos* is a didactic representation enabling the creation of beings as if in a quasi-ludic act. The piece, initially designed for schoolchildren, touches on the very process of creation and genetic biorecombination. The generation of new hybrid organisms from informational combinations and transformations challenges our vision of the technological apparatus.

The technology of text is simple for transforming and interoperating due to its standardization and uniformization throughout centuries of organization of the world's information (Bowker and Star 1999). Digital biology is being approached as a field where many of these concepts conceived initially from written text will be translated in the generation of new forms of life, affecting not only classifications but the way we conceive information. The explosion of the information has brought advanced notions on text recombinations that today are affecting social processes.

Digital biology will affect the way in which we have been conceiving the production of knowledge.

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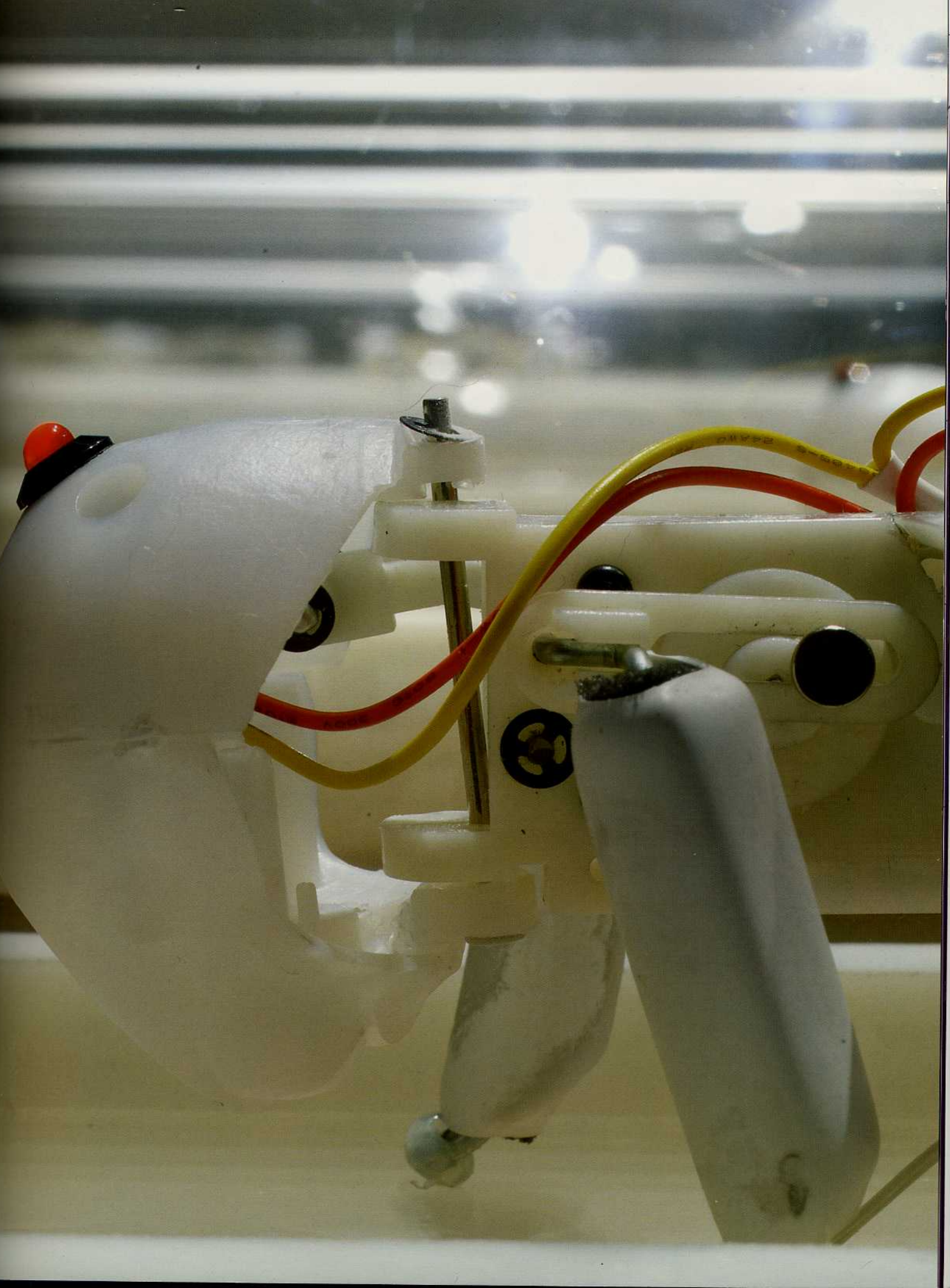
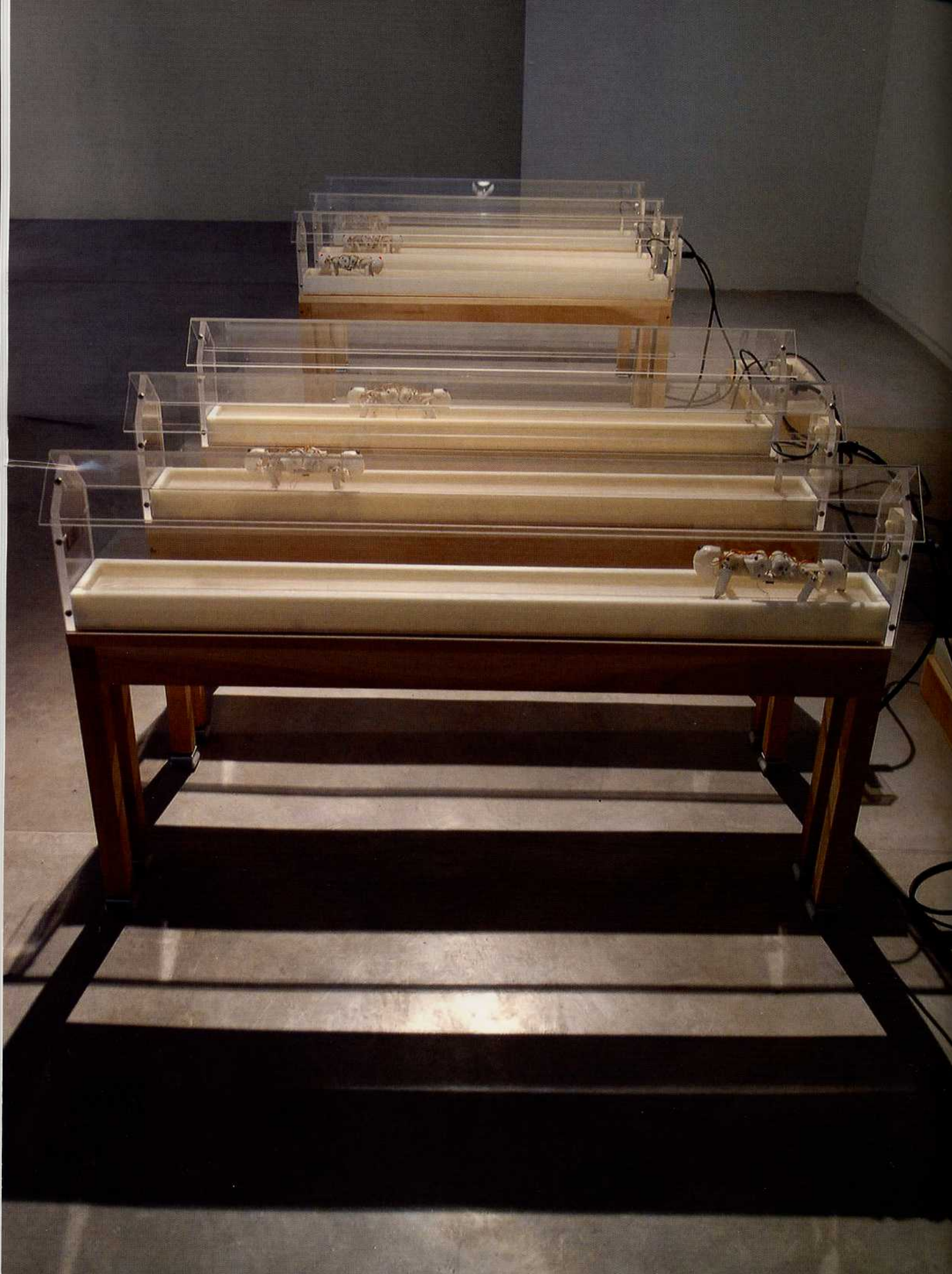
Fernando David Orellana (El Salvador/EE.UU.)

8520 S.W. 27th Pl. v.2, 2004
Escultura robótica
Dimensiones variables
Cortesía del artista

8520 S.W. 27th Pl. consta de seis piezas o esculturas robóticas independientes pero con un mismo funcionamiento. Se trata de una obra que intenta simbolizar el proceso humano de toma de decisiones. Seis robots bicéfalos de apariencia idéntica recorren viviendas individuales y transparentes de construcción tubular, de tipo laboratorio o incubadora. Estas estructuras restringen sus movimientos a un desplazamiento lineal, hacia adelante y atrás. Unos sensores regidos por un algoritmo de números aleatorios e instalados dentro de cada pieza controlan los recorridos de los robots: hacia delante, hacia atrás o una cuasi inmovilidad vacilante. Unas luces intermitentes colocadas en sus cabezas indican el esfuerzo que les implica definir sus acciones. *8520 S.W. 27th Pl.* obtuvo una mención especial del jurado en el Concurso Internacional sobre Arte y Vida Artificial, Vida 8.0, organizado por Fundación Telefónica en 2005.





Fernando David Orellana

Born in El Salvador in 1973.

Due to political reasons, his family had to emigrate to the United States when Fernando was just six years old. He is a remote descendent of Francisco de Orellana, who arrived in America in the 16th century with Francisco Pizarro. According to the Orellanas' family history, their distinguished ancestor discovered the Amazon river while looking for a way towards the ocean. While pursuing that enterprise, he found a tribe of extraordinarily tall women. At least, that is what Fernando was told as a child by his parents.

From his years spent in El Salvador, Orellana recalls the constant presence of body guards and an urban landscape dotted with armed men. He claims that his family owned a large extension of land that the state took away from them in the late 1970s. That, together with the fact that his father was a political figure who became the target of a succession of threats, encouraged the family to move to Miami in 1979. For years, the parents forbid their children from talking about their origins or from wearing Salvadorian emblems.

The Orellanas were a well-off family, so they enrolled Fernando in one of the city's best private schools. At the time, Miami did not have the large Latin American community it has today, therefore his colleagues were mostly whites, many of them of Jewish descent. He recalls just one Latin classmate, Óscar, who he talked in Spanish with. He felt like a foreigner, always as if looking in from the outside, and longed for easy communication with the other kids. With the passing of the years, Spanish was relegated to the sphere of the family. That is why he claims that he speaks Spanish like a twelve-year-old boy who never matured linguistically. When he was thirteen, the family visited El Salvador for the first time since they had left. Paradoxically, he also felt a foreigner there, sensing that he did not belong in the country or in its customs. However, he felt that physically he blended in smoothly among the country's population, that in El Salvador he was just like everyone else, with similar looks, similar features, the same colour of skin.

His father had been a painter as a young man, and had been part of the Salvadorian art scene before becoming a businessman. He had a collection of works that he had acquired over the years and that he took with him into exile in the United States. Many years later, on a journey to El Salvador, Fernando saw works by those same artists in a museum. As a child he used to draw all the time, and his father gave him his old painting materials and taught him about composition, textures and other formal issues. It was with his father that he had existential conversations as a teenager about the meaning of art.

When he was eleven or twelve, he was enrolled in painting classes that proved to be unbearable to him. The teacher was academic and traditional, and his classmates much older than him. He was bored to death and soon left. But Fernando continued painting despite that failed experience. Besides, he became an art lover who read artists' biographies and was specially fascinated with Surrealist painters. So, when at the age of sixteen he decided that he would pursue an artistic career, he believed that he was already very old, and that all great painters had developed their vocation when they were much younger.

In 1992, the year he finished secondary school, his family was in a difficult economic situation and he started his university training at the Broward Community College. There, he followed a computer art programme that introduced him into the world of electronic media. The lecturer had set up a computer lab for artistic purposes, where the students could learn to use a number of graphic applications. On his teacher's recommendation, he applied to The Art Institute of Chicago. He was accepted and in 1994 he moved to that city. That same year, his parents separated and his father returned to El Salvador. Since then, Fernando has travelled there regularly.

Fernando says that he was not really aware of the importance of The Art Institute of Chicago until he graduated there. He experimented with various supports, disciplines and media. The students attended the courses they were really interested in, and he took an introduction to video course while continued painting. Meanwhile he thought that it would be worthwhile to acquire some technical skills, and he spent two years learning animation. He was much more interested in the study of movement and kinetics that animation in itself, so he enrolled in a course given by Ken Rinaldo on microprocessors and robotics. He was totally fascinated with the subject and began to study mechanics and later physics. He graduated in 1998 with a major in Art and Technology.

He followed all his studies with the aid of a grant, rounding off his income by working as a waiter. However, a few months before his graduation he managed to get a position at (art)n Laboratory (http://www.artn.com/), the organisation directed by Ellen Sandor, were he would spend the following four years working intensely. He learnt the art trade there, producing his own paintings, sculptures and his first machines that could draw by themselves. Ellen funded and bought some of his works.

In 2004, he completed his master at the Ohio University under the supervision of Ken Rinaldo. During the two years of the programme, he experimented with various techniques and ideas, drawing prototypes of works he would later develop. After that, he worked at the studio of Ann Hamilton, first as project assistant, and later as coordinator. Although he cannot find the right words to explain it, he claims that working with Hamilton had a definite impact on his own art. He currently lectures at Union College. He creates electronic art and paintings, and truly believes now in the existence of a common link between the two media. He lives in Troy, New York.

Selected Exhibitions

Tang Museum of Art, Saratoga Springs, New York, USA, 2007; Glass Curtain Gallery, Chicago, USA, 2006; *Goggle Works*, Reading, USA, 2006; Nova_Space, Chicago, USA, 2005; The Ark, Dublin, Ireland, 2005; Biennial of Electronic Art Perth, Australia, 2004.

Selected Awards

Honorary Mention, Concurso Internacional Arte y Vida Artificial, Vida 8.0, Fundación Telefónica, Madrid, Spain, 2005; Honorary Mention, Concurso Internacional Arte y Vida Artificial, Vida 7.0, Fundación Telefónica, Madrid, Spain, 2004. His works are included in various collections such as the Richard and Ellen Sandor Family Collection Chicago and the Leslie Lerner Collection Kansas City.