

<https://artnodes.uoc.edu>

## ARTICLE

## NODE "POSSIBLES"

# The human body from a biotechnological perspective in art contexts: active space of experimentation in constant transformation

**Dr. Rafael Ortíz Martínez de Carnero**

Architect and Artist. Creative Director and Founder at O+R Studio

Date of submission: January 2023

Accepted in: July 2023

Published in: July 2023

## Recommended citation

Ortiz Martínez de Carnero, Rafael. 2023. «The Human Body from a biotechnological perspective in Art contexts: active space of experimentation in constant transformation». In: Pau Alsina & Andrés Burbano (coords.). «Possibles». *Artnodes*, no. 32. UOC. [Accessed: dd/mm/aa]. <https://doi.org/10.7238/artnodes.v0i32.410379>



The texts published in this journal are – unless otherwise indicated – covered by the Creative Commons Spain Attribution 4.0 International licence. The full text of the licence can be consulted here: <http://creativecommons.org/licenses/by/4.0/>

## Abstract

Over the last three decades, the rise of new conceptualizations around the human body in connection with technology and machines has led to the development of new art practices in parallel with technological advances in the fields of biology, medicine and computing.

This paper examines the human body in art contexts where biotechnology plays a relevant role in the generation of new conceptualizations around the human body topic. Thus, re-contextualized in social and cultural spheres and technical terms, the body will become redesigned, revamped, or augmented through the use of technological advances ranging from plastic surgery to robotic prosthetics.

The human body is our vehicle of direct interaction with the environment. Its modification, alteration or expansion implies a redefinition of the existing limits between our corporality and the environment itself. Not only in the physical sense, but metaphysical and social. Hence, the introduced artists and strategies blur these limits and establish new relations through the body as a physical and social entity. In the search of new boundaries far beyond socio-cultural and natural limitations, they will reach new social, perceptual and conceptual statuses, far beyond aesthetic practices, focusing on the generation of political and social debates.

**Keywords**

art; body; plastic surgery; activism; prostheses; robotics

*El cuerpo humano desde una perspectiva biotecnológica en contextos artísticos: espacio activo de experimentación en constante transformación*

**Resumen**

*Durante las últimas tres décadas, el auge de nuevas conceptualizaciones en torno al cuerpo humano en relación con la tecnología y las máquinas ha llevado al desarrollo de nuevas prácticas artísticas en paralelo con los avances tecnológicos en los campos de la biología, la medicina y la informática.*

*Este artículo examina el cuerpo humano en contextos artísticos en los que la biotecnología desempeña un papel relevante en la generación de nuevas conceptualizaciones en torno al tema del cuerpo humano. Por lo tanto, recontextualizado en las esferas social y cultural, y en términos técnicos, el cuerpo se rediseñará, renovará o aumentará mediante el uso de avances tecnológicos que van desde la cirugía plástica hasta la prótesis robótica.*

*El cuerpo humano es nuestro vehículo de interacción directa con el medio ambiente. Su modificación, alteración o expansión implica una redefinición de los límites existentes entre nuestra corporalidad y el propio entorno. No solo en el sentido físico, sino también en el metafísico y social. Por eso, los artistas y estrategias que se presentan difuminan estos límites y establecen nuevas relaciones a través del cuerpo como entidad física y social. En la búsqueda de nuevos límites mucho más allá de las limitaciones socioculturales y naturales, alcanzarán nuevos estatus sociales, perceptivos y conceptuales, sobrepasando las prácticas estéticas, centrándose en la generación de debates políticos y sociales.*

**Palabras clave**

*arte; cuerpo; cirugía plástica; activismo; prótesis; robótica*

**Introduction**

“By changing his or her body and making it as close to [theirs] wishes..., the...being would in effect change biological time, not to stop or stretch it but to live our biological time intensely” (Andrieu 2007, 66).

The proliferation of theories and practices around the human body and its relationship with technology and machines, during the 20th century and the beginning of the 21st century, has led to new conceptualizations and the development of new forms of artistic expression in parallel with technological progress in the fields of biology, medicine and computing.

The socio political and technological development, in addition to the historical turning points that were the two World Wars, drive the emergence of new political attitudes, new technologies of visualization, and studies of the body that result in the development of paradigms around its conceptualization. Clearly, one of the fundamental facts that has allowed this revolution is access to healthcare. As stated by Anne Marie Moulin, “...the right to healthcare assumes medical advances and developments without comparison. Where monitoring and control of everyday acts of life that surpass anything that would have been imagined before” (2006, 29).

“There is a new sense that one can simply construct the new self that one wants, freed from the constraints of one’s past and one’s inherited genetic code” (Deitch 1992, 167).

As Jeffrey Deitch (1992, 168) pointed out, self-awareness and self-improvement became relevant sociocultural aspects in the 1970s that would become reinforced with the self-image and self-indulgence of the 1980s. This sociocultural context, supported by the increasing development of body-altering techniques, promotes the development of new conceptualizations and widens the perspectives of the self and the human body.

On the other hand, Manfred Clynes and Nathan Kline coined the term *Cyborg* in 1960: “The Cyborg deliberately incorporates exogenous components extending the self-regulatory control function of the organism in order to adapt it to new environments” (27). Later, Donna Haraway in *A Cyborg Manifesto* (1985, 125) establishes, “A cyborg is..., a hybrid of machine and organism, a creature of social reality as well as a creature of fiction. Social reality is lived social relations, our most important political construction, a world-changing fiction”. According to Haraway, in both science fiction and modern medicine we can find examples of cyborgs, as creatures that are simultaneously animals and machines, natural and artificial hybrids: the link between machines and organisms.

This rupture of the traditional limits of the body will lead to new perspectives that will introduce new parameters or redefine previous assumptions around the concept of the human body, such as the exchange of body parts, especially organs and tissues, the development of genetic engineering, the appearance of virtual bodies, and artificial intelligence. On the other hand, the increased ability of visualization and the advances in information computation and programming techniques allow the analysis and observation of the body from new points of view, facilitating data gathering of body details and information.

## 1. The body transformed – surgical modification strategies

In previous decades, physical intervention in the human body in art contexts played a relevant role; in the 1960s with the performance works of the Viennese Actionists<sup>1</sup> and later, Marina Abramovic<sup>2</sup> and Ulay, in the 1970s and 1980s. However, the turning point will come when artists start to substitute physical pain and body limitations that express fragility or humanity with the use of painless medical-surgical precision techniques, where the metamorphosis and variations represent extreme possibilities of technological progress. As Rachel Armstrong pointed out: “These artists witness their own [transformation]... from a position that seems to be outside of their own body...playing the role of both Dr. Frankenstein and his monster...” (1998, 5).

### 1.1. ORLAN

In the case of the French artist ORLAN, the alteration of her own body is carried out through a series of surgical/performance operations. Each operation has its specific performance style constructed around the global concept of Carnal Art.<sup>3</sup> ORLAN started operation performances at the beginning of the 1990s, through a series titled *The Reincarnation of Saint Orlan* in collaboration with Dr. Marjorie Cramer. During the process, ORLAN recites psychoanalytical texts maintaining consciousness. At the beginning of each operation/performance, ORLAN reads aloud the text *La Robe* (The Dress), 1983, from Eugenie Lemoine-Luccioni, a psychoanalyst who collaborated with Jacques Lacan:

“Skin is deceiving...in life one only has one’s skin... there is a bad exchange in human relations because one never is what one has... I never have the skin of what I am. There is no exception to the rule because I am never what I have” (Lemoine-Luccioni 1983, 95).

To complete a full identity change process at every level, when the interventions are finished, ORLAN starts a process of searching for a new name with a publicity agency, and with the collaboration of a lawyer, she will legally register it.

In ORLAN’s works, the body transcends from being an inalterable subject to become simultaneously the space in which a surgical operation and performance will take place. The result of the process, the transformed body, becomes the object for public debates in talks and conferences exploring topics in connection with body ownership, the relationship between patient and doctor in medical contexts and our ability to design our bodies. In essence, questioning the status of the human body as a place for artistic intervention through the rupture of natural limitations and social conventions and emphasizing new possibilities for the human being with the support of technology and medical advances in surgery.

On the other hand, in the ORLAN’s projects, achieving direct control of body transformations can also be interpreted as a form to adapt to the constantly changing social and aesthetic environments. This topic is clearly present in the Korean film, *Time*, 2006, by Kim Ki Duk, in which the characters subject themselves to surgical operations to obtain new looks and identities to improve their personal relations. This way they gain control of a social situation or actively have control of their personal relations through the modification of their bodies and identities.

## 2. The body transformed – biopolitical activism

The birth and popularization of cyberfeminism according to Francesca Ferrando (2016, 180) is connected to the success of Donna Haraway’s *A Cyborg Manifesto*, 1985, and the development of new technologies of communication that support at the same time participation and decentralization stressing multiplicity and connectivity.

In this context, cyberfeminist artistic groups had understood the transformed body as a space for biopolitical activism in relation to new technologies. An example of this type of art projects is the activist and cyberfeminist group subRosa, with projects that focus on the study of the existing relations between sovereignty of the body and society, questioning the development of biotechnology and digital manipulation techniques in the era of globalization. To subRosa, the body, either the human body or animal, is the most valuable product in culture since its inception.

Through participatory and active events, performances, installations and publications, the group develops criticism based on the parameters of production, reproduction, control of productive forces and biopolitical

- 
1. As Piedad Soláns states, for the Viennese Actionism: “The body becomes a territory where creation and destruction takes place, in the topography of the analysis of the limits and the zone of resistance of a subjectivity that, through the vulnerability of the flesh, violently confronts political, social, and technological power” (2000, Fourth Cover).
  2. Abramovic establishes a new type of relationship between the limits of the body and the possibilities of the mind, between the body of the artist/performer and the audience, thereby confronting the audience with the physical and mental limits of the body.
  3. Carnal Art is a self-portrait from the classical point of view but developed with current technology that “...swings between disfiguration and refiguration. Its inscription into the flesh is due to the new possibilities inherent to our age. The body has become a ‘modified ready-made’, no longer seen as the ideal it once represented, not ready enough to be adhered and signed” (Orlan, n.d.).

power. Their projects examine from the social and economic effects to the health effects on art and the medicalization of sex and gender. The subRosa group makes a critique of topics such as organ trafficking worldwide, the use of stem cells and how the female body is used as an object in the biotechnology and plastic surgery industries.

According to subRosa: “In the Biotech Century, women’s bodies have become flesh labs and Pharma-commons: They are mined for eggs, embryonic tissues and stem cells for use in medical, and therapeutic experiments, and are employed as gestational wombs in assisted reproductive technologies” (2008, 221).

One of their projects, *Vulva De/ReConstructa*, 2000, connects directly with surgery practices, as a response to the emergence of private plastic surgery companies marketing campaigns focused on surgical operations involving the vulva and vagina, like vaginal rejuvenation and vaginoplasty. The work consists of a 10-minute video performance, which is moving between the virtual and real planes. Through the analysis and study of the websites of these companies, the group criticizes the marketing style employed by the private medical industry. Emphasizing the omission of information about the practices and the lack of rigor of the pre- and post-operation images and testimonies of women who have supposedly been altered surgically, which emphasize the higher self-esteem and increased sexual pleasure. The use of non-sophisticated microsurgical techniques will bring with it a high risk of damaging these fragile structures of the body (subRosa 2008, 231).

Like other works previously developed in the 70s by feminist artists, *Vulva De/ReConstructa* aims to provoke the debate and disseminate knowledge on issues related to the sexuality of women. Not only raising questions about the use of our bodies as places in which we project signs of power, desire, beauty, health and pleasure but also about their commodification and instrumentalization as subjects of production. SubRosa proposes an act of de-instrumentalization and resistance within the global culture of mass consumption, urging us to reflect on our bodies beyond their enrollment in a legal, medical or social system of gender division.

In a different direction but inside similar contexts, some practices connected to afrofuturism<sup>4</sup> contribute to the introduction of gender and racial issues. The principal difference is that under these practices, as Francesca Ferrando (2016) states, the term human loses its neutrality to be considered historically as a privilege and a status from which many human collectives have been deprived. “For instance, women, people of colours other than white, disabled people and so on...” (Ferrando 2016, 180).

In this way, the work of artists such as Wangechi Mutu or Denenge Akpem involves the development of artworks in which hybrid human

bodies composed of biotechnological elements explore the previously mentioned topics. In the case of Denenge Akpem, through performance installation works such as *Rapunzel Revisited: An Afri-Sci-Fi Space Sea Siren Tale*, 2006, in which she performs as a siren using tentacles made of fiber optic lights.

On the other hand, Wangechi Mutu explores these topics using diverse artistic media being the collage conceptually and technically the base of these projects in which she combines African aesthetics with human, animal, plant and mechanical prosthetic elements generating speculative cyborgian female characters. As Tiffany E. Barber (2016, 12) pointed out through the analysis of Mutu’s collage *Non je regrette rien*, 2007, in relationship with the cyborg topic, these figures and configurations tackle issues and experiences of alienation and dislocation from a racial perspective.

### 3. The body augmented - prosthetic modification strategies

In this case, the body is understood as an artistic workspace through the use of prosthesis.<sup>5</sup> The importance of these types of strategies is not limited to the mere fact that a body can be improved through prosthetic technologies, but rather in exploring relationships in which the body and technology come into direct contact as integrated, fused, reciprocal or even parasitic elements. Thus, the introduction of prosthetics in artistic contexts questions the boundaries between the natural and the artificial, flesh and machine, natural evolution and post-natural evolution, in direct relation with the concept of posthuman subject “... an amalgam, a collection of heterogeneous components, a material-informational entity whose boundaries undergo continuous construction and reconstruction” (Hayles 1999, 3).

Marquard Smith in *The Vulnerable Articulate*, 2006, states that prosthetics, since the late 19th century, have evolved from being invisible body parts to visible parts incorporated into the body based on parameters related to the inclusion and exclusion of an individual in a social environment and not just from a practical or functional perspective. This concept is very important to understand how the technological development of prostheses is accompanied by a conceptual development that will allow their transition from the medical world to the art and design world.

In this regard, there is a transition in the perception of prosthetic devices from being devices that can imitate members aesthetically and technologically emulate specific member movements through mechanisms, to start to be understood as elements that are able

4. Mark Dery coins this term in his essay *Black to the Future*, 1993. “...to refer to the contribution of the black experience to the settings of the upcoming times” (Ferrando 2016, 180-81).

5. The term prosthesis, originally Greek, πρόσθεσις (prosthesis), is normally used in medicine to define the substitution or replacement of a missing body part by an artificial one. In our case, within a framework related to art and technology in contemporary culture, it can be expressed in terms of “...an addition, a replacement, and also an extension, an augmentation, and an enhancement”. (Smith and Morra 2006, 2).

to provide something more that is coming from the technological rather than the natural realm.

One of the most representative examples of the use of prostheses in the contemporary art world is the former American paralympic athlete Aimee Mullins who collaborated in the late 1990s and the early 2000s with two important figures in the art and fashion design world: Alexander McQueen and Matthew Barney.

Mullins made her appearance as a model in the fashion world in the late 1990s, in a photo shoot by Nick Knight for issue number 46 of the British fashion and style magazine *Dazed and Confused*, titled “Fashion-able?”. This issue had fashion designer Alexander McQueen as guest editor, with whom Mullins works in the collection of spring 1999, using prostheses made of wood ash designed by McQueen. According to McQueen: “When I used Aimee [Mullins] for [this collection], I made a point of not putting her in... sprinting legs [prostheses for running]. ...We did try them on but I thought no, that’s not the point of this exercise. The point is that she was to mould in with the rest of the girls.” (2011, 211). The words of McQueen reinforce previously explained concepts in connection with the social inclusion or exclusion of the disabled individual.

In subsequent collaborations with the American artist Matthew Barney, her physical disability is emphasized using different types of artistic prostheses designed specifically for each of the roles played by her through the series of art movies *Cremaster Cycle*, 1994 – 2002.

Particularly in *Cremaster 3*, 2002, Mullins plays different roles around the figure of the apprentice played by Barney. First, as an anonymous character, cutting potatoes while sitting with her prosthetic legs through a device connected to the sole of the prosthesis, in an adjacent room of the Cloud Club Bar, and later in the role of Entered Novitiate, a woman who will become a chimerical divinity, half-woman half-leopard hybrid.

In this case, the specific body features of Mullins, allow Barney, through the use of art-designed prostheses, to emphasize the representative possibilities of “being”, not only as a means to overcome a handicap but also as a way of creating hybrid bodies and characters. According to Smith: “In *Cremaster 3*, Mullins is no longer the generic if individualized figure of sexual athleticism, the cyborgian sex kitten, or the eroticized amputee. Well, she is still all of these things, and explicitly so, but she is also somehow more” (2006, 60).

#### 4. The adapted body - from functional prosthetics to sensitive prosthetics

This section focuses on the use of prostheses in contemporary artistic contexts as a way to expand the possibilities and limits of the body. This expandability is directly related to the technological evolution of

prosthetics, from functional elements capable of replacement and enabling movements to elements that allow sensitivity, making possible the development of independent functions of the original function of the body.

In the 1960s postwar United States, electronic prostheses appeared to enhance the capacity of limb movement. Despite the introduction of electronic devices, prostheses still lacked the ability to sense touch or the existence of the replaced member. It would be in the 1980s with the development of devices for myoelectric prosthetic systems, like the robotic Utah Arm,<sup>6</sup> when there would be a major turning point, since these structures used electronic systems and devices to leverage the capabilities of the body’s nervous system. Subsequent development of prosthetic stimulation through Functional Electronic Stimulation (FES) facilitated the mobility of paralyzed limbs through electrodes connected to non-paralyzed muscles of the body, connected to stimulators embedded in paralyzed muscles.

The development of the previous technologies invites us to rethink the relationship between the senses and their organs. Recently, prostheses designed by Paul Bach-y-Rita at the University of Wisconsin, display examples about the reorganization of the body based on the neural model and not in the body itself, so that the senses are reoriented. As stated by Cartwright and Goldfarb, “Paul Bach-y-Rita...provides a concrete realization of the idea of rerouting the senses by introducing an electrical sensor that interfaces with the tongue and transmits visual information... Bach-y-Rita asserts. ‘You see with your brain’ (2006, 146).

##### 4.1. Stelarc - body expansion strategies through robotic prostheses

Stelarc understands the body<sup>7</sup> from parameters of obsolescence and inability to adapt to the environment and its changes. Therefore, there is a relevant group of his projects in which the use of robotic prostheses in the human body, installing them in his own body, connects directly with the cyborg concept, in which hybridization between the organic and the synthetic is accomplished through different types of symbiotic relationships and implementations between the body and machines. In the development of his works, we also appreciate an evolutionary process that will go from the expansion of the body to almost the dematerialization of the body in its merging with machines.

##### 4.2. Stelarc - the amplified body

Stelarc started to work with robotic prostheses through a series of performances titled *The Third Hand*,<sup>8</sup> which consisted in the incor-

6. “The robotic Utah Arm,..., places electrodes in contact with nerve endings in the amputee’s residual limb.... The wearer is taught to control the device’s motorized movement through nerve impulses triggered in remnant musculature” (Cartwright and Goldfarb 2006, 128).

7. “...the body with this form and with these functions is not adequate, and we should consider its redesigning, its reengineering...” (Stelarc 2005, 228).

8. *The Third Hand* was designed in collaboration with a team of engineers at the Waseda University and the Tokyo Institute of Technology.

poration of a third robotic arm to the body, whose movements were “caused” by electromyographic (EMG) signals from the abdominal muscles of the body. In 1982, at another *Third Hand* event at Maki Gallery in Tokyo, Stelarc used the three hands jointly to write the word *evolution* on a glass panel. According to Jane Goodall: “...he made a defining gesture in more ways than one. Prosthetic extension must involve harmonization and synchrony if it is to lead to a new evolutionary- or postevolutionary” (2005, 11).

In later works within this category as, *Amplified Body*, 1992, a different process of interaction between the machine and the body occurred, a split, in which the body interacted in the performance with an industrial robot. It is important to highlight that in this series of events, the performance was also an installation of structured and interactive lighting activated in response to the electric shocks of the body. Hence, the electrical rhythms of the body were expressed from the inside to the outside; externalized. Externalization is also present in Stelarc’s works where technology inserted in the body, as internal prosthesis, projects data to the outside, as was the case of *Stomach Sculpture*, 1993.

### 4.3. Stelarc - the parasitized body by external agents

Stelarc also explores the possibilities of expansion of the body through its connectivity with external elements like computer networks and the internet. Stelarc sees the potential of the internet as a driver of “...powerful individual and collective strategies for projecting body presence and body awareness... it generates new collective physical couplings and a telematic scaling of subjectivity. What becomes important is not merely the body’s identity, but its connectivity...its interface” (Stelarc 1998, 66).

In these cases, the body is occupied and activated by external agents such as other bodies, information, or data. At first, Stelarc explores the possibilities of interaction between a body and other bodies or parts of bodies that are in different places, therefore, the body finds its awareness and action through these multiple interactions. With this approach, the most complex body would function as a “host” of a series of external remote agents with different physiologies and locations. Thereby, a task can start with a body in one place and be completed by another body elsewhere, becoming a medium for the manifestation of remote agents.

In the work *Ping Body/Proto-parasite*, 1995, for the *Telepolis* event at the Centre Pompidou, Paris, visitors from 3 different locations: Centre Pompidou, The Media Lab in Helsinki, and the *Doors of Perception* conference in Amsterdam, have the ability to remotely access and actuate on Stelarc’s body located in Luxembourg. The system is activated using a touch screen interface connected to a muscle stimulation system. Moreover, the system is equipped with an ISDN, Integrated Services Digital Network, that captures the links and allows the body, in Luxembourg, to see the face of the person who is activating the body while programmers can remotely see the choreography. Another feature of the project is the control of body stimulation. On the one hand, the

muscle stimulator located in Paris controls the left side of the body, and Stelarc in Luxembourg controls the right side.

The evolution of this project culminated with the establishment of a body, arbitrarily controlled by data collected on the internet, resulting in the work, *Ping Body- an Internet Actuated and Uploaded Performance* (1996) for the *Digital Aesthetics* event in Sydney and later for DEAF (Dutch Electronic Art Festival) in Rotterdam the same year. In this performance, body stimulation, instead of being activated by other “bodies” in different locations, was done through signals created by data generated by internet activity that triggered the development of the choreography in the performance.

The body movements were amplified through a MIDI interface that calculated the position, proximity and bending angles of the limbs. The body, activated through internet data, was uploaded to the network as information and images on a web page to be accessed by the public. Therefore, reversing the relationship between the body and the internet. In this case, the internet becomes not only a medium of transmitting information but a way of “...transduction - affecting physical action between bodies: electronic space as a realm of action rather than information” (Stelarc 1998, 69). As a consequence, the body could be understood as a prosthesis for the development of the activity of an agent or artificial external agents.

## Conclusion

The human body, throughout history and in parallel with technological advances, has expanded, outsourced, and subordinated some functions in relation to its environment through the incorporation of machines and devices, that to some extent could be considered prosthetics from their capacity to replace “natural” body functions artificially. As Stelarc asserts, “The body has always been a kind of prosthetic body coupled to its technology” (2005, 232).

In this way, artistic practices with biotechnological approaches have understood the human body, from a posthuman perspective, as a place for self-experimentation in terms of redesign, transformation and extension far beyond its biological limits and in a constant search for new transformational capacities.

Although medical and surgical advances allow aesthetic modifications of the body, the current technological developments have still not reached levels of sophistication that favor the introduction of constant or endless modification or to generate a radical rupture of the body unity, specially ruptures between body and mind. The human body is a cerebral entity, phenomenological, conscious, and operative with no separation between body and mind. At some degree, the body is subjugated and limited by its difficult to modify temporality and spatiality as a living being.

On the other hand, from a sociocultural context perspective, there is an increasingly public exposure of the human body together with

the exponential development of social networks, which supposes its constant public evaluation and aesthetic criticism. According to Peter Pál Pelbart (2016, 193), our present time is characterized by the predominance of the body for the generation of identity and the reduction of subjectivity to the body. He states that the body is adapting to the culture of spectacle according to the celebrity model and defines this conceptual model as a “fascist body”, “... , since, facing this unreachable model, a large part of the population is thrown into a condition of sub-human inferiority” (2016, 194), suggesting the protection of the human body not only from interventions, mutilations and aesthetic modulations but also from bioinformatics digitization.

## References

- Andrieu, Bernard. “Embodying the Chimera: Biotechnology and Subjectivity”. In: Eduardo Kac (ed.). *Signs of Life: Bio Art and Beyond*, (2007): 57-68. Cambridge: The MIT Press.
- Armstrong, Rachel. “What is Sci-Fi Aesthetics?”. In: Rachel Armstrong (ed.). *Art & Design Magazine: Sci-Fi Aesthetics*, (1998): 2-5. London: Academy Editions Ltd.
- Barber, Tiffany E. “Cyborg Grammar? Reading Wangechi Mutu’s Non je ne regrette rien through Kindred”. In: Reynaldo Anderson and Charles E. Jones (eds.). *Afrofuturism 2.0: The Rise of Astro-Blackness*, (2016): 3-26. Lanham: Lexington Books.
- Cartwright, Lisa and Brian Goldfarb. “On the Subject of Neural and Sensory Prostheses.” In: Marquard Smith and Joanne Morra (eds.). *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*, (2006): 125-54. Cambridge: The MIT Press.
- Clynes, Manfred and Nathan S. Kline. “Cyborgs and Space”. *Astrotechnics*, (1960, September): 26-27, 74-76.
- Deitch, Jeffrey. “Post Human, 1992”. In: Dan Byrne-Smith (ed.). *Science Fiction. Whitechapel: Documents of Contemporary Art*, (2020): 167-74. Cambridge: The MIT Press.
- Ferrando, Francesca. “A Feminist Genealogy of Posthuman Aesthetics in the Visual Arts”. In: Dan Byrne-Smith (ed.). *Science Fiction. Whitechapel: Documents of Contemporary Art*, (2020): 180-82. Cambridge: The MIT Press. DOI: <https://doi.org/10.1057/palcomms.2016.11>
- Goodall, Jane. “The Will to Evolve.” In: Marquard Smith (ed.). *Stelarc: The Monograph*, (2005): 1-32. Cambridge: The MIT Press.
- Haraway, Donna. *A Cyborg Manifesto*, 1985. In: Jeffrey Katsner (ed.). *Nature. Whitechapel: Documents of Contemporary Art*, (2012): 124-29. Cambridge: The MIT Press.
- Hayles, N. Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999. DOI: <https://doi.org/10.7208/chicago/9780226321394.001.0001>
- Lemoine-Luccioni, Eugénie. *La Robe. Essai psychanalytique sur le vêtement*. Paris: Seuil, 1983, 95.
- McQueen, Alexander. *Alexander McQueen: Savage Beauty*. In: Andrew Bolton (ed.). (2011): 211. New York: The Metropolitan Museum of Modern Art. New Haven: Yale University Press.
- Moulin, Anne Marie. “El Cuerpo frente a la Medicina.” In: Jean-Jacques Courtine, et al. (eds.). *Historia del Cuerpo. Volumen 3: Las Mutaciones de la Mirada. El Siglo XX*, (2006): 29-88. Madrid: Taurus.
- Orlan. “Manifesto of Carnal Art”. *Orlan*, (n.d.). [Accessed: 5 May 2016]. <https://www.orlan.eu/texts/>
- Pelbart, Peter Pál. “Life and Death in the Context of Biopolitical Domination, 2014.” In: Dan Byrne-Smith (ed.). *Health. Whitechapel: Documents of Contemporary Art*, (2020): 192-99. Cambridge: The MIT Press.
- Smith, Marquard. “The Vulnerable Articulate: James Gillingham, Aimee Mullins, and Matthew Barney.” In: Marquard Smith and Joanne Morra (eds.). *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*, (2006): 43-72. Cambridge: The MIT Press.
- Smith, Marquard, and Joanne Morra. “Introduction.” In: Marquard Smith and Joanne Morra (eds.). *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*, (2006): 1-14. Cambridge: The MIT Press.
- Soláns, Piedad. *Arte Hoy - Accionismo Vienés*, Fourth Cover. San Sebastián: Nerea, 2000.
- Stelarc, and Marquard Smith. “Animating Bodies, Mobilizing Technologies: Stelarc in conversation.” In: Marquard Smith (ed.). *Stelarc: The Monograph*, (2005): 215-46. Cambridge: The MIT Press.
- Stelarc. “Parasite Visions: Alternate, intimate and involuntary experiences.” In: Rachel Armstrong (ed.). *Art & Design Magazine: Sci-Fi Aesthetics*, (1998): 66-69. London: Academy Editions Ltd.
- subRosa. “Common Knowledge and Political Love.” In: Beatriz Da Costa and Kavita Philip (eds.). *Tactical Biopolitics: Art, Activism, and Technoscience*, (2008); 221-42. Cambridge: The MIT Press. DOI: <https://doi.org/10.7551/mitpress/7494.003.0023>

## CV

**Dr. Rafael Ortiz Martínez de Carnero**

Architect and Artist. Creative Director and Founder at O+R Studio

[oplusrstudio@gmail.com](mailto:oplusrstudio@gmail.com)

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

He is an architect, 2007, and director of O+R Studio, who is based in Shanghai and Seville since 2013. He has worked as Architect at Vito Acco-nci Studio in New York and as Project Manager at AS. Architecture-Studio at Shanghai. He holds a master of Science in Architecture from the Pratt Institute, New York, 2009 and an International Doctorate, from the Univer-sity of Seville, 2017. His research focuses on the study of design strategies at the intersection between nature and technology and the impact they produce on society, the landscape and territory, from an interdisciplinary approach that encompasses art, architecture and urban design.

He has held individual and collective exhibitions in Seville (2023, 2021, 2018, 2007, 2006), Termoli (2023), Gimpo (2023), Cádiz (2018), Shanghai (2013, 2012), Toledo (2011), and New York (2009). Parallel to the activity of his studio, he has been programme leader and lecturer for the University of Derby (U.K) in China and professor at the Raffles Design Institute (Sin-gapore) in China, the University of New Haven (U.S.A) and the University of Seville, in Spain. He was also a speaker at the Institute for the Study of International Expositions (2022), Kyoto University of the Arts (2022), University Institute of Lisbon (2021), University of Seville (2020, 2017), Leibniz Universität Hannover (2020), Shanghai Architects Fair (2014), and the Southeast University (2013).