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Approaching Transhumanism: On How Human Beings Transform in the 21st Century

The following article is to introduce the reader into a cultural and intellectual movement whose aim is to identify the need for improvement in human life in the sphere of physicality as well as mentality with the aid of modern technologies – transhumanism. With the dramatic change in the perception of technology, transhumanist welcome the opportunity to improve cognitive skills, help to perpetuate human happiness, or increase longevity. Although the opponents of the transhumanist thought dismiss it as “the world’s most dangerous idea,” the adversaries advocate that the alternation of human form is both practical and reasonable. With the use of modern technology, enthusiasts of transhumanism try to prove that the human body needs to be re-invented in order to transcend the natural limitations. In my work I will try to tackle the problem of human body being currently subject to gradual transition from *Homo Sapiens* to *Robo Sapiens*, the process of ‘becoming’ a cyborg. By incorporating bodily augmentation, contemporary artists such as Stelarc or Neil Harbisson cast a light on the change of physical form, as well as the definition of being human. Evoking much controversy, transhumanism brings a completely new dimension to the understanding of the current human condition.

key words: transhumanism, posthumanism, Stelarc, transformation, Neil Harbisson

*O, wonder!
How many goodly creatures are there here!
How beauteous mankind is!
O brave new world,
That has such people in't!*

Shakespeare, *The Tempest*

One of my most disturbing, and vivid at the same time, childhood memories is that of me watching for the first time a genuine cult classic – *Robocop*. Although the film does seem a bit banal for my taste right now, I perfectly remember the initial scene of Alex Murphy’s assassination: his limbs being shot off, his body lying motionless on the concrete, the feeling of utter horror creeping over me and resulting in watery eyes. But then, after getting through this perturbing scene, I was able to witness the birth of Robocop itself; dreadfulness was supplanted by astonishment at the creation of a human-resembling machine which cannot be affected by the process of ageing nor any disease. For me back then, the alternation of human body to such an extreme appeared so surprising and futuristic that it nearly bordered on scientific, yet unattainable, miracle. Years passed by and I have kept a watchful eye on curious and at the same time awe-inspiring instances of employing high technology in order to improve the human

condition – either people handicapped due to tragic accidents, like an individual with an electric arm in place of his lost limb; or affected by minor misfortunes, for example an eccentric with prosthetic finger fitted with USB. By the same token, one may conclude that man is subject to transformation which, by affecting our body, influences the meaning of being human and has a bearing on the relation between mankind and its surroundings. The aim of this article is to briefly introduce the reader into transhumanism, as well as to illustrate the ways in which the human body is currently being subject to the gradual transition from *Homo Sapiens* into “*Robo Sapiens*,” or cyborgs; more importantly, I would like to highlight that the alternation does not only affect physical features, but also the mere definition of being human. In order to demonstrate how the idea of *transhumanism* is internalized, I will reflect on two artists who decided to augment their body to advocate the need of transcending the natural limitations.

Living in the age of nanotechnology and genetic engineering, we cannot deny the fact that the meaning of being human changed significantly over the period of centuries. Since the use of new technologies allows for the augmentation of the human body, we have now entered the age in which man is able to enhance his physical capacities, combat diseases, slow down the process of ageing or redesign future generations. For numerous scholars, this significant change involves the dusk of humanism and at the same time the dawn of what comes after humanism; bearing in mind how man’s capacities can be boosted nowadays, it seems a right statement to make that one will not simply remain human, but rather will eventually evolve into something more – he or she will become *posthuman*. Enthusiasts of posthumanism – *transhumanists* – who believe that the 21st century should not constitute the endpoint of evolution, welcome the possibility of using science and technology for humankind to gain greater capacities than we have at present and to achieve the posthuman condition (Bostrom). Tirosch-Samuelsen observes that in the age of posthumanism, man will not be controlled by nature any longer, but will become the one who exerts control over nature (20).

The term *transhumanism* was coined by Julian Huxley in 1957 and first appeared in his essays *New Bottles for New Wine*. Huxley advocated the emergence of a fulfilled society, entirely committed to the development of human species through planning and controlling the evolution. Max More, who formalized the doctrine in 1980s, accounts for transhumanism in the following words:

Transhumanism is a class of philosophies that seek to guide us towards a *posthuman* condition. *Transhumanism* shares many elements of humanism, including a respect for reason and science, a commitment to progress, and a valuing of human (or transhuman) existence in this life rather than in some supernatural “afterlife.” *Transhumanism* differs from humanism in recognizing and anticipating the radical alterations in the nature and possibilities of our lives resulting from various sciences and technologies such as neuroscience and neuropharmacology, life extension, nanotechnology, artificial ultraintelligence, and space habitation, combined with a rational philosophy and value system.

Bearing in mind the essence of the term “transhumanism,” the movement has to be recognized as a multidisciplinary study that draws on academic subjects considered by many traditional disciplines like philosophy, cultural studies; as well as modern fields of study concerned with technology such as biotechnology, information technology, etc. By the look of it, the combination of liberal arts and hi-tech appears to constitute a truly extraordinary novelty in a world of well-established conventions. Attaching high importance to the human condition, the transhumanist thought has for the last two decades been developing to become a paradigm for thinking about the future of human beings.

Idealistic as it seems, transhumanism identifies the need for improvement in human life in the sphere of physicality as well as mentality with the aid of modern technologies. Huxley's call for mankind to "transcend itself – not just sporadically . . . but in its entirety, as humanity" resulting in "man remaining man, but transcending himself, by realizing new possibilities of and for his human nature" (qtd. in Tirosch-Samuels 17) ceases to be just an utopian dream the moment one realizes that transhumanism helps us to comprehend the surrounding world in a more complete way, to grasp the dimensions which were impossible to explore in the past. It seems that one of the ways to discover the capacities of our body and senses may be through entertaining new technologies and transforming into a cyborg.

Although the transhumanist doctrine was formulated only in the 20th century, it is hard to state at what exact point in the history of human thought the idea of a cybernetic organism was formed: was it in ancient myths and stories emphasizing the improvement of appearance, strength and mental competences? Or maybe it was the influence of Shelley's *Frankenstein*, the Romantic version of the myth of technology? The transhumanist interest in human body is not merely a contemporary trend; through centuries the human being has been a predominant theme in the arts: ancient Greeks marked their search for perfect physical proportions in their solemn statuesque sculptures, great masters of Renaissance expressed their predilection for classic symmetry in paintings, pop culture artists promoted portraits of idealized icons such as Marilyn Monroe. The fact that the topic reappears throughout the ages implies that the fascination for improving human body and brain is deeply rooted in one's (sub)consciousness. Contemporary transhumanist artists perceive human nature as capable of being remoulded, they explore the ways in which electronic devices (among other things) may be incorporated into human body not only to redefine the definition of being human, but also to examine new ways of comprehending the world.

The vast majority of people associate the concept of cyborg solely with the science fiction genre; in countless books and films cyborgs constitute a product of certain merger, a combination of machine and human body parts, usually deprived of feelings and emotions. The cyborg is a creature that fills common people with awe, as they do not understand its functioning and otherness. Currently, some artists aim at breaking the negative stereotype, spreading awareness of cyborgs through various artistic media and exhorting others to transform into cyborgs; they ask the question of what it means to be normal, to be "us" as opposed to "them," which seems crucial in the 21st century.

In her "Cyborg Manifesto," Donna Haraway blurs the traditional distinctions between humans and machines as well as humans and animals, defining a cyborg as "a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction" (291). Combining the living and the mechanical, the binaries of human vs. nonhuman, technology vs. biology, divine vs. man-made, subject vs. object are broken. For Haraway cyborgs are "disassembled and reassembled, postmodern collective and personal self" (302); being in the continuous state of transgression between the human and the mechanical, they escape gender difference. The omnipresence of electronic devices in our life forces us to form a question regarding the exact moment of becoming a cybernetic organism: is it a transformation we are still waiting for? or maybe we have already incorporated the transhumanist doctrine without even acknowledging it? For Andy Clark, a philosopher and a cognitive scientist at the University of Edinburgh, the transformation into a cyborg is not solely achieved through bodily augmentation:

My body is an electronic virgin. I incorporate no silicon chips, no retinal or cochlear implants, no pacemaker. I don't even wear glasses (though I do wear clothes). But I am slowly becoming more and more a Cyborg. So are you. . . . Perhaps we already are. For we shall be Cyborgs not

in the merely superficial sense of combining flesh and wires, but in the more profound sense of being human-technology symbionts: thinking and reasoning systems whose minds and selves are spread across biological brain and non-biological circuitry. (3)

Clark's statement constitutes a powerful comment on the contemporary society, a statement difficult to argue with. The ubiquity of technology in our lives results in gradual addiction to both gadgets and applications, which involuntarily become a part of our cybernetic identity.

One of the artists who follow the idea of transhumanism is the Australian performer Stelarc. Born as Stalios Arcadiou in 1946 in Cyprus, he focuses mainly on the ways the abilities of human body can be extended through the use of technology. Considering human body obsolete both in form and function for its lack of efficiency and durability, Stelarc appeals for it to "transcend" its evolutionary limitations" (qtd. in van Zyl 22). The artist however rejects the idea of designing a blueprint for a utopian body; instead, he speculates on "ways that individuals are not forced to, but may want to, redesign their bodies – given that the body has become profoundly obsolete in the intense information environment it has created" (Stelarc, "Extended-Body"). What must be highlighted at this point is that Stelarc's statement concerning the body's obsolescence is not a proclamation of its death, but rather a call for its improvement and exploiting its potential. As Massumi puts it, "the body obsolescence is the condition of change" (109), and is not the change necessary for the evolutionary progress to take place.

In his performances, the artist objectifies his own body referring to it as "the body" instead of "my body," which is often criticized by feminists (qtd. in Jones and Sofia 59); however, the usage of third person singular seems to be essential, as it distances Stelarc from his physicality and simultaneously transforms him into both an artist and an artistic creation. As he claims:

the body is an impersonal, evolutionary, objective structure. Having spent two thousand years prodding and poking the human psyche without any real discernible changes in our historical and human outlook, we perhaps need to take a more fundamental physiological and structural approach, and consider the fact that it's only through radically redesigning the body that we will end up having significantly different thoughts and philosophies. I think our philosophies are fundamentally bounded by our physiology; our peculiar kind of aesthetic orientation in the world; our peculiar five sensory modes of processing the world; and our particular kinds of technology that enhance these perceptions. (Stelarc)

Being an obsolete form which needs to be altered, extended and redesigned in order to align itself to technological environment in which it finds itself, the body constitutes the main topic of Stelarc's, to many shocking, performances. His artistic activity concentrates on the process of "becoming," the integral part of the natural cycle of human development – "the ever-transforming, the ever-recontextualizing what has been done so that it can be done differently" (Grosz 193). In order to improve the imperfect body, Stelarc employs modern technology and robotics establishing the connection between the human and non-human. One of Stelarc's most famous projects involves the attachment of the robotic Third Hand. Positioned to his right arm, the Third Hand was capable of independent motion through signals sent via electrodes placed on Stelarc's abdomen and thigh muscles; the robotic hand could pinch, grasp, release and rotate. The Third Hand was used during performances taking place between 1980 and 1998 in Japan, the USA, Europe as well as Australia and became one of the best-known performance objects used by the artist. Initially, it was designed as a semi-permanent extension of the body, however due to skin irritation and considerable weight of the equipment, it was used only during performances. As we can learn from Stelarc's numerous comments, the Third Hand performances explored the

intimate interface of technology and augmentation; it stands for an addition to the body rather than a replacement for a missing limb: “[a] prosthesis is not a sign of lack, but rather a symptom of excess,” we can read on the artist’s official website. Thus, the robotic arm was not meant to replace, but to transcend the limits imposed by the organic, mortal body with only two arms, and add to body’s functionality; by combining organism and machine, Stelarc contributes to cyborg discourse in terms of exploring the complex relations between body, machine, self and agency (Clark 117).

In *Fractal Flesh*, a performance from 1995 at Telepolis art and technology festival organized in Luxemburg, Stelarc plugged the body to a muscle-stimulator connected to the Internet. Participants at Centre Pompidou in Paris, Media Lab in Helsinki, and Doors of Perception conference in Amsterdam were able to access Stelarc’s body with the use of touchscreens and through gestures cause Stelarc’s both arms and one leg to move involuntarily; the artist himself was able to control only a part of his body. The artist explained that in this performance he speculates about

the idea of the cyborg not simply being a cyborg individual body . . . the cyborg becomes a sort of cyborg-system of a multiplicity of bodies spatially separated but electronically connected – the Internet perhaps as an external nervous system that connects these operating nodes, and allows for an extended operational system to come into being. (qtd. in Kreps 78)

Remotely accessed and activated, the body becomes possessed by somebody else. Through his performance, Stelarc extends his own nervous system into the non-biological space, exploring new possible collaboration and intimacy provided by the cyborg technology; Clark calls Stelarc’s vision positive and liberating as self-exploration with the use of hi-tech enhances the sense of our own presence and the awareness of others (118). Stelarc himself highlights the importance of technology in human life, explaining that:

Technology has always been coupled with the evolutionary development of the body. Technology is what defines being human. It’s not an antagonistic alien sort of object, it’s part of our human nature. It constructs our human nature. (Stelarc)

As he explains on his homepage, his projects and performances explore the body as an alternative anatomic architecture; he further pinpoints that:

With gene mapping, gender reassignment, prosthetic limbs and neural implants, what a body is and how a body operates becomes problematic . . . It is time to question whether a bipedal, breathing body with binocular vision and a 1400cc brain is an adequate biological form. It cannot cope with the quantity, complexity and quality of information it has accumulated; it is intimidated by the precision, speed and power of technology and it is biologically ill-equipped to cope with its new extraterrestrial environment. (“Stelarc Early Texts”)

Stating that the biological body lacks organization, Stelarc seeks alternative anatomical architecture. In his *The Ear On Arm* project, which required two surgeries, the artist permanently reshaped his body by implanting a cell-cultivated ear onto his left forearm. This prosthetic attachment fused with his organic arm and by developing its own blood supply become an independent entity. Stelarc’s project included also positioning a microphone inside the ear, however due to subsequent infection, it had to be removed. The next step of *The Ear on Arm* project is to reinsert the microphone and connect it to the wireless transmitter so that it becomes Internet enabled; as a result, the audience visiting Stelarc’s website will be able to hear everything that he hears. For Stelarc, the ear will transform into an engineered Internet structure,

“an available, accessible and mobile organ for other bodies in other places, enabling people to locate and listen in to another body elsewhere” (“Ear on Arm”). The overall goal of this particular project is to draw attention to the importance of body’s connectivity as opposed to its identity, interface or location.

The artist seeks to free the body from gravity and extend it beyond the constraints of skin or physical space. Experimenting with alternative exhibition spaces, Stelarc’s work from 1993 centres around a sculpture made of titanium, steel, silver and gold which was situated in his stomach. To make it more challenging, the sculpture – a domed capsule of fist size – extends and retracts emitting light and sound. The act of introducing the sculpture to Stelarc’s organism, documented with the use of endoscopy equipment, was, according to the artist, the most dangerous performance he has ever done with his internal organs being at risk of rupture during the insertion of the piece. With the artwork inside the body, it “becomes hollow with no meaningful distinction between public, private and physiological spaces. The hollow body becomes a host, not for a self or a soul, but simply for a sculpture” (Stelarc). With the invasion of the human body, considered to be the sacred habitat of the spirit, Stelarc deprives the body of the essence of humanity – the soul. Perhaps, however, blurring the distinction between the external and the internal, the sacred and the profane, may be read as a modern critique of the humanists’ establishing themselves in an antagonistic relation with their surroundings; the posthuman / transhuman body is not considered opposed to the world, but, rather, recognizes its immersion in the technological world.

Amelia Jones, art historian and art critic, insists that claims made by Stelarc constitute merely masculine denials and desires to simply escape the body (Fisher 184), however one may disagree with this statement. Taking into consideration that the transhumanist belief in the technology is based on the idea of transcending the biological givens, including sex and gender, Stelarc’s work cannot be simply treated in terms of feminine or masculine ideology. Above all, his performances ought to be regarded as avant-garde manifestos which taken literally lose their poetic meaning. Additionally, distancing from “the body” and transcending its boundaries does not destitute a purely masculine domain as some female artists, including the icon of French contemporary art, Orlan, are in agreement with Stelarc arguing that human body is indeed obsolete. Stelarc’s moving beyond skin as a barrier and rupturing the surface of his body is to prove that skin is no longer a closure, but rather an entity surrounding the empty spaces of human body, a body which needs to be recolonized.

While Stelarc’s exploration of flesh and machine is purely artistic, the second artist I am willing to discuss in this article began his interest in incorporating electronic devices into his body for more practical reasons. Born with achromatopsia – a visual disorder characterized by the inability to perceive colours other than black, white and shades of grey – the British-Catalan artist Neil Harbisson has lived most of his life in a grayscale-world. Fascinated by the very concept of colour, Harbisson studied fine arts and was given a special permission to paint with black and white exclusively. Under the impression of Newton’s idea of colours corresponding to the musical scale, Harbisson came up with the idea of “translating” colour frequencies into sound frequencies. With the help of Adam Montandon they commenced the “eyeborg project,” which aimed at creating a cybernetic device able to pick up colours and transform them into sounds. The initial outcome of the project was a camera installed on Harbisson’s head connected with headphones in which he could hear the emitted sounds, and a laptop-sized computer set that Harbisson had to carry in a backpack at all times. Seeking further improvements, the artist decided to collaborate with a software engineer. The result of their co-operation was a chip subsequently installed inside Harbisson’s skull; by pressing against his head, it produces audible

sounds noise Harbisson is able to hear through the bone conduction. The device is currently being charged with the use of USB cable attached to the back of Harbisson's head; however, the next goal is to substitute the source of energy:

One of the next stages is to find a way of charging the chip with my own body energy, so I might be using blood circulation or my kinetic energy – or maybe the energy of my brain could charge the chip in the future. That's one of the next things; to be able to charge the chip without depending on any external energy. (Harbisson "Cyborg")

Similarly to Stelarc's *Ear* which transformed into an independent entity, Harbisson attempts for his eyborg to become completely autonomous; eliminating the need to supply the eyborg with electricity would allow Harbisson to unite with the device to a yet higher extent.

Harbisson describes himself as a cyborg due to the augmentation of his body with a cybernetic device; interestingly, he does not perceive the eyborg as an artificial prosthesis, but rather as an integral part of his body that helps him to comprehend the surrounding world in a more accurate way. Nonetheless, he is far from claiming that the process of becoming a cyborg was a straightforward, sudden transformation:

Feeling like a cyborg was a gradual process. First, I felt that the eyborg was giving me information, afterwards I felt it was giving me perception, and after a while it gave me feelings. It was when I started to feel colour and started to dream in colour that I felt the extension was part of my organism. (Harbisson "Cyborg")

As he admits, it is rather the union of brain and software than of electronic eye and his head that made him feel cyborg. With eyborg being his lifetime project, Harbisson confesses that he does not even remove the device for sleep or shower. In 2004, faced with the necessity of renewing his UK passport, Harbisson was met with firm refusal to do so for his passport photo presented him wearing his eyborg antenna, an electronic device not allowed on a passport photo. After a tedious battle with UK officials and many letters from his doctor, friends and himself, in which they insisted that the eyborg should be considered an integral part of his body, Harbisson was finally allowed to have this particular photo of him wearing eyborg in his passport. By the same token, he became the first person in the world being a government-recognized cyborg – he accomplished something that seemed almost impossible. The acknowledgement of Harbisson's being a cyborg changes the position of other people using cybernetic equipment as an augmentation of their senses; being previously denied access to certain public spaces for security reasons, cyborgs may now exercise their legal rights to use their devices on a daily basis.

Similarly to Stelarc, Harbisson employs modern technology in performances and uses his state create art. However, whereas the former artist is mainly interested in removing limitations imposed by the skin and extending his body through elaborated prostheses, the latter focuses on extending senses with only minimal interference in body's architecture. Intending to merge vision and hearing, his projects include transforming colours into sounds and vice versa as well as exhibiting colours of music; by connecting eyborg to loudspeakers he is capable of producing sound portraits from audience or creating paintings from sounds:

I've created Martin Luther King and Hitler in colour from their speeches and I've showed the result to people and asked them to guess which one's which. And people usually get them wrong. Hitler's appears very colourful because he used a wide range of frequencies in his speeches whereas Martin Luther King's speeches have dominant colours such as different shades of blue and purple. ("Neil Harbisson")

By the look of it, this particular experiment involving vision and sound may constitute a solid proof of the fallibility of our perceptive skills and, at the same time, a tentative call for improving our cognitive faculty; if senses are the primary source of knowledge, convergence of technology and information science in order to extend senses would in consequence extend our knowledge.

The optimistic vision of transhumanism as a remedy against human imperfections represented by Harbisson is rashly criticized by some of the critics in terms of ethics. In his book titled “Our Posthuman Future: Consequences of the Biotechnology Revolution,” Francis Fukuyama – a political scientist and political economist – questions both social and moral consequences of transhumanism. To Fukuyama, transhumanism is likely to result in humanity’s alternation out of all recognition – incorporating machines into body foreshadows the creation of a monstrous hybrid as well as the rise of new social hierarchies. If one starts to transform oneself into something superior, what social rights will augmented individuals claim compared to those who were left behind? Fukuyama calls transhumanism “the world’s most dangerous idea”; however, what he does not realize is the fact that the desire to transcend the limitations of human body is not uniquely a 20th century trend, but rather a pan-cultural and pan-historical phenomenon; as Andy Clark points, humans have always tried to enhance themselves not only through basic tools, but also language (qtd in. Devlin 25). Bearing that in mind, we cannot inhibit that deeply rooted drive to improve the human condition. Yet, some opponents of transhumanism hold even more radical opinions. Bill McKibben, an American environmentalist, strongly protests against any activity that would result in unethical human enhancement: “We need to do an unlikely thing: we need to survey the world we now inhabit and proclaim it good. Good enough...Enough intelligence. Enough capability. Enough” (qtd. in Devlin 19); however, he fails to notice that transhumanism and the idea of improving the human condition cannot be proved unethical in their nature. While McKibben dismisses transhumanism as unnecessary, Harbisson in his TED Talk encourages people to make use of technological innovations in order to improve their perception:

I think that life will be much more exciting if we stop creating applications for mobile phones and start creating application for our own body. I think that it will be a big change that we will see during this century. (Harbisson “I Listen to Color”)

His endeavours to change the world are not merely an idle platitude. In 2010 Harbisson established the “Cyborg Foundation” whose objective is to help individuals in becoming cyborgs as well as to protect their rights. Believing that cybernetic extensions should be treated as body parts, “Cyborg Foundation” supports projects that aim to enhance perception; one of them involves adding sensors to the back of person’s head, so that it vibrates when someone approaches them from behind.

Harbisson’s dream is for mankind to cease creating technology and to become technology and with the trend of bodily intervention being quite popular these days, it does not seem extremely far-fetched. With rapid scientific progress, will the 21st century see the rise of Nietzsche’s *Übermensch*? For Vita-More, a transhumanist artist, individuals improving their body obtain beneficial results, which in turn proves that altering human form is practicable; she asserts that the opponents of the idea must reconcile with the forthcoming era of *robo sapiens* substituting *homo sapiens* for the fact that duplicating the mind seems now probable, and that extending life needs to be considered feasible (Vita-More 70).

Transhumanism, although currently a marginal movement, through its interdisciplinary nature constitutes a fertile ground for the discussion of current limitations and future liberation of

human form. Evoking much controversy, it does bring a completely new dimension to the understanding of the current human condition, which is considered by Max More merely a transitional stage between our animal heritage and posthuman future (qtd. in Tirosh-Samuels 23). The use of biotechnological enhancements which are to improve cognitive skills helps to perpetuate human happiness, increases longevity, triggers dramatic change in the perception of technology which ceases to constitute a lethal weapon against mankind and starts to stand for improvement. The incorporation of scientific thought into our lives is unavoidable and the idea of experiencing life through technology, entertaining and repulsive at the same time, does not appear completely outlandish. To quote Bostrom, human nature is “a work-in-progress, a half-baked beginning that we can learn to remould in desirable ways.” Whether we like it or not, the transition is taking place right now, because of the extensive use of social media, the Internet, we are currently experiencing live through the screens of our laptops – going one step further and incorporating it into our bodies, terrifying as it may seem, appears to be the next step in our evolution as human beings. The real question is whether this evolution would lead to the eventual loss of humanity? Or would we share with Shakespeare’s Miranda the awe and joy at the new world and its possibilities?

Works Cited

- Bostrom, Nick. “Transhumanist Values.” *Nickboctrom.com*, n.p. n.d. Web. 10 Apr. 2014.
- Clark, Andy. *Natural Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*. Oxford: Oxford UP. 2003. Print.
- Devlin, Matthew. *Cultivating Better Brains: Transhumanism and its Critics on the Ethics of Enhancement Via Braincomputer Interfacing*. Diss. University of Western Ontario, 2014. Web. 1 Dec 2014.
- “Ear on Arm.” *Stelarc.org*. Stelarc, n.d. Web. 2 July 2014.
- Fisher, Michael M. J. “Body Marks (Bestial/Natural/Divine): An Essay on the Social and Biotechnological Imaginaries 1920–2008, and Bodies to Come.” *Anthropological Features*. Durham: Duke UP, 2009. 159-96. Print.
- Fukuyama, Francis. “Transhumanism: The World’s Most Dangerous Idea.” *Foreign Policy* 144 (2004): 42-43. Print.
- Grosz, Elizabeth. “Naked.” *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*. Eds. Marquard Smith and Joanne Morra. Cambridge: MIT Press, 2006. 187-202. *Google Books*. Web. 2 Dec 2014.
- Haraway, Donna. “A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century.” *The Cybercultures Reader*. Eds. David Bell, and Barbara M. Kennedy. London: Routledge, 1991. 291-324. Print.
- Harbisson, Neil. “Cyborg Neil Harbisson Uses His Eyeborg to Listen to Colour.” *Dezeen.com*. 20 Nov. 2013. Web. 15 June 2014.
- . “I Listen to Color.” *TED Global Scotland*. June 2012. Web. 10 June 2014.
- Jones, Meredith, and Zoë Sofia. “Stelarc and Orlan in the Middle Ages.” *The Cyborg Experiments: The Extensions of the Body in the Media Age*. Ed. Joanna Zylińska. London: Continuum, 2002. 139-140. *Google Books*. Web. 11 Dec 2014.
- Kreps, Andy. *Cyborgism: Cyborgs, Performance and Society*. Lulu.com. 2007. *Google Books*. Web 15 June 2014.

- Massumi, Brian. "The Evolutionary Alchemy of Reason – Stelarc." *Parables for the Virtual: Movement, Affect, Sensation*. Durham: Duke UP, 2002. 89-132. *Google Books*. Web. 6 Dec 2014.
- More, Max. "On Becoming Transhuman." *maxmore.com*. Max More, 1994. Web. 2 July 2014.
- Stelarc. "Extended-Body: Interview with Stelarc." *Ctheory.net*. n.p., n.d. Web. 7 July 2014.
- "Stelarc Early Texts." *Stelarc.org*. Stelarc, n.d. Web. 2 July 2014.
- Tirosh-Samuels, Hava. "Engaging Transhumanism." *H± Transhumanism and its Critics*. Ed. Gregory R. Hansell and William Grassie. Philadelphia: Metanexus Institute, 2011. 19-54. Print.
- Van Zyl, Susanne Hildegard. "Crossing the Boundaries: Stelarc's Artworks and the Reclaiming of the Obsolete Body." Diss. University of the Witwatersrand, 2008. Web. 2 July 2014.
- Vita-More, Natasha. "Bringing Arts/Design into the Discussion of Transhumanism." *H± Transhumanism and Its Critics*. Ed. Gregory R. Hansell and William Grassie. Philadelphia: Metanexus Institute, 2011. 70-83. Print.
- Zylinska, Joanna and Gary Hall. "Probings: an Interview with Stelarc (with G. Hall)." *The Cyborg Experiments: The Extensions of the Body in the Media Age*. Ed. Joanna Zylinska. London: Continuum, 2002. 114-130. *Google Books*. Web. 11 Dec 2014.