UNIVERSITY OF LINCOLN

The Question of Transhumanism

An exploration into origins, ethics, identity and innovation.

Figure 1: Sarif Industries 2012

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February 2015

Word Count: 8689

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Introduction

"Transhumans want to improve and extend life. We are designing the technologies to improve and extend life. Emotions are integral to our senses and understanding. We are designing the technologies to enhance our senses and understanding."

Transhuman Art Manifesto, Natasha Vita-More, revised 2003.

Transhumanism is the growing intellectual movement of radically enhancing the human body and the way we live, think and feel. Transforming the human condition using technology to enhance strength, mind and psychological capabilities. Unknown by many, It is one of the fastest growing movements. By overcoming our limitations there is no end to what we, as a species, are capable of.

Influenced by the work of science fiction: scientists, theorists, philosophers and engineers dream of a future where our population will expand throughout the galaxy, and so encourage the possibility of extra-terrestrial species, whilst walking in the realm of gods. The Transhumanists' ideas of elevating beyond our capabilities, is a goal faster than how long it would take for us to evolve and thus we must change our condition using technology and the arts.

"A predominant area where the arts interface with transhumansim is at the transformative human stages – the cyborg, transhuman, and posthuman and in altering elements of time – real time, virtual time and hyper-reality. Integrating the scope of emergent technology outside the traditional framework of human perception is well suited to the arts and design." *Max More, 2013*

A transhuman and posthuman Utopian future has solutions that theorise and solve all the problems that we suffer from in modern times: economy, rising population, medical capabilities and death rates, resources, and the human nature of war. However with all the good that posthumansim may be able to fix in a utopian future, there is the possibility it could cause the exact opposite and lead to dystopia. This is why it is known to be an extremely controversial subject.

In the dissertation you are about to read, I will be noting all the key issues that transhumanism holds and the solutions to problems it can solve. I will discuss the origins of the concept along with how fictional writing has influenced and continues to influence the movement. I will then discuss how some transhuman technology, currently being researched, has controversially angered certain people and the ethical reasoning behind this along with technology currently being used for medical and military purposes. In my final chapter I will discuss the advocates of the Transhumanist movements - their work and what they have achieved - going into detail about what work they have done and the futuristic possibilities that can be achieved considering the current pace of technology evolvment..

Chapter 1 – Origins of Transhumanism

Before it was regarded as a growing field of study Transhumanism was first thought of as a philosophy and an idea for enhancing the human body and for extension of human life. While similar to the theory and concept of posthumansim, they are not actually the same thing.

Posthumanism is a concept and a philosophy originating from Science Fiction, futurology and contemporary art defined as a human or entity that exists beyond the human or mortal state of mind and body.

Ihab Habib Hassan an American theorist and writer stated that "Humanism may be coming to an end as humanist transforms itself into something one must helplessly call posthumanism" *Hassan, 1977.*

He is stating here that as we are evolving into a new era, the "postmodern" era, we are slowly shedding our humanity for this higher decadence of human achievement. The two concepts and fields of practise both share the same ideals and values, and they both believe in the "need for change, revaluating knowledge recognition of multiple identities, and opposition to sharp classifications of what humans and humanity ought to be." *Max Moore (2013).*

In this chapter I will be exploring the philosophical outlooks that have formed around Transhumanism since its first creation and how the theory has been adapted, researched and evolved.

The first use of the word Transhuman was used by Dante Alighieri in 1312, in his *Divine Comedy*. He referred to it as, "Tansumanare", which means to pass beyond the human. However this usage was intended as a religious and spiritual nature. Even T.S. Eliot's use of the word "transhumanized" in his play *The Cocktail Party (1949)* was not about the technological advancement and transformation in today's modern standards but rather referring to it as a process beyond an isolated human condition of the Homo sapiens' final stage of evolution. Even in the Thirteenth to Eighteenth Century European alchemists can be regarded as harbingers and proto-Transhumanists due to their search for magical and fantastical technology capable of curing any disease and granting immortality, such as the legendary Philosophers Stone and the Elixir of Life.

The first realization of human development through the use of scientific methods for the Transhumanist goals was during the time when science first started to bloom in the early 1600s. Francis Bacon (1561 – 1626) could be seen as the precursor of Transhumanism. He was an English philosopher, scientist and author. In his work *The Advancement and Proficience of Learning Divine and Human (1605)* and *Novum Organum Scientiarum (1620)*, he advocated the reasoning behind advancing human limitation and helped the western thought of the time to ignore utopian approaches and consider empirical methods and solutions to scientific problems. This caused scientists of the 17th Century to become enlightened about proto-Transhumanist possibilities.

Another pre-theorist of the Transhumanism movement was Nikolai Fedorovich Fedorov (1829 – 1903) who defended the scientific methods to achieve life extension, physical immortality, further evolution and even methods such as the resurrection of the dead, along with space and ocean colonization. He was part of the Russian Cosmism movement, a

philosophical and cultural movement of the early Twentieth Century, which theorised broadly in natural philosophy, looking at the combination of religion and ethics, the philosophy of evolution and future existence of humankind, society and the cosmos.

One representative of the Russian cosmism, Konstatin Tsiolkovsky wrote in a letter "The Earth is the Cradle of the Mind – but one cannot eternally live in a cradle." *(1911).* This suggests that their philosophy included that humans will eventually leave the Earth as technology advanced and evolved.

Before Darwin's publication of *Origin of Species (1859)* human's view of their evolution was fixed as a unique mind set in nature. Later this developed into new theories of advancement as a species that we are progressively evolving and can be better understood through science. This perspective made it clear to philosophers and theorists that "human evolution, advancement and nature itself can be deliberately changed to suit society and how we live." *Max, M. (2013)*

Transhumanism, as we commonly perceive it today, however took form in the latter Twentieth Century. Scientists, theorists and biologists such as J.B.S. Haldane, The "father *of* cryonics," Robert Ettinger and F.M. Esfandiary. These men envisioned worlds where humans direct their own evolution to the benefit of society and lifespan.

J.B.S. Haldane (1892 – 1964) was a British Indian scientist known for his works in genetics and evolutionary biology, his first paper in genetics, published in 1915 was the first demonstration of genetic linkage in mammals. One of his most well-known published works was, *Daedalus; or, Science and the Future (1923)* which one of the early visions of Transhumanism wherein he conceptualised in-vitro fertilization, or "ectogenesis" - the

process of fertilizing an egg outside the female body. He was the one that used the word "clone" to describe creating exact copies of humans which was later picked up by other scientists and writers.

Robert Ettinger, also known as the "father of cryonics" theorized that humans could extend our lives by putting our bodies into sub-zero temperatures to the point of clinical death, upon whence we enter a sleep like state in which the body is unresponsive yet still alive. He explained the theory and the process to achieve this in his first book, *The Prospect of Immortality (1964).* Robert Ettinger also published the book, *Man into Superman (1973),* one of the primary Transhumanist books, wherein he explored the transformative possibilities of the body, specifically using the word "Transhuman" to describe this.

F.M. Esfandiary's book, *Are you a Transhuman (1989)* describes transhuman as "transitional human" marking their way of living as a path towards posthumanity. He has been awarded the nickname 'FM-2030' for his work and has debated in Transhumanism. He taught classes on "New Concepts of the Human" at the New School for Social Research in New York during the 1960s, and brought together an organization of futurists called the UpWingers. Esfandiary focused more on the physical elements of the philosophy. He considered the idea of altering the human body and his books included questionnaires that reader could fill out to see how transhuman they were. These were based upon how much they travel and what alterations they had made to the body through existing medical technology. By doing this, Esfandiary made a connection with the reader to suggest that transhumanism is a mainstream theory that is currently happening rather than a theory of future expectations, and thus giving the reader a better understanding of the situation and how the practise is evolving.

In a 1994 *Scientific American* article, *Minksy, Marvin (1994) "Will Robots Inherit the Earth?"* Marvin Minsky described how that if a human wanted to extend life, this would require replacing biological organs, including the brain, with vastly superior computer devices. He has been known to discuss the topic of artificial intelligence, also known as AI, and development of something arguably more powerful than human intelligence. The idea of accelerating the process that technology changes human life, as a singularity, has been elaborated and revised as multiple visions and theories, such as the pathway of nanotechnology, conceived by Eric Drexler during the 1980s. This was popularized and researched as a plausible influential possibility for creating perfect AI and other medical technologies, by influential writers such as, Bostrom *1998;* Broderick *2001;* Kurzweil *1990, 1999.*

However the influences of the development of technologies did not come from the philosophy and scientific advancements of the Twentieth Century. Fictional writing and the arts have embraced the concept and revised the possibilities of how a postmodern future could be represented. The role of science fiction has greatly elaborated and popularized the way of transhumanized thinking. Postmodern Futures in Dystopian and Utopian settings are embraced by fictional writers because of their growing popularity amongst the consumers and their thought provoking plots that show plausible futuristic technology and the problems they could cause to human advancement. Common fictional pieces which tackle the concept of modifying the body have the goal of making the reader or watcher, think about the differences of what is plausible and what is important to ensuring a positive future for the users of said technology. The concept has been visualized in a large range of

medias, including literature, television and film, animation, graphic novels, video games, and even table-top games.

Authors such as, Greg Egan, Dan Simmons, Isaac Asimov, Phillip K. Dick and C.S. Lewis have all written about concepts of Transhumanism in their science fiction novels. Greg Egan is well known for his work in science fiction and supernatural horror. His novels such as, *Permutation City* (1994), *Distress* (1995) and *Schild's Ladder* (2002) are good examples of the use of Transhumanism and post modernism concepts, such as the philosophical aspects of artificial life and simulated reality in Permutation City. Perhaps his most heavily related work to Transhumanism, in which he references the concept many times, is Diaspora (1997). The book is set in a posthuman future where transhumansim has been picked up as the main philosophy that has been embraced by all earthly cultures during the Twenty First Century. Dan Simmons, well known for his work on *Hyperion Cantos* (1989 – 1997) a series of books with a postmodern setting, set on a completely different planet after earth was consumed by a black hole, heavily relies on AI to run the planet to the point where there are more AIs than humans left.

Phillip K. Dick, one of the most renowned science fiction writers, was an American novelist and philosopher, who wrote over 100 short stories and published 44 novels, having a total of 11 films have been based and adapted from his work, including Bladerunner, Total Recall and Minority Report. In his novel, *Do Androids Dream of Electric Sheep* (1968), Philip heavily relies on the use of androids with super advanced AI to drive the story, set in a world that has been severely damaged by nuclear war, resulting in the endangerment and extinction of most species. The 1982 film directed by Ridley Scott, Bladerunner, is an adaption of this

book, taking the heavily descriptive cyberpunk setting that Phillip K. Dick created for the story.

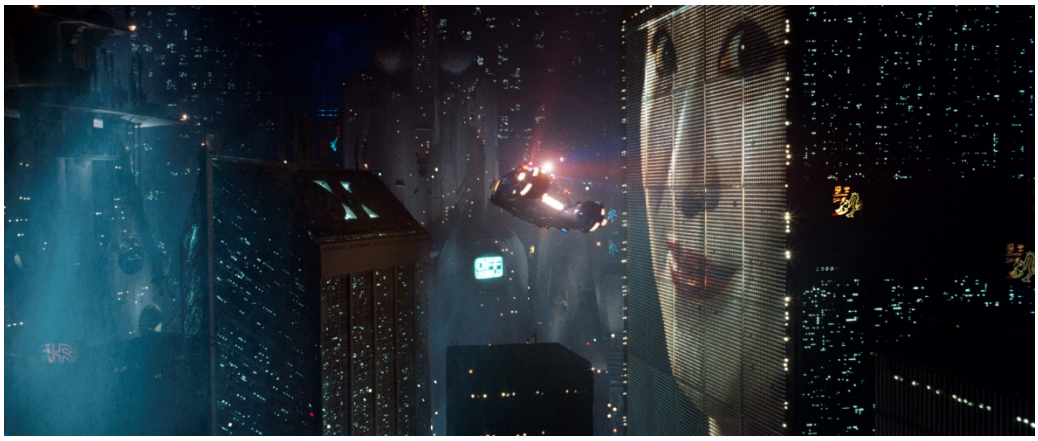

Figure 2: Blade Runner Cityscape

Posthuman futures with transhuman topics drive the settings of many film and television stories. Famous films like *2001: A Space Odyssey (Stanley Kubrick, 1968), Avatar (James Cameron, 2009), Tron (Steven Lisberger, 1982), The Matrix (The Wachowski Brothers, 1999)* and the *Star Wars* franchise, are prime examples of transhuman possibilities being applied through the use of film. James Cameron's *Avatar*, takes place on a largely uncharted moon named, Pandora, where an alien race of blue humanoids named the Na'vi inhabit this moon. In this story James Cameron introduces the concept of taking over these bodies by simulating brain waves into fake copies of the Na'vi from the original host, that only work with genetically matched humans. What is interesting about this film is that it touches on one of the core philosophy of transhumanism, being able to transcend into a much more advanced humanoid. The humans are able to greatly adapt to survival through the use of these fake bodies named "Avatars" The film heavily relies on visual effects and was actually written a decade before release, Cameron is quoted as saying that he wanted to wait until film technology had advanced enough for him to create his vision.

Steven Lisberger's "*Tron" (1982) is* a predominately science fiction film about humans being able to enter the computer world known as "The Grid" in the franchise. Kevin Flynn, played by Jeff Bridges, and a computer program named Tron have to fight against a super AI named the Master Control Program (MCP). The idea of recreating a human with a (not so) physical body, that has all the aspects that a human has, including memories, emotion and thought, and turning that into data is a very posthuman concept that was first used in Tron. A 2010 sequel was made called, *Tron Legacy*, that explores the same plot with much more advanced visual graphics.

The Matrix, directed by "The Wachowskis" - Lana Wachowski (formally known as Laurence Wachowski) and her brother Andrew Paul Wachowski. Heavily used the fictional "cyberpunk" science fiction genre in their trilogy series. Set in a world far in the future where humans have unwillingly been put into an augmented reality, which they perceive as the modern age, called The Matrix, unaware that they are being harvested by sentient robots. The main character, Neo, is taken from this augmented life and brought to a dystopian reality where his companions believe he is the "chosen one" capable of freeing all the humans and restoring the Earth to its original state.

Like Tron, The Matrix takes the concept of putting humans into a digital world with physical bodies. However the Wachowskis created the concept that allowed the characters to be aware that their world is not real, and their physical capabilities, skills and mental skills have been enhanced. This then enabled them to perform tasks that rebel against the sentient robots. The concept of physically implanting information into the brain through disks was introduced in this film as a futuristic concept, allowing Neo to learn fighting skills and worldly knowledge in a matter of seconds. After the film trilogy finished, the franchise was

expanded to other story telling medias, such as comic books, video games and a Japanese animated short film.

Popular television shows such as *Star Trek, The X Files, Firefly* and animated shows such as *Neon Genesis Evangelion* and *Mobile Suit Gundum* are more prime examples of fictional work that have inspired and taken inspiration from, posthuman and transhuman future possibilities. Interestingly enough however, although the popular science fiction series Star Trek has inspired and popularized technology that some would see as Posthuman or Transhuman, very little genetically or cybernetic advanced humans appear in the show. However they do encounter and ally with transhuman aliens along the story line.

"Captain, although your abilities intrigue me, you are quite honestly inferior. Mentally, physically. In fact, I am surprised how little improvement there has been in human evolution. Oh, there has been technical advancement, but, how little man himself has changed." - Khan, *Star Trek: The Original Series: Space Seed*

The antagonist to the beloved franchise, Khan, is clearly saying in this scene how inferior humans are because of the lack of modifying they done in order to evolve as a race. Technology used in Star Trek actually influenced some modern devices people use every day but would not consider them to be originated from science fiction. Stun Guns that police officers use were a concept that originated from the Phaser Guns that characters use in Star Trek. These then fire electrical pulses when the phasers are “set to stun”. Star Trek was known for having scenes where character would use communicators to talk to each other via cameras, while it seemed farfetched during the 60s, all smartphones now have front cameras which allow people to “face cam chat” with others. Even universal translators used commonly when characters encountered new species in the series, now exist as true

translators. These uses voice recognition pick up different languages and then translate them to whatever is set, exists now.

Now we understand the origins, theories and representations of transhumanism and postmodernism, we should address the issues and debates surrounding the ethical and religious dilemmas that cause people to deem the subject to be unmoral and unethical. Why do people believe this to be the way forward or a step back, in human advancement?

Chapter 2 – Ethics and Identity

In the last chapter I talked about how past theorists and fictional writers have affected the views of scientists and engineers today and how this has inspired the technology that could be considered as posthuman or Transhuman. In this chapter I will be comparing the different views of the topic. While some believe that the only way to go forward in human evolution is to modify and change their body in unnatural ways, others believe it will be the death of the human "soul" and modifying the body will cause humans to lose their "Identity".

"Instead of attacking transhumanism with a scientific-sceptical question. Can this be done? , opponents challenge with a moral question, Should this be done?" *Stephen Lilley, 2013*

Transhumanism can be found to be a touchy subject amongst some religious people. Some believe that modifying the human body is basically akin to "playing god" as it is deemed as unnatural and immoral. Although some notable Transhumanists of the past have been known to be spiritual or religious such as Francis Bacon or Ihab Habib Hassan the majority of modern Transhumanist thinkers are either atheist, agnostic or secular humanists.

Secular Humanists believe that one can be either moral or ethical without the need of a higher power like a God. They do not believe humans to be superior to nature nor believe that a person can either be evil or good.

A well-known controversial religious group that have been arguably scamming funding from followers according to opponents. Are the church of Scientology. Founded by science fiction writer L. Ron Hubbard. Scientology teaches its followers that they are born as immortal beings that have simply "forgotten their true nature" Scientology is a tax-exempt religion

recognised in United States, South Africa, Australia, New Zealand and certain European countries. Scientologists have argued that their cause is a genuine religion that have been misinterpreted, misrepresented and persecuted.

Figure 3: Church of Scientology

Christians believe that transcendence can only be achieved in the eyes of God when they ascend to heaven. They believe that God fashioned man and woman from material to take a specific physical form, they accept any flaws and believe that their body was not a punishment nor a mistake, but rather a gift and thus refuse to change anything about it. Robert Song, a Lecturer in Christian Ethics at the University of Durham states that for Christians.

"Transcendence takes the form not of escape from the vulnerability that accompanies embodiment, but of the hope of a transformed body in a divinely renewed heaven and earth." (2006)

Can someone become Transhuman or Posthuman while remaining the same person? Identity is a key issue when discussing the debates of transhumanism. Personal, sexual and structural identity can all be considered as something that flaws the idealism of transhumanism and postmodernism. In a world where anyone can augment and modify themselves to their advantage or preference, gradually changing their body and mind to be the same as a top athlete, it becomes unclear whether the personal identity of each person would be preserved, leading to a world where everyone is the same, in terms of strength and psychological wellbeing. However it might not be possible to modify someone exactly like who they aspire to be. An identity is constituted by a core set of psychological features such as their memories or morals, and unless one chooses to modify these aspects in this futuristic setting, then the Identity of a person starts to disappear causing them to cease to exist.

In philosophy, personal identity relates to change, sameness and time. Personal Identity is the distinct personality of a single individual. Individuals' characteristics can be distinguished from the personality by which a person is recognized or known. In this sense, one can only lose their identity when they lose their personality. Being Transhuman is more about expanding the human lifespan rather than adding technology to the human body. Technology is just a theory that allows this goal to be accomplished. Arguably if surgery was performed on a human which could possibly expand their life far beyond the normal lifespan, then theoretically, if the expansion was too great, it could cause a psychological shock and would completely remodel the psyche, causing the person to be differ from what they were before. This could possibly be seen as a change to their identity.

Cloning can be seen as a way of loss of identity. In biotechnology cloning is the process of producing an identical genetic organism, by copying DNA, cells or organisms to recreate a living animal or plant. A notable story whilst on this topic is Dolly the Sheep. Dolly was the first mammal to have been successfully cloned through an adult cell. An embryo was created from the cells taken from the mothers' udder and inserted into the mother sheep ovum. This experiment took 434 attempts before Dolly's embryo started successfully growing inside the mother sheep resulting in normal pregnancy stages. Dolly was born in 1996 and died in 2003, having living to nearly 6 years old, which was several years beneath the average lifespan of her species. The story of Dolly the sheep was a publicly significant story as it showed how genetic material from an adult cell can be reprogrammed to grow a completely new organism. Since the birth of Dolly other mammals have been recreated with the same methods, such as mice, pigs, a cat and horses.

There are multiple forms of types of cloning, all of which can be seen as controversial, particularly the practise of human cloning. While human cloning has not been officially recognised, by using stem cells however, scientists have been able to create artificial cells and tissue to help cure humans of disease and treat injuries, along with growing back parts which have been lost, such as ears or fingers. By using test mice as host to grow them, they can later be surgically removed and attached to the patient. There have been multiple demands for the field in human cloning to be completely stopped by opposing scientific, governmental and religious organizations. Opponents of the practise are concerned about the technology being prone to abuse, leading to harvesting of organs and tissues from clones that would genetically have the capability to think and feel. They believe the technology is not developed enough to be safe, and some who are superstitious believe that

successfully cloned humans would integrate with families and society despite not having an identity of their own.

However the advocates of the practise that support the study of cloning, human cloning in particular, believe in the development of therapeutic cloning to generate tissue and organs to help treat patients who cannot obtain transplants by other means and this avoid the use of drugs to keep them alive. They also hope it would slow down the aging progress of humans.

With cloning, it could be theoretically possible to resurrect extinct species or to help reproduce endangered species. This idea was used in the 1990 novel Jurassic Park by Michael Crichton, where a scientist envisioned using an amber that contained fossilized gnats and ticks that had DNA inside them from the blood of dinosaurs. The novel features many different extinct species resurrected in this way.

A concern related to the rising trend of transhumanism, is surveillance and privacy. A group called Stop the Cyborg have recently banded together after the release of Googles' product known as Google Glass. This is a pair of glasses that allows the user to record, browse the internet, and send emails and voicemails, along with many other features. People are opposed to this product as they believe it puts them at risk and infringes their own personal privacy. Users of Google Glass have been ejected from properties such as restaurants and cafes as the owners didn't feel comfortable being at risk of being filmed. The 'Stop the Cyborg' blog has over 2,000 followers and provides stickers and merchandise to warn users not to use the product on business owners who are wary of having their privacy exposed. *See figure 4.*

"With a camera or a phone, the taking of a picture is a clearly delineated act where the social signal is clear. You are taking a photo and taking on the role of camera man. With wearables like Glass, Autographer or Memoto only the mode that the device is in changes. There is no physical stance and no change of role on the part of the person. You just happen to be recording." (http://stopthecyborg.org/about/)

Figure 4 Stop the Cyborgs

The Amish are an established Christian Church Fellowship group. They are known for living simple lives and are actively reluctant to adopt the conveniences of modern technology. They can be seen as the exact opposite of transhumanism, which heavily embraces new technology trying to better and change oneself. The Amish significantly populate US and Canadian areas. In 2008 a study suggested that the population of people following this lifestyle increased to 227,000 over the past years.

The advancements of technology in the military field have been increasingly significant in the past years. Technological advancements such as exoskeletons, which at one time were seen to be work of fiction have started to be produced to help soldiers fight on the battlefield. The exoskeleton allows soldiers to carry heavier loads, up to 17 times greater

than normal and to increase their agility to a much greater degree. The construction of the exoskeleton suit has vastly improved over the years. The first version of a exoskeleton suit was the “The Man Amplifier” developed in the 1960s by Neil Mizen at Cornell University. The suit was never completed, but his work inspired future exoskeleton suits. With the research from Neil Mizens, “Man Amplifier”, An American multinational conglomerate cooperation, called General Electric and the U.S. military developed the Hardiman Suit in 1965. Intended to be able to lift 1,500 pounds, it was never successfully developed.

Fast forward to 1997 and Japans research firm, Cyberdyne, an innovative cybernetic R&D institution, developed the first prototype for The Hybrid Assistive Limb, also known as HAL. The use of this technology was intended to assist the disabled and elderly with daily tasks. In 2013, HAL 5 received a global safety certificate for medical use. The exoskeleton uses sensors to pick up bio-signals on the surface of the users skin, causing the suit to mirror the body’s movement. *See figure 5*

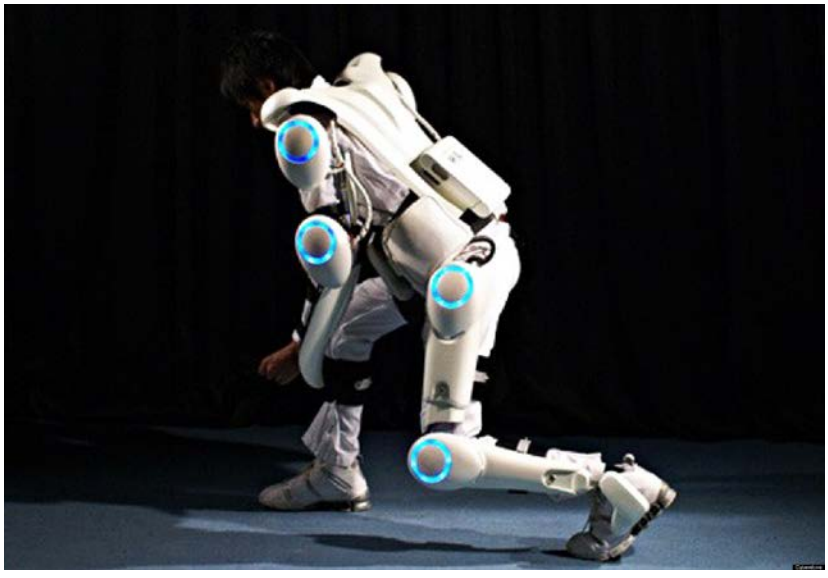

Figure 5 Cyberdyne exoskeleton suit

While Cyberdyne has developed exoskeleton suits for medical use, U.S military's Defence Advanced Research Projects Agency (DARPA) has been funding suits for military use. The latest suit developed for this purpose was the Human Universal Load Carrier (HULC) developed by the company, Esko Bionics. It has been announced that this suit will be examined for a military project where they are trying to develop an "Iron Man" suit as part of the TALOS project announced in 2013.

All of DARPAs research and funding go to military technology in the form of weapons and soldier enhancements, trying to create the fictional 'Super Soldier' through cybernetic implants, drugs, genetic engineering and eugenics. DARPA have managed to develop a controversial program using electronic devices implanted into the brain to allow soldiers to block out post-traumatic stress disorder. This device however does not get rid of it, but it simply blocks it from their mind making them forget the cause of the disorder. The program was put together with the intention of letting the soldiers carry on fighting after they have started suffering the disorder.

DARPA have also announced that they wish to start researching and developing technology inspired by James Cameron's, Avatar, for creating robot surrogates that soldiers can control from a safe area in a Virtual Reality setup. DARPA have invested 7 million dollars and their goal is to "develop interfaces and algorithms to enable a soldier to effectively partner with a semi-autonomous bi-pedal machine and allow it to act as the soldier's surrogate."

Military transhumanism is a good example of what makes the subject so controversial, as people believe that certain methods are in-humane, in such cases, engineering humans to become killing machines or "super soldiers", not allowing them to leave the military easily and being forced to continue fighting. While there are strong mixed views on how the

military handles new technology, those opposed use these examples against them to help support their views.

When discussing the need for exoskeleton suits, one must also consider replacing body parts with prosthetic limbs. In Star Wars episode V: The Empire Strikes, the main protagonist, Luke Skywalker, loses his hand and has it replaced with a cybernetic hand that can feel and move freely to his will. In 1980 this type of technology was science fiction and its logistics was left to the imagination of the viewer. However in more modern times working prototypes have been developed that allow users with prosthetics to have these abilities, allowing them to sense how much pressure to put on an object when they pick it up with these artificial limbs. A recent story of a man named Les Baugh, who lost both of his arms in an electrical accident forty years previously, has been deemed the first person to be able to control two prosthetic limbs through transmissions from the brain at once. He underwent surgery to reassign nerves that once controlled the arm and the hand.

The development of the cybernetic limbs came from the production of the DEKA Arm System, another DARPA funded project created by the inventor, Dean Kamen. "This prosthetic limb system can pick up objects as delicate as a grape, as well being able to handle very rugged tools like a hand drill," Justin Sanchez, DARPA program manager of the Revolutionizing Prosthetics program told international new agency, Reuters.

Figure 6 DEKA cybernetic arm

DEKA received a $40 million funding from DARPA to develop this technology and it can be seen as a start to great advancements in cybernetic prosthetic technology. In a related story, Rob Spence, a documentary producer lost his eye in a shooting accident and replaced it with a 'bionic eye' that can record what he sees. This connects back to the argument about privacy as Rob Spence has been given job offers related to secret camera work when his story was published. With such enhancements no one can feel secure about their privacy being intruded, and not just for the people with the replacements. In a fictional posthuman world where cybernetic replacements are being mass produced for the public, the companies that manufacture these enhancements would potentially have control over what the user sees, thinks and does. This has been portrayed in fictional stories, such as the 2000 video game, Deus Ex, published by Eidos Interactive. Opponents of the Transhumanist movement are scared of this outcome. However all can be avoided if companies set moral ground rules and try not to become corrupt less this situation occurs.

I have now covered some of the negative outcomes to the Transhumanist subject and why certain people are opposed to the concept of advancing the human body with technology. In the next chapter I will discuss current Transhumanists and their beliefs and reasoning for

this type of future in the next chapter. I will look into the mind of advocates such as James Hugh, Max Moore and Nick Bostrom. I shall look into the technological innovations of transhumansim and why supporters of the concept suggest ‘we must’ embrace this future.

Chapter 3: Technological Innovation

While most of the technology that has been morphed from transhumanism and the concept of future technology often visualised in fictional writings has been given a bad reputation from opponents of the movement, the advocates of the movement believe in the positive outcomes of the technology and how they could help the earth and humans as a race. In

this chapter I will be discussing the possible emerging technologies and their benefits, along with talking about current Transhumanists who will lead, innovate and inspire this technology.

James Hughes is considered one of the most well-known current Transhumanist. He served as the executive director of the World Transhumanist Movement, now known as Humanity+, up to 2006 when he founded the Institution for Ethics and Emerging Technologies, or IEET, with Nick Bostrom. James Hughes is also widely known for his work as a sociologist and bioethicist at the Trinity College in Hartford, Connecticut. In his book Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future. Hughes articulates transhumanism as a political ideology and program. The book discusses Human self-modification and political governance, and he discusses all the essential transhuman technologies that would help the body “transcend”, such as artificial intelligence, nanotechnology and genetic engineering. Hughes offers answers to the bio political and ethical issues related to the subject, and concludes with suggestions for pro technology solutions, including expanding and deepening human rights, reforming genetic patent laws, and providing everyone with health care and basic guaranteed income.

Along with James Hughes, Nick Bostrom is also famous for his support in the transhumanism movement. He is known for his work on the subject of existential risks on a global scale. Along with the anthropic principle, human enhancement ethics, super intelligence risks, the reversal test and consequentialism. Bostrom works as a philosopher at St. Cross College, University of Oxford. As well as being a founder of the IEET he is also a founder of The Future of Humanity Institute, a research centre focused on predicting and preventing large

scale risks to human civilization. Bostrom has published over 200 articles, books and journals of his work.

In his most recent book, “Super intelligence: Paths, Dangers, Strategies.” *2014, Oxford University Press*, he discusses and argues about the capabilities of AI. He claims that if machines surpass the brain in general intelligence, then this emerging super intelligence could replace humans and emerge as the dominant lifeform on earth, a future that has often been articulated in science fiction writing. In his book he writes, “Machines have a number of fundamental advantages, which give them overwhelming superiority” and states that “Biological humans, even if enhanced, will be outclassed.” However due to these speculations he did not receive a very good reception. The journalist newspaper, The Economist, stated that “Bostrom is forced to spend much of the book discussing speculations built upon plausible conjecture…” *2014*

A third well known Transhumanist and philosopher is David Pearce. He was the co-founder of Humanity+ in 1998 along with fellow philosopher Nick Bostrom. He is a vegan along with being a transhumanist who believes that the evolved humans of the future have a responsibility not only to avoid the cruel mistreatment of animals but to structure and redesign a futuristic global ecosystem so that wild animals do not suffer from the effects of human advancements. David Pearce is the author of a lengthy online manifesto, The Hedonistic Imperative. In it he discusses transhuman technologies involved in, nanotechnology, genetic engineering, pharmacology and neurosurgery, how it can converge into a project that he refers to as “paradise engineering”, a bioethical solution to eliminate “suffering” in all species human and non-human.

Other more members of Humanity+ include theorists, philosophers, futurists and engineers such as, Natasha Vita-More, Max More, Aubrey de Grey and George Dvorsky who all work together in this organization to help research the ethical use of emerging transhuman technology in the hope of enhance the human capabilities. Humanity+ have organized a number of conferences to spread the knowledge and views of human enhancements around the world. Their most recent conference was held at San Francisco University during December 2012. During their name change from World Transhumanist Association to Humanity+ they also started publishing H+ Magazine which ran from 2008 to 2009 with 5 PDF based issues, and 1 printed issue. During 2010 it was re-released as a web only publication not based around complete additions.

Another non-profit organisation that works closely with Humanity+, is the Institute for Ethics and Emerging Technologies (IEET), and as mentioned before was founded by Nick Bostrom and James Hughes. Like Humanity+ they specialise in transhuman technology and they seek to understand the impact of the emerging technology on society and individuals on an ethical scale. They describe themselves as a "technoprogressive think tank" and they believe that "technological progress can be the catalyst for positive human development as so long as we ensure that technologies are safe and equitably distributed." *IEET*

This generation of advocates of the transhuman movement are those that will most likely continue to lead the study and the practise of transcending the human body, for future years inspiring philosophers of further generations. A small percentage of the wide range of technology advocates who will continue to research and practise has been briefly discussed in the other chapters, but there is much more to discuss on these technologies and how it is believed we can benefit from them. Some of the top transhuman technologies include,

Cryonics, Virtual Reality, Gene Therapy, Space Colonization, Cybernetics, Autonomous Self-Replicating Robotics, Molecular Manufacturing, Megascale Engineering, Mind Uploading and Artificial Intelligence. This long list of concepts and practises developed by Transhumanists are only a percentage of the technology they research and develop, but are the most mainstream and researched among the whole list.

Cryonics is the preservation of the human body, and particularly the brain, in a death like state. Without decay the cells prevent aging in the body. As mentioned in the first chapter Robert Ettinger is known as the "father of cryonics" due to his research on the topic and his 1962 book, The Prospect of Immortality. Cryonics is considered as an important transhuman topic, because although it puts the body in a death like state, it still prevents the aging progress. Advocates in the practise of cryonics believe this is currently the best way to get a chance of a second life after death.

"The premise of the cryonics is simple: Do nothing, and when you die, you die forever; get cryopreserved, and when you die, maybe you get a second chance But what does "when you die" mean, and why does it matter?" *Sandy Sandfort, 2010*

Not only is the technology available today, but it is considered relatively mature as scientists have managed to reliably stop cells from decaying, and the revival process of a whole human body seems possible in the next century or so.

Figure 7 Cryonics

With the release of the prototype of the Oculus Rift during 2012 the development of virtual reality has boomed in development as an immersive entertainment media industry. Oculus VR, the developers of Oculus Rift, have planned for a consumer product release during 2015. Video Game publishers and developers have been increasingly coming close to producing photo realistic computer graphics for their games, using engines which constantly update to run them. By 2020 it is predicted that reality simulations that use these engines will become so high-resolution and immersive, that it would become "indistinguishable from the real thing." *Michael Anissimov.* By using full body VR suits a user can fully immerse themselves into virtual reality enough to be able to feel surroundings and interactions also.

Virtual Reality has been used by companies and military to help simulate situations in which someone can be put in. At the Naval Survival Institute, they have simulated a VR parachute training scheme to help students to learn the basics of parachuting in various scenarios. When looking into Virtual Reality, it is easy to consider the topic of immersive Massive

Multiplayer Online worlds, such as Second Life, or World of Warcraft. Some users spend their whole life dedicated to these online video games, shutting themselves off from the world, so it is easy to compare what sort of effect VR headsets would have to people with the same addictive tendencies, getting trapped in the virtual world confusing it for the real world. This is a problematic situation which may occur, so companies that produce the technology need to be aware of this situation in order to help prevent it.

Gene Therapy essentially replaces the bad genes with good genes, and by combining gene therapy with the biological process of RNA interference which knocks out gene expression, we have the ability to manipulate our own genetic code. Aubrey De Grey's, Strategies for Engineered Negligible Senescence (SENS), contains many prescriptions for gene therapy. SENS is the term used for regenerative medical therapies being developed, all in the hope of repairing or curing all age-related damage to human tissue, trying to postpone the aging effect and all the diseases that are caused by age, thus extending human life.

This procedure solves the core ideology of transhumanism, extending life. Within a couple of decades, progress to anti-aging and gene therapy could advance and improve so much, that humans will be able to gain an extra year of lifespan per year, as the progress of the research continues, eventually reaching "longevity escape velocity" and eventually reaching Indefinite Lifespan, which is the transhuman term used to refer to the hypothetical longevity of human or other life forms, under the conditions where aging is completely and utterly prevented and treated periodically. This could controversially be compared to "immortality" however it does not affect the damage done by disease, physical trauma, starvation and other causes of death that cannot be saved by preventing aging. However by the time gene therapy is advanced enough to have an effect, it is most likely that medical

technology would also catch up to be able to easily cure the majority of diseases and enable quick administration of aid to anyone that has suffered from physical trauma resulting in a return to good health.

Like the majority of transhuman technologies, Gene Therapy is especially exciting because it is in the early stages of development. Scientists are yet to perform gene therapy on germline cells, due to the controversy of producing genetic changes which are hereditary, however it is only a matter of time before worldwide governments might regulate further research. Scientists have managed to perform gene therapy on mice which allows them to stay slim no matter how much food they eat, and have also managed to cure Lou Gehrig's disease in mice also. It could possibly only be a few years before the treatment is successfully developed on humans to produce a cure.

Figure 8 Deus Ex: Human Revolution Protagonist

Anyone who has heard of transhumanism, is most likely to immediately think of cybernetic enhancements. Visualised in many different fictional writings, it is a core topic when discussing transhumanism. By enhancing the body with cybernetics humans can "Run faster, jump higher, reach further, and you'll always win!" *Jerry Garcia.* Cyborgs in fiction that fit

stereotypes are usually super law enforcers, cyborg assassins and “bad-ass” action heroes or villains. *See figure 8*

However, how can bodily cybernetic enhancements benefit us? Some medical cybernetics have already been introduced and have made integrations with society that we would consider normal but are very transhuman. Common medical implants, such as pacemakers can be considered a cybernetic enhancement, by attaching them to the heart they benefit those with weak hearts, or those with irregular heartbeats. Hearing aids are another great example of regularly used cybernetics, and also recent technology which allows the blind to be able to see by embedding tiny retinal implants into the eye. The Argus Retinal prosthesis is this technology. In 2013 the Argus II became the first commercial visual prosthesis that was approved by the Food and Drug Administration for the use in the United States. Transhumanists believe that by enhancing the body with cybernetics, humans will become more athletically and intellectually capable of survival. That they will become more than that which they were born to be and to transcend beyond their earthly capabilities.

This leads me to another science fiction capability not far off from our reach, Space Colonization. If human population continues to grow, Earth will no longer be able to house the billions of people and we will be forced to branch out to different worlds and space. In his book, The Millennial Project, Marshall T. Savage talks about the stages of what he believes will lead to interstellar colonization. In the book he give specific scientific and engineering details to back up his reasoning and gives a step by step guide of what would happen. Space colonization is linked to transhumanism because of the association of future philosophy, but also more because the embrace of transhumanism would be necessary for humans to colonize space and neighbouring planets. Humans are simply not designed to live

in space or other planets. Our body was evolved over time based on our experience on earth. If we colonized to Mars, we would burn quickly, and on Venus, we would freeze and also suffocate from the lack of oxygen. There is a need for the body modification so that we are suited to live on those planets.

With regards to cybernetic enhancements, implanting certain technology must be done on a molecular scale. Molecular Manufacturing and Nanotechnology. Star Trek fans would remember a device known as the Replicator, a device that could produce anything from a communication device to edible food. Characters just programmed what they wanted in the replicator and it appeared. Researchers and engineers are developing molecular manufacturing devices that could someday make this device a reality. The device uses manipulators to position atoms and molecules to build objects in a diamond structure, and create objects as complex as a laptop device or a car motor. Using this method a motor could be so powerful that a cubic centimetre would be enough to propel a car, or computers could work at the same rate as an average modern computer, but "can be 10^{12} smaller and use 10^{6} less power." *Centre for Responsible Nanotechnology*

In terms of medical advancements in molecular nanomachines and manufacturing, researchers believe that it has the potential to revolutionize medicine. They could be used in the fight against infection, replacing worn-out, damaged cells and radically expand lifespan. Robert A. Freitas Jr. writes "The "microbivore" would act as an artificial mechanical white cell, seeking out and digesting unwanted pathogens including bacteria, viruses, or fungi in the bloodstream." *2009.* When nanomachines are released into a patient's blood stream in large numbers, the sensors could provide extremely accurate diagnosis and perform very precise surgical procedures.

However, there are downsides to this technology, as it could potentially change or damage the world's economies in a negative way. Manufacturing industries would be made obsolete and society could be completely changed forever. It could chance the way we do business and could be used in an act of terrorism as theoretically it would be easy to manufacture nanorobots that could self-replicate synthetic algae capable of clogging up arteries or whatever synthetic body parts humans might have at this point.

One major scare that people have when considering a posthuman and transhuman future, is the uprising of super AI robots, John McCarthy, a computer scientist who first used the term in 1955 later defines AI as "the science and engineering of making intelligent machines"*2007.* People are scared of a future where computers would have such advanced AI that they would come to a realisation that they do not even need humans anymore to construct, modify and look after them, and they would simply eliminate humans thinking we are obsolete. However the development of AI is key to figuring out impossible questions that the human brain is incapable of realising.

Currently there are many branches of AI, including logical, pattern recognition, common sense and reasoning and AI that learns from experience to name but a few. Branches that focus in common sense and reasoning are the areas where AI is furthest from human-level, despite the 60 years that have been put into this research. While there has been a considerable amount of progress such as the development in non-monotonic reasoning, and theories of action, more research and ideas need to be developed. In Isaac Asimov's 1950 novel I, Robot, all the machines produced are programmed with three universal rules that they must follow, known as the "Three Rules of Robotics." These rules ensure their service to humanity "1) Never harm a human being, or allow a human to be harmed; 2) Never

disobey a human order, unless to obey rule 1; and 3) Never harm yourself, unless to obey rule 1 or 2."

Conclusion

During this dissertation I discussed how the technical advancements of transhumansim could either benefit us, or be a huge downfall for our future. While I believe I remained non-biased through the dissertation. I would like to think myself as someone who would choose

to heavily embrace this future if given the opportunity as I believe it could benefit us as a species and could determine the fate of the earth and all human beings.

"Technology has always been a double-edged sword, bringing us longer and healthier lifespans, freedom from physical and mental drudgery, and many new creative possibilities, on the one hand, while introducing new and silent dangers on the other. Technology empowers both our creative and destructive natures." *Ray Kurzweil, 2013*

It is hard to determine a definite conclusion to this topic as it all depends on the decisions of our future generations. However based on the current progress and situations we have encountered and discussed, based on the reactions of the public and the theories pointed out in fictional writings. If future advocates of transhumanism take these into account without thinking of the selfishness of enhancing a small group in a large world. There is hope it would benefit us.

"As Transhumanist arts come into focus, As more artists join our efforts, As more designs are produced, As more music is composed, As more stories are written, As the tools and, ideas of our art continue to evolve, So too shall we." *Transhuman Art Manifesto, Natasha Nita-More, revised 2003*

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