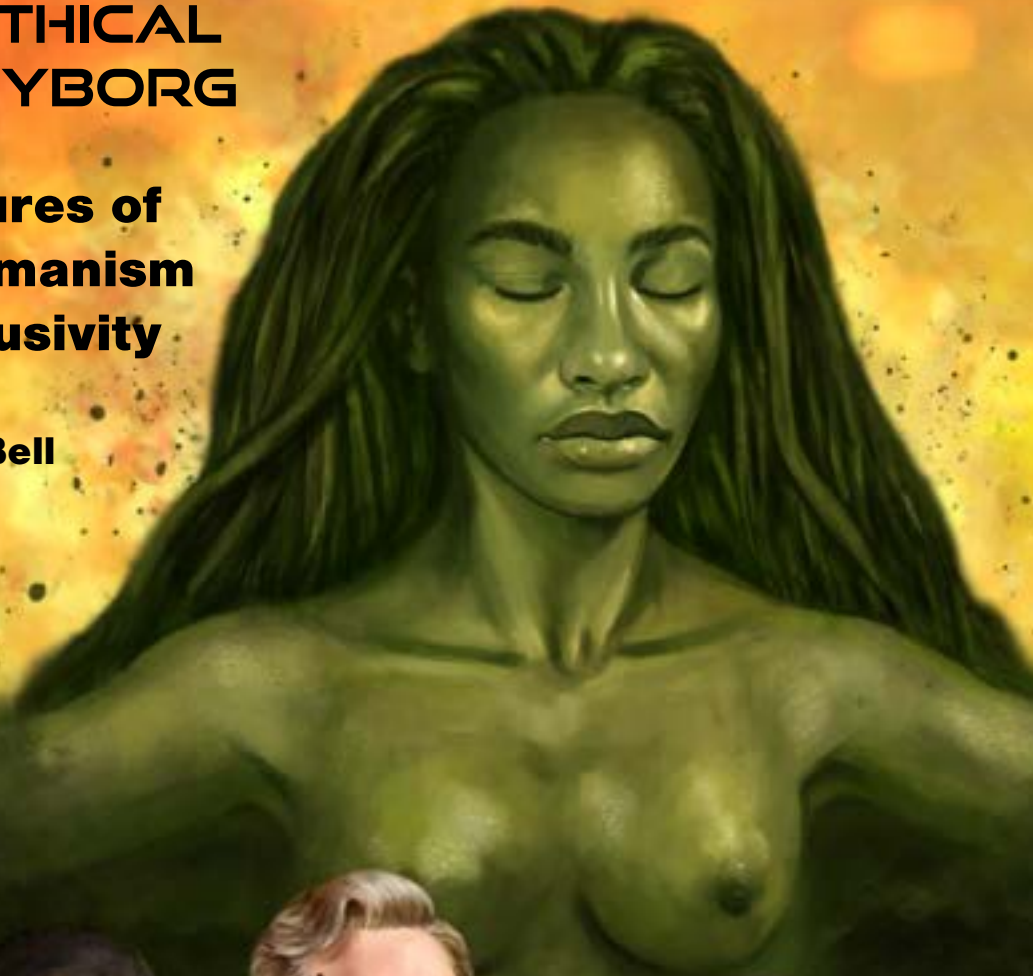




**THE
ETHICAL
CYBORG**

**The Futures of
Transhumanism
and Inclusivity**

By Trevor Bell





**The Futures of
Transhumanism and Inclusivity**

By Trevor Bell
Submitted to OCAD University in partial fulfillment of the requirements
for the degree of Master of Design in Strategic Foresight & Innovation
Toronto, Ontario, Canada, 2021

To view the virtual gallery, foresight scenarios, and found objects from the future created for this research, please go to www.ethicalcyb.org.

Questions and discussion are welcome in the website comment section, through the website contact page, or emailed to info@ethicalcyb.org

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Abstract

This project addresses the possible futures of Transhumanism, and the effects on culture and society those futures could create. History has shown us that when social and political systems are not created for, and by, the people they serve, they often do not serve those people's best interests and turn into sexist, racist and classist systems. How might we ensure that the directions biomedical designers and engineers pursue to create future biomedical devices are informed by the wishes and concerns of the people who will be integrating these devices into their bodies? Similarly, how can policy makers work closely with people seeking to improve their lives through bionic integration, so that the system is designed to include people in need (who are otherwise already disadvantaged), and not simply to provide benefits only to a privileged few. This project aims to create a set of future implications which will help guide and decolonize the future of healthcare policy, biomedical design, and the Transhumanist movement as a whole.

Keywords: accessibility, innovation, ethics, foresight, healthcare, policy, Transhumanism

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Introduction

Context and Problem

My interest in this research first started during my undergraduate degree at The Savannah College of Art and Design while I was working on my senior capstone project in 2017. I was creating a piece of critical design (Dunne & Raby, 2007) which discussed the laws around amputation, when I came across the Transhumanist movement in my research. I became concerned with the future of transhumanism when I found a series of YouTube videos posted by a preacher from Alabama, USA, who was using hate speech to talk about people who pursued transhumanism, saying that to integrate technology with the body is to play God, and that anyone who does so should go to Hell. These videos have since been removed from YouTube.

As I looked further into the transhumanist movement I began to be concerned for the possible futures it could create because of how white-led it is, and the rhetoric being used by the people leading the movement. Another concern is that the movement is catered to the rich, with little evidence of planning for proposed future technologies to be accessible. This makes me concerned that only the rich and powerful will get access to life-changing technology and leave already disenfranchised people further behind. What I am seeing from the transhumanist movement has all the ingredients to become an oppressive social system.

Acknowledging My Personal Bias

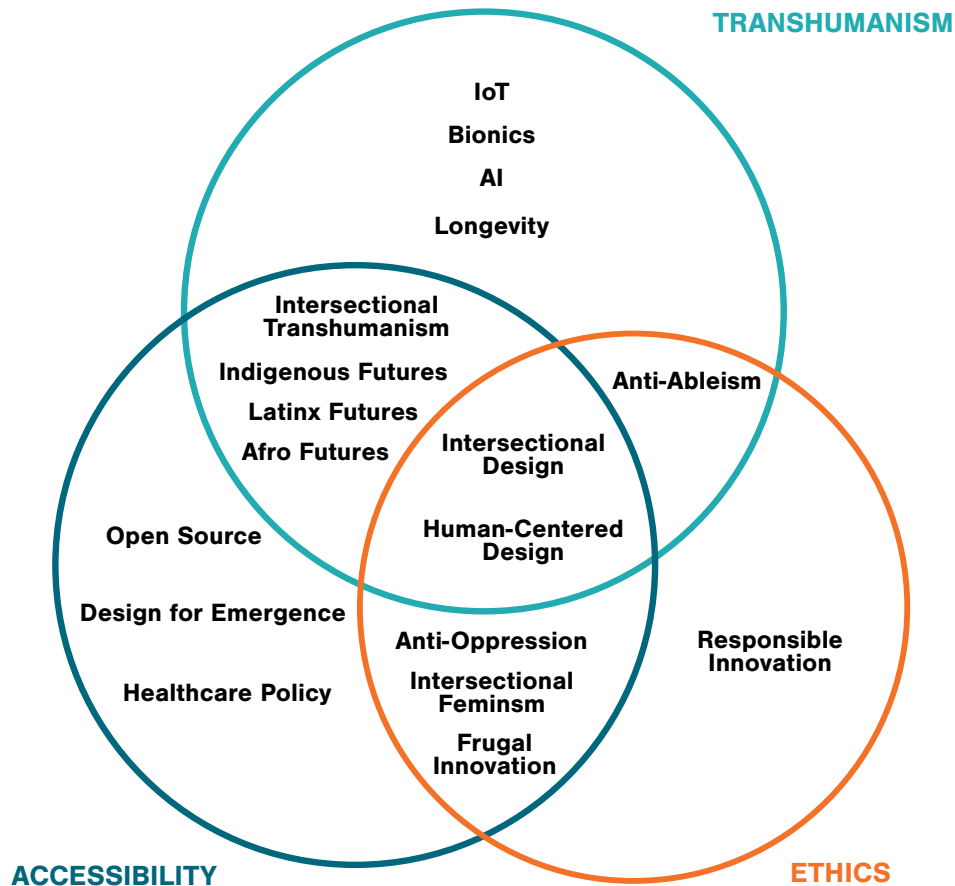
Before we begin discussing my research methodologies, I would like to acknowledge my personal biases pertaining to the subjects explored in this project.

I am an able bodied white man of average height and weight in my late 20's living in good health. As I live in the US, the quality of healthcare I can receive is good, but expensive so I avoid the healthcare system if I can. In the emergent cases that I have had to go to a hospital, my injuries have only been severe enough to require stitches, casts, or physical therapy. The built world is designed for people like me. If it were not for my design education, I would rarely notice if something was designed with accessibility in mind or not. I recognize that I have a second hand understanding which comes from learning, so I can only empathize with peoples lived experiences. With this in mind I know that I have to check my implicit bias and privilege recursively, because in order to make change, I need to understand that the needs of the people affected by the systems I work in are very different from, and arguably greater than, my own.

Finding the Terms to Use

To demystify this work, I would like to define some of the key terms used in this research. Early on in my proposal for this project, I used a venn diagram to help illustrate my system of interest and to better understand the overlaps of the actors and actants within the system. This diagram grew throughout the research process as I came across new terms, schools of thought, and practices. Figure 1 illustrates this diagram and the terms used in this research. Figure 1 illustrates this diagram and the terms used in this research.

Figure 1. Venn Diagram of Research Terms



Note. Adapted from John Venn's 1881 work, *Symbolic Logic*.

Introduction

Definitions of the terms used in this research

The following is a list of definitions for the terms most deeply studied in this research:

Transhumanism

Transhumanism (capital T) is a field of study that “seeks to continue the acceleration of evolution of intelligent life beyond its current human form and human limitations by means of science and technology guided by life-promoting principles and values” (More & Vita-More, 2013, 3). Transhumanism (lowercase t) describes what can be achieved to surpass the current limits on the human condition (Reason, 2016).

Decolonization

Decolonization is a term that in 2022 is being used to describe more than one school of thought. As with many terms, it has been adapted to related practices, but here I intend to make a distinction between the original use of the term, how it has come to be used, and how it is used in this research. Thinking chronologically, we should first understand that the term *colonization* is rooted in the experiences of oppression by Indigenous people, and the hold that Western ideology has on society (Khandwala, 2019). In an early use of the term, decolonization was described as a combative philosophy that prioritizes Indigenous forms of knowledge, spirituality, and cultural practices to challenge oppressive systems created and perpetuated by colonization (Endres, 2016).

Though decolonization was not meant to be a metaphor for other ethical practices used to improve society at large, it has found a place in the lexicon of social justice. This adoption is a potential example of what Eve Tuck and K. Wang Yang described as *settler moves to innocence* in their 2012 article “Decolonization is not a Metaphor”:

...[A] settler[’s] desire to be made innocent, to find some mercy or relief in face of the relentlessness of settler guilt and haunting... Directly and indirectly benefiting from the erasure and assimilation of Indigenous peoples is a difficult reality for settlers to accept. The weight of this reality is uncomfortable; the misery of guilt makes one hurry toward any reprieve. In her 1998 Master’s thesis, Janet Mawhinney analyzed the ways in which white people maintained and (re)produced white privilege in self-defined anti-racist settings and organizations. She examined the role of storytelling and self-confession - which serves to equate stories of personal exclusion with stories of structural racism and exclusion - and what she terms ‘moves to innocence,’ or “strategies to remove involvement in and culpability for systems of domination (p. 17)... (Tuck & Yang, 2012, p. 9)

In this research I am using the term *decolonization* in a manner that combines its original intent to

Introduction

Indigenize, and how it is used in the lexicon of social justice as a general practice of moves to equity. The scope of this research seeks to consider non-Western (non-white) ways of knowing when designing for the future. If we wish to bring about futures in which the use of prosthetics and implants is an all inclusive practice that should be accessible to all demographics, I believe the search for voices to inform the future of the systems that serve them should be inclusive as well.

Intersectionality

Intersectionality is a critical framework coined by legal scholar Kimberlé Crenshaw that highlights the overlaps of systems of oppression which constrict identities, power, and privilege (Carastathis, 2014) by moving away from single-axis, socio-analytical structures and utilizing a framework that considers the intersections of race, sex, and class in a given system (Crenshaw, 1989). This critical framework was created to highlight bias and violence against black women, but has since been applied to advocacy efforts of other marginalized groups (Columbia Law School, 2017).

Frugal Innovation

Frugal innovation describes the use of minimal resources to create functional solutions to diverse problems in a way that is inclusive and sustainable. Minimizing the use of materials to be lean and simple ensures that the product cost will be low and affordable, making an innovation more accessible to a greater number of people. This minimal approach also means that there are less resources used, and less waste material (Leadbeater, 2016).

Cyborg

The term *cyborg* is an abbreviation for *cybernetic organism* and refers to the physical augmentation of people's bodies. Cyborgs are portrayed in the media as a futuristic concept, but we should remember that the concept of a cyborg is not new. As long as there have been interventions to aid physical ability there have been cyborgs, starting with the first spectacles and wooden prosthesis (Cromby & Standen, 1999).

Anti-Oppressive Practice

Anti-oppressive practice (AOP) is historically rooted in approaches to social problems that focus on how the larger system protects the unearned privilege and power of some groups of people while generating difficult and unfair conditions for many others (Baines, 2017, p. 2).

Research Question

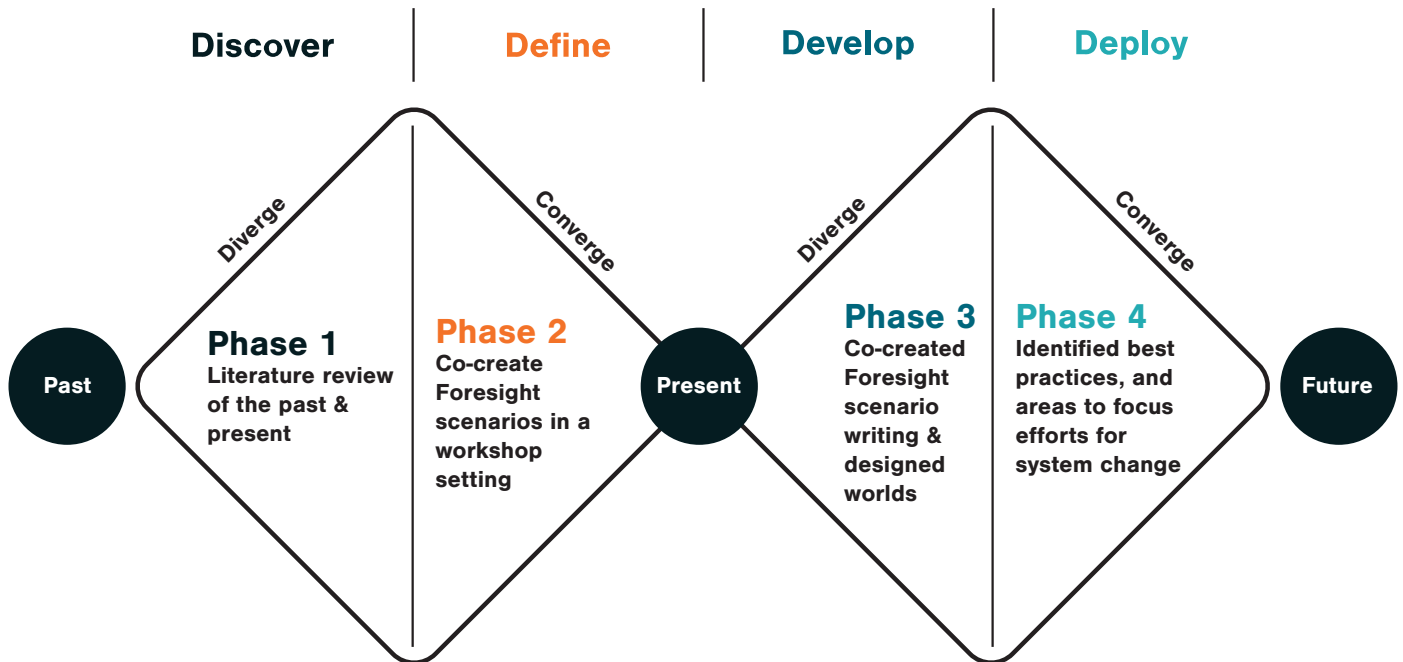
How might we use planning and design to decolonize the futures of Transhumanism, through the lens of healthcare policy and biomedical innovation, to promote the emergence of inclusive and accessible social systems that are anti-oppressive and free of sexism, racism and classism?

Research Methodology

Research Methodology

This research uses a literary analysis to understand the overlaps of three social systems, and applies a foresight analysis to explore the possible futures of these intersections and understand how to promote inclusiveness and accessibility. The research methods used in this project follow a double diamond process (see Figure 2) comprising two phases of divergence and convergence.

Figure 2. Double Diamond Model



Note. Adapted from the United Kingdom Design Council's Double Diamond Model

This method uses four core principles:

Put people first. Start with an understanding of the people using a service, their needs, strengths and aspirations.

Communicate visually and inclusively. Help people gain a shared understanding of the problem and ideas.

Collaborate and co-create. Work together and get inspired by what others are doing.

Iterate, iterate, iterate. Do this to spot errors early, avoid risk and build confidence in your ideas.

These principles help to effectively create innovative change (Design Council, 2019, The design principles section, para. 1).

Phase 1 - Discover

In the first stage of divergence I conducted an extensive literature review to gain an understanding of the current state of affairs of the transhumanist movement, healthcare policy writing, and biomedical

Research Methodology

innovation, as well as understand how oppressive systems have formed in the past.

Phase 2 - Define

In the first stage of convergence I applied the information gathered from the literature review and applied it to a deck of trends and emerging issues to narrow the scope of the research.

Phase 3 - Develop

In the second stage of divergence I took the information gathered in the previous two phases to inform foresight tools that were done in a collaborative workshop setting. These exercises created scenarios which help to understand the potential problems that could arise for people seeking prosthetics or implants 15 years in the future.

Phase 4 - Deploy

In the second stage of convergence I analyzed the public perception of the scenarios to guide where to place the most efforts for change. To illustrate the ease of change for each of these areas of interest, they are shared through the lense of system leverage points in a living document that will be shared with relevant individuals and entities, and be further developed as more insights are gathered.

Motivation

Motivation

The social and political systems we create are traceable, and their structures can be compared with one another to learn how they came to have similar or differing outcomes. The structures of oppressive systems share characteristics that are explored in this research to understand how to recognize an oppressive system in its infancy, and how to nurture it to become inclusive and accessible.

Social relations can be analyzed at multiple levels when looking at the spaces where oppressive systems are formed. Whether we look at macro or micro levels, we can argue that social systems are fundamentally enacted by the interrelationships among people. The macro-level relations describe the larger social structures that, broadly speaking, outline the shape of a society. These include financial institutions, government bodies, religions, and cultures. The micro-level relations are inherently more personal and are indicative of everyday practices, social norms and values. Since the various manifestations at each level of a social system are created by people, these can also be changed by people. Transformative efforts can alleviate the difficulties people face, and the emotional pain these difficulties cause. Although these efforts improve the lives of individuals, rarely will social-justice work on an individual basis create impactful change. Instead, efforts to benefit individuals that focus on transforming societal forces that create and perpetuate systems of inequity and oppression through social work, allyship, social movements, and one's own conscious effort to promote AOP in their work will create lasting change (Baines, 2017).

Culture as a Creator of Change

Social culture acts as a great director of system structure. The paradigms of a society shape the way information is shared, assigns value to commodities, creates social structure, and more (Meadows, 1999). In many societies today, the media carries the information in which cultures root themselves. Media has become so integrated into culture that one can now pinpoint the origin of tropes and narratives that are referenced in the interactions that form social dynamics. Technology is a product of social culture. It is driven by the needs and desires of the people, market forces, and the vested interests of the wealthy (Cromby & Standen, 1999).

Canadian communication theorist, Marshall McLuhan, coined the phrase *the medium is the message*, advocating for analysis to be directed towards the mode of communication, instead of the content of the message (McLuhan, 2006). The medium of technology's portrayal as fluff reporting tells a story of how Western culture thinks about ability. Misinformation about the usefulness of high-tech prosthetics tells us that society is more interested in what looks futuristic than what is actually functional and helpful. A

Motivation

quick Google or YouTube search for advanced prosthetics will pull up articles and videos displaying new implants or wearable technology that are delivered in a manner meant to evoke awe and inspiration in the viewer. The true state of today's technology and the value it brings to its users lies beneath the surface of such videos. Quick scene changes hide the transition time between movements and grips for prosthetic arms and hands and gloss over how much use of an anatomical hand is required to assist in setting up prosthetic limb function. Promotional videos of prosthetic legs seldom show the time it takes to put on a protective sleeve, or maintain a limb (Hussaini, 2021). These videos offer a way for people to cognitively contain the meaning of difference, keeping us from realizing that there is ability where disability is seen. Many prosthetics users feel that the limbs they received were falsely advertised, and sometimes prefer not to wear them to relieve the weight and irritation (99% Invisible, 2021).

Transhumanism

The term *transhumanism* was coined in 1957 by evolutionary biologist and zoologist Julian Huxley to describe his ideas of evolutionary humanism, and to express his belief that humanity will one day develop into a new kind of existence through the use of eugenics. Though eugenics has been dropped as a legitimate scientific study due to its racial bias, humans could still be considered the focus of a design project with the advancements of prosthetics, neurotechnology, nanotechnology, and biotechnology which enhance mental and physical capacities (Tirosh-Samuelson, 2011). Though there are differences in the beliefs held by different groups and individuals within the Transhumanist culture, the collective goal of the movement is to promote futures that are suitable to post-human life, which includes space colonization and the creation of virtual worlds and metaverses (More, 2013). Posthumanism is a school of thought that believes people should try to develop the human condition in ethical ways to evolve our understanding of the self (Bostrom, 2007).

The rhetoric found in Transhumanist discourse is focused on the individual and the preservation of their life, without considering how socioeconomic dynamics and inequalities limit access to advanced technologies. The assumptions of this rhetoric are that everyone will have free access, or that Transhumanists will be among the privileged elite (Hayles, 2011). This also assumes that human enhancement will progress simultaneously across socioeconomic groups, showing that Transhumanist discourse has not adequately included the topics of race, ability, identity, and economic standing (Butler, 2018). As an example, one of the leading voices of the Transhumanist movement is Max More, the CEO of Alcor Cryonics in Scottsdale, Arizona, USA. More's company freezes the bodies and/or brains of clients until a time that regenerative

Motivation

and anti-aging technology is available to bring them back to life. The \$80,000 - \$200,000 USD cost of this service, including yearly dues (Keep, 2015), suggests that the technologies emerging through the transhumanist movement may well be expensive and catered to the upper echelon, in the early stages and possibly for much longer.

In comparison to the challenges faced by people with limb-loss or limb-difference, the pursuits of Transhumanists are inessential and what technology historian David C. Brock calls a *wishful-worry*. These are things or scenarios placed some time in the future that are presented as a serious concern, but are not comparable to the experienced and nascent pains of people who are marginalized (Brock, 2019). The emergence of these systems would be informed by silos and self-serving systems (re)created to serve the interests of Transhumanists.

Central to Transhumanist goals are the pursuit of super-intelligence and immortality through digital augmentation, anti-aging technology or digital disembodiment (Horgan, 2021). While the advancement in transhumanist technologies make these topics valid points of consideration for the future, the rhetoric being used to discuss these topics does not apply anti-oppressive practices and alienates those who will not be served by, or will not be able to buy into, the proposed systems. The pains of people who live on the margins of transhumanism, e.g., people living with limb-loss or limb-difference, point to a need for design interventions in the built environment. Their experiences with the gradual advancements in bionic and prosthetic design show that more focus could be placed into the design of accessible environments. The technology is already here to improve architectural elements of buildings and the design of products (99% Invisible, 2021).

AfroFutures as Intersectional Transhumanism

There is hope for a movement away from the white-dominant culture of Transhumanism as critical schools of thought are being applied to Transhumanism to make it more inclusive. In a presentation at the 2017 Techno-Resistance and Black Futures Festival, Goldsmiths, London, Florence Okoye proposed AfroFuturism as intersectional transhumanism. AfroFuturism applies a collective approach to transhumanism (Okoye, n.d.), which differs from the reductionist approach of Transhumanist thinking. It also offers a critique of the current standing of Transhumanism as a sexist, racist, and ableist movement and provides movement towards inclusive futures (Ferrando, 2019). Transhumanist technology is becoming more deeply embedded in the daily lives of people, creating an urgency for biomedical

Motivation

innovators and health policy writers to consider the equity of their designs and the implications of their outcomes. Critical schools of thought like AfroFuturism, Latinx Futures, Indigenous Futures, and Anti-Oppressive practices offer frameworks to design for marginalized groups. Among the values-based tenets held in common across these communities, is an idea that empowers all practitioners of inclusive design: By designing for the margins of society, we inevitably design for everyone, not simply the most visible majority in the middle of the bell curve (Winchester III, 2019). The AOP organizational-level strategies can be grouped into five themes as follows:

- Increasing diversity
 - Developing and implementing anti-oppressive policies
 - Engaging in effective anti-oppressive education training
 - Fostering an organizational culture conducive to AOP
 - Ensuring the agency engages in social action.
- (Barnoff, 2017, pp. 173-174)

Lack of diversity in organizations is a significant problem. If the diversity of a community is not represented in an organization, it is likely that there are institutional barriers that are preventing certain groups from accessing the agency, or making them not want to access it (Barnoff, 2017).

Biomedical Innovation

Biomedical Innovation creates potential solutions for many medical conditions through the practices of stem cell therapies, nanomedicine, and biomaterials (Euroscientist, 2018). In this research I am particularly interested in the innovation of biomedical technologies which pertain to bionics, prosthetics, and wearable technology, and which align with transhumanist goals.

Innovators should follow a code of ethics that encompasses material and environmental considerations, as well as accessibility for all users by being mindful of resource consumption, user requirements, and contextual constraints. Adding a simplicity model and user centric approach to resource consumption can create more value in products at a lower cost, which can serve a greater number of people and ensure that the rate of resource replenishment is taken into consideration. These values describe the Frugal Innovation design framework. The framework also coaches that extra features on a device increase cost, making it unavailable for some customers. Extra features also add to the complexity of the device, making it difficult to use for some users. Some additional features may not even get used, furthering the waste of resources (Frugal Innovation, 2016).

Healthcare Policy Creation

There is a two-way relationship between culture and policy which implies that policy makers should have a solid understanding of the cultures they are designing for, and how the policies they create can be culturally desirable. Understanding the differences between cultures across jurisdictions can avoid blanket solutions and inform national and international policy creation for a range of socioeconomic groups (Daniell, 2014).

Foresight Workshops

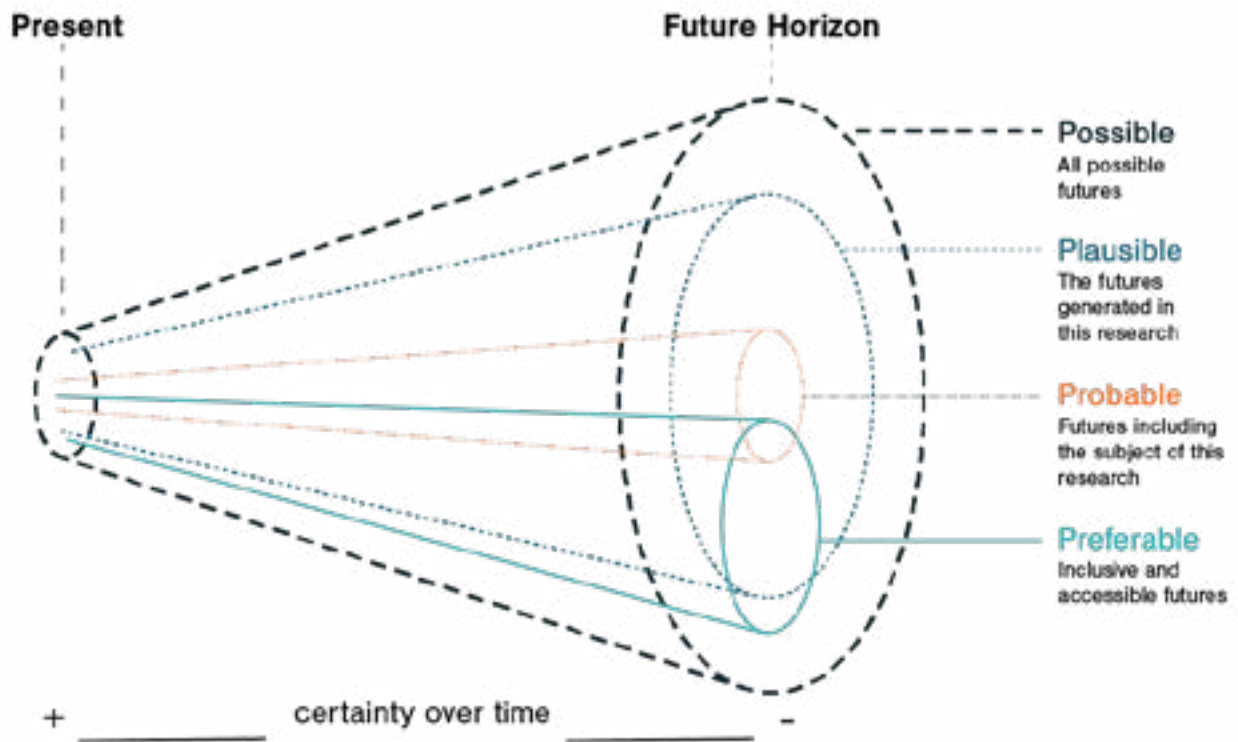
Foresight Workshops

In seeking to understand how to prepare for unknown futures, the practice of foresight utilizes the information available in the present moment to project into the future and create plans for robust structures and resilient systems. It is natural to fall into dichotomous thinking when talking about the future. We can easily say what we want and don't want in the future, but we know life has more complexities than a binary system of good and bad possibilities. The practice of foresight takes a pluralistic approach when planning for the future, making it easier to prepare for alternative outcomes (Candy, 2010). There are four classes of potential futures that we can see from our standpoint which vary depending on the future's likelihood and specificity, and become less certain over time (Montgomery & Woebken, 2021). The Futures Cone (see figure 3) is a common visual used in Foresight to illustrate these classes of futures:

The widest cone is that of possible futures— all the futures we can possibly imagine, no matter how implausible. Possible futures include futures that transcend current knowledge or transgress widely accepted physical laws. Within this cone is the cone of plausible futures, which are futures that could logically happen, given our current understanding of the laws and systems of our universe. Nested again at the center of the cone of plausible futures is the smallest and most precise cone— that of probable futures. Probable futures are considered likely to happen based on our understanding of current trends, and can be thought of as a linear extension of the present. All three of these categories are defined by informational or cognitive knowledge, whereas the fourth— preferable futures— is concerned with what one subjectively wants to happen. The cone of preferable futures may overlap any of the three other cones because it is based on value judgments, which can vary greatly between people. (Montgomery & Woebken, 2021, p. 40)

The Foresight work in this research explores scenarios which can be found in the possible futures cone. The research also promotes design practices and mindsets to guide these futures into the preferable futures cone.

Figure 3. The Futures Cone



Note. Adapted from Extrapolation Factory Operator's Manual.

Workshop Design

Foresight scenario creation requires input from research to drive the scenario creation tool. This input can be generated from any number or combination of research methodologies. Literature review, interviews, workshops, etc. can all be used to generate information for scenario creation. For this project I chose to do my scenario creation in a workshop setting. Workshops create a collaborative environment which inherently attracts people who are keen to discuss and explore the topic, and who will likely bring richness to the research. Including an element of co-creation was important for this project to ensure that the research was not driven by my own biases, and that the knowledge base was greater than my own.

Due to the time requirements of the techniques I chose to use, I decided to break up the work into two separate workshops, with the second workshop taking place one week after the first. Running two workshops has the added benefit of giving participants the time between workshops to digest the data generated, and allows anyone who was not able to participate in the first workshop to join in the second. To ensure that my workshop participant pool was not limited to proximity to my location, I chose to create

Foresight Workshops

a workspace in the form of a 'digital sandbox' on Miro.com. On the Miro board I was able to prepare the design tools and exercises in a linear format that would be easy for participants to follow. The workshops were hosted on the popular video conference platform, Zoom, which has an in-program Miro app that allows participants to work in Miro directly from the Zoom call, creating an easier experience. One week before the first workshop I sent an email to participants with details about how to prepare their Zoom account with the Miro app, and provided a link to a Miro board where I had created a space for participants to learn Miro tools we would be using in the workshops.

Recruiting

When recruiting participants I made efforts to send invitations to a diverse set of individuals and groups. To broaden the reach of my invitations, I created Instagram and Twitter accounts for the project (@ethicalcyborg for both) and created posts at each phase of the project with relevant hashtags to reach a global audience.

With Microsoft Forms I created a consent form ([See Appendix A](#)) for participants which outlined what was being asked of them in the workshop, options for what personal information they would like to be shared in the list of contributors, and what their rights as participants were. I shared this form with an invitation message across relevant email and social media groups, LinkedIn, relevant companies and institutions, and individuals who are experts in fields relevant to this research topic. Once a participant signed and submitted the consent form, an automated email was sent to them with a description of what to expect in the workshop, a reminder of their rights as participants, and a deck of trends and emerging issues.

On the morning of the workshops I sent out an email outlining the timeline of activities participants would be involved in, a reminder to download the Miro app for Zoom, and a Zoom link. In the first workshop on September 22nd, 2021 I hosted 9 participants, and in the second workshop on September 29th, 2021 I hosted 11 participants. These numbers were lower than the desired attendance for each workshop, and the diversity of the participant pool was not as broad as I had hoped. Not having representation from every professional background or social group that is of interest to this research means that the findings generated in these workshops are partially based on participant's explicit knowledge from reading and hearing about the research subjects, and not their tacit knowledge from life experience (Vicente, 2003). Although the participant pool was smaller than I had hoped, the research generated was still rich and extensive enough to proceed with into the rest of the methodology of this project.

Trends and Emerging Issues

One week before the first workshop, those who signed up to participate were sent a document containing the project rationale, research question, and a deck of four trends and emerging issues ([See Appendix B](#)). In foresight practice, these decks are created by signal and trend finding. Scanning for signals is practiced to identify weak and strong signals of change that will grow to impact the system of interest. These signals are organized by shared characteristics into groups called trends. The current social relevance of a signal can be gauged by how often it appears in your scanning, and in what form. Often, early signals are seen in talks, interviews and writings by leading authorities or activists of an issue. In time these weak signals grow into strong signals and begin to appear in academic journals and leading publications. As these ideas disseminate, they become trends that are picked up by various subgroups within public life, as well as politicians, at which point they are considered in policy creation. As a weak signal grows in strength, its trajectory becomes more rooted in its course and is harder to change or correct through policy creation. That is why it is important to catch these signals early, while there is time to plan and design for their emergence (Molitor, 1977).

The signal research for this project accumulated into four broad, distinct trends and emerging issues:

It's a Love-Hate Relationship

This trend shows strong signals of polarized opinions of the transhumanist movement and the integration of bionics with the body.

Decolonizing the Cyborg

This trend shows weak signals of new groups on the margins of the transhumanist movement who promote more inclusive and ethical schools of thought.

Accessible Policy

This trend shows that current systems of healthcare do not create enough access to care for people seeking quality prosthetics and implants.

Birth of Systemic Problems

This trend shows strong signals that the portrayal of the lives of people using prosthetics does not accurately convey their living situation, which perpetuates inaction in the areas that need attention.

Question Storming

As a cognitive warmup to the first workshop, participants were taken through a question storming exercise. Question storming is used to fully explore a topic and to get participants to think about the topic from different viewpoints. The exercise also brings participants to a common understanding as they learn from each other's contributions. The process of question storming brings participants through five question categories that generate information that can be applied to following exercises in a workshop methodology. These categories are:

Opening Questions

Expand and explore topics, diverge, spark ideas, use deep thinking, reveal possibilities, open new perspectives to analyze the topic further.

Examination Questions

Evoke observation and analysis, narrow the inquiry to focus on details, examine both the topic and your perspective about it.

Experimental Question

Evoke imagination, find unexpected connections.

Navigation Questions

Guide the route, evaluate the perspective, adjust.

Closing Questions

Focus on convergence and selection. Guide towards commitment, decisions, and actions. Find criteria to select opportunities and prioritize. (Gray, Brown, & Macanuso, 2010)

The completion of the Question Storming session marked the midpoint of the first workshop. I provided a break in the workshop for the participants to step away for a bio break and discuss the information generated in the exercise amongst each other. This made room for rich conversation that connected ideas generated in the session, and even led to additional points for some questions.

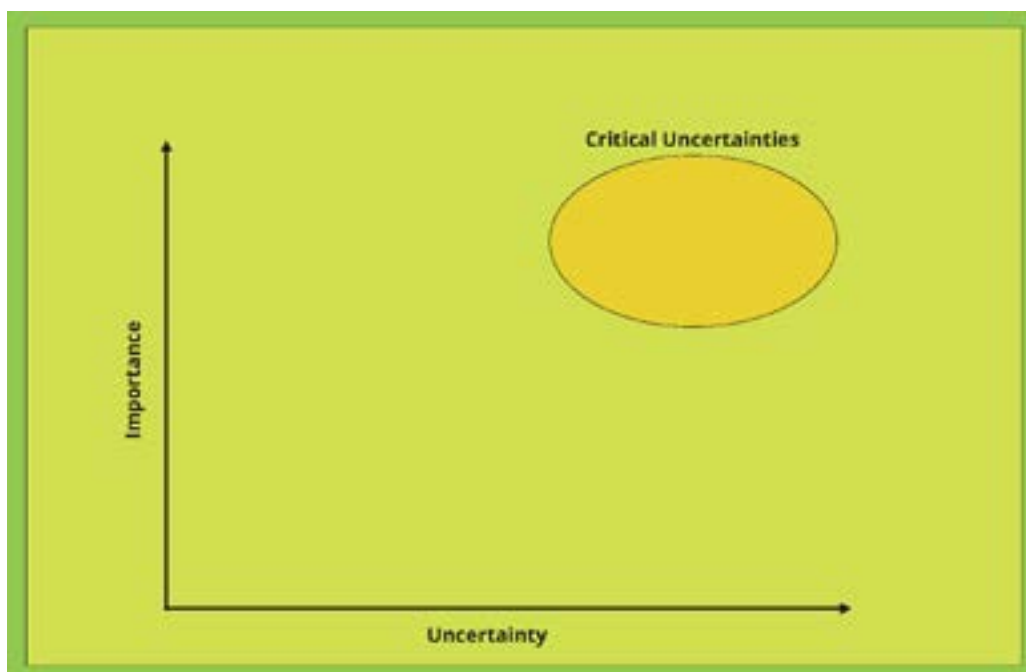
Critical Uncertainties

The second half of the first workshop began with listing the drivers of change that were brought up in the question storming exercise. Drivers are the forces that create substantial change in a system. To help participants come up with drivers from every sector of our topic, I had them think through the lens

Foresight Workshops

of STEEPV, which stands for social, technological, economic, environmental, political, and values. By choosing drivers through this framework, the participants were more likely to cover all facets of the topic (Saritas & Proskuryakova, 2017). The drivers were placed on a 2-axis chart which identifies *critical uncertainties*. The axes of the graph are labeled “importance” and “uncertainty” (See Figure 4). Critical uncertainties are the drivers that rank high in both importance and uncertainty when thinking about their potential impact (Rhydderch, 2017). Once we had narrowed the drivers down to three critical uncertainties, I asked participants to keep our collective work we did in their thoughts over the next week and ended the workshop.

Figure 4. Critical Uncertainties



2x2 Matrix

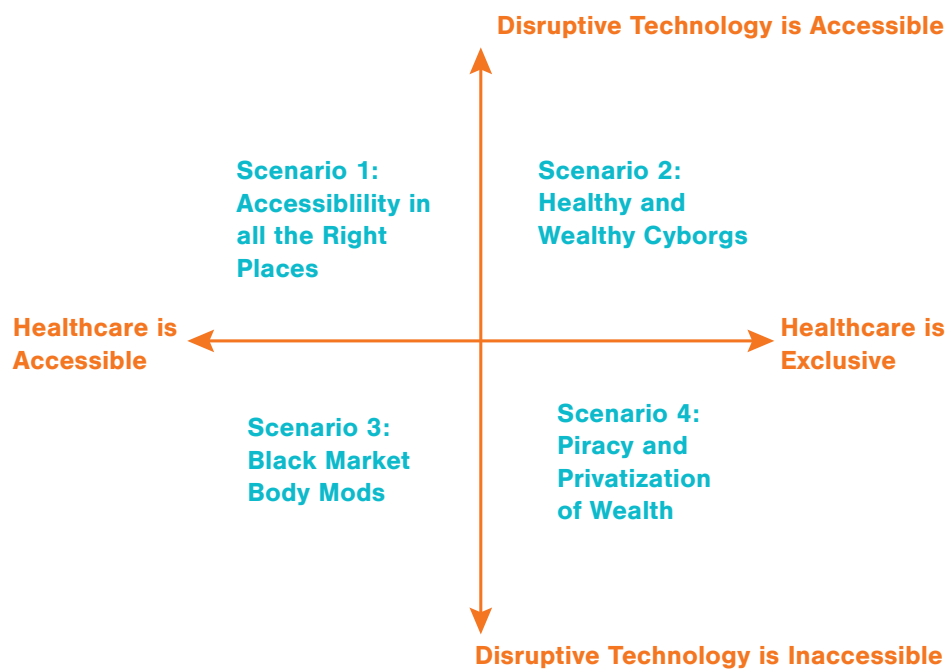
At the beginning of the second workshop I had the participants review the work they did with the critical uncertainties and asked if they had thought of any new ones in the week since the first workshop. After some discussion I had them choose the two that they would like to see in combination for the foresight exercise. These two critical uncertainties were “healthcare” and “disruptive technology.” To create the foresight scenarios I took the workshop participants through a *2x2 Foresight scenario matrix*. This is a foresight method that is commonly used in futures workshops and design sprints because it has a shallow learning curve. For many participants the concept of a 2x2 matrix is familiar from math classes in their early

Foresight Workshops

education, or in similar work exercises. The method is also easy to pick up for people who have not seen it before. Each axis of the matrix gets a label, then each quadrant is filled in with information that matches the combination of its two axes (Rhydderch, 2017). The purpose of scenario creation in foresight practice is to create an idea of what elements might appear in the context of a possible future. Scenarios typically look toward a planning horizon 20-50 years in the future and analyze what aspects from the past, present, and emerging signals will appear in future (Dator, 2019).

To create the names of the matrix axes I had the participants apply the two chosen critical uncertainties with qualitative descriptors. Opposed to qualitative descriptors being used to describe each end of the axes, like high to low, qualitative descriptors offer richness and inspire participants to be more imaginative in their generation of world building. When the participants were ready to begin the foresight exercise I broke them into four groups in Zoom breakout rooms, so that they could discuss among themselves. Each group also had their own space on the Miro board to work so that their 2x2 Matrices did not get overcrowded. To end the last workshop, I had the groups reconvene and discuss the different futures they had each created. The last task was to analyze the emergent qualities within each quadrant, and to name each of the resulting four future scenarios (see Figure 5).

Figure 5. 2x2 Foresight Scenario Matrix Tool



Scenario Writing

For the creation of the scenario and day-in-the-life writing for the four scenarios ([See Appendix C](#)), I wanted to stay consistent with my collaborative creation approach and invite others to create the writings with me. Unlike the open call for participants that I used to recruit for the workshop, I chose to share the writing workshop invitation with members of my graduate student cohort from the OCAD U Strategic Foresight & Innovation program. Forming a writers circle within my cohort ensured that the scenarios and day-in-the-life writings were created by individuals who had experience with foresight work and scenario writing, so I would not have to spend time teaching someone the details that are important to bring to the surface from the workshop data.

To make the writing process easier, the workshop data for each scenario was put into a STEEPV chart. This allowed us to see where the workshop participants were able to generate enough information and which categories were lacking. In the sections that did not have enough information, the writers and I worked together to infer what would belong in these categories by looking over the workshop data from the Question Storming exercise and the 2x2 matrix.

The writers were given a limit of approximately one page for each of their writings. There can be a temptation to make the writings longer to fit more detail in, but for the sake of the reader, keeping each writing to a page ensures that the reader will be able to work through the four scenarios without fatigue.

Working with Creatives Professionals

In the practice of foresight, scenario writing is often accompanied by *found objects from the future*. These found objects are used to create a tangible illustration of what things might be found to exist in the world of a particular foresight scenario (Institute for the Future, n.d.). I knew that if I were to be the one creating the found objects for each scenario, they would all be influenced by my own personal bias, and the range of mediums used to create them would be limited to my creative skill set. It was important to me to have a diverse team of artists and designers creating the found objects, so I sent out a call for creative proposals through my social circles and the project's social media pages to recruit interested people. Those interested were sent a participant consent form ([See Appendix D](#)) which outlined their rights as creatives and

Building Foresight Scenarios

collaborators in this research. I believe in compensating artists and designers for their work, so I followed the guidelines of Canadian Artists Representation/ Le Front Des Artistes Canadiens (CARFAC) and paid my creatives in accordance with their guidelines for Permanent Collection Exhibitions. The virtual gallery for this research project falls under Category 1 Exhibiting Institution (galleries with operating budget under \$500k). To uphold CARFAC standards the project made a commitment to the creator(s) of each single work to provide a minimum fee of \$155 DAC (CARFAC, 2009).

Those who signed up to be creative were given the foresight scenario and accompanying day-in-the-life writings as a prompt for the found objects from the future. The creatives were asked to create a proposal for the scenarios that interested them most, and were assigned on a first-come-first-serve basis, with later submitters being assigned to available scenarios that would best fit their creative medium and ideas for contribution. As there were eight creatives, each scenario was assigned to two individuals who were coached to focus on different elements of the scenario to ensure that the works had as broad a visualization of the world as possible. Each creator was given full freedom to use creative license in developing a concept for their found object. I provided some guidance to those who had not worked in foresight practices before to ensure that their object conveyed enough detail from a scenario that it could visually support the world building and day-in-the-life writing. Once the selected works were completed, I paid each creative their fee, and sent a Creative Commons licensing form

([See Appendix E](#)) for their works which affirmed their intellectual property rights, and outlined my right to reproduce their works for the purposes of this project. The works created for the gallery were created in a range of artistic styles including creative writing, illustration, motion graphics, and 3D product design. The breadth of mediums used adds richness to the scenarios by showing in how many ways the future will create change in day-to-day living.

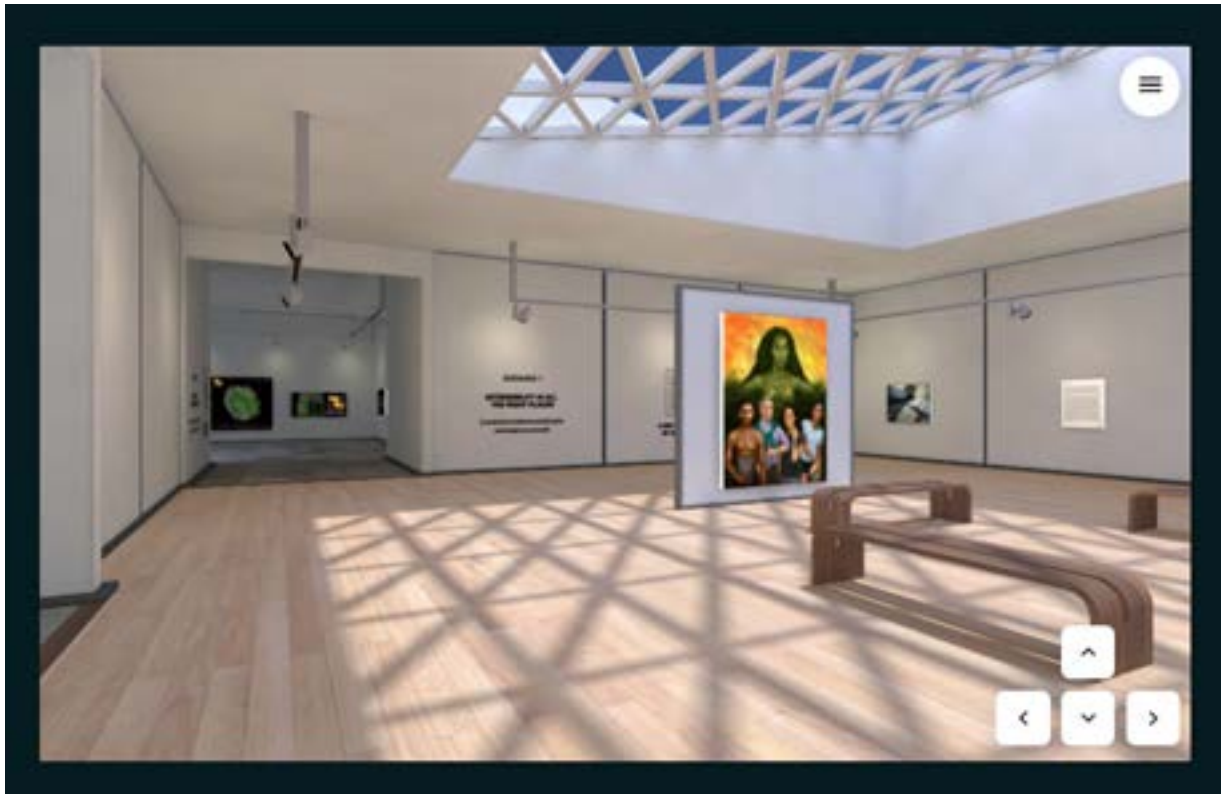
Creating a Virtual Gallery Space

My hopes for this research is that it will live on, and be easily accessible and shareable. To accomplish this, I created a website using the website builder, Wix, where all the research and deliverables for this project can live. For a domain name I chose ethicalcyb.org, because the use of “.org” in “cyborg” makes for a Web address that is memorable, compact and easy to type.

A virtual gallery space is hosted on the website, where viewers can read about each of the four futures created in the workshops, and view their respective found objects from the future. Following the virtual gallery, viewers are invited to use a comment box to share their thoughts and concerns about the future, and their beliefs on where efforts should be placed to ensure the emergence of inclusive systems.

I wanted viewers to have an immersive experience that would be more interesting than scrolling through text and images to learn about the scenarios and the found objects. In the proposal phase of this project in the Winter of 2019, I thought I would display these works in the OCAD U Graduate Gallery Space. When the COVID-19 pandemic created a global shift to sheltering-in-place, I looked for alternatives to physical galleries. The decision to shift to an online gallery space had an unexpected benefit, which is that now the works can be viewed by anyone in the world, and the gallery can stay open for as long as I am able to pay for the domain. The virtual gallery was created using a blank gallery space designed by a Dutch platform called Ikonospace, which creates generic galleries for personal use, and replicates physical galleries and museums so that people can view exhibitions online. The Ikonospace gallery spaces are run on a cloud based software developed by the German company, Kunstmatrix. Anyone with a computer or smart screen device connected to the internet can navigate through the virtual gallery or take a guided tour.

Figure 6. The Ethical Cyborg Virtual Gallery Space



Note. A screenshot of the virtual gallery on ethicalcyb.org

Comment Book

To create a space for discussion about the project, and to gather the thoughts, concerns, and opinions of gallery viewers, I implemented a *Graffiti Wall* in the form of a comment section on the website, below the gallery. A Graffiti Wall is a qualitative research method which uses a canvas where participants are invited to write or draw their comments about a topic, and is best placed in the context of use. This method encourages participation through casual facilitation, and offers anonymity for participants (Martin & Hanington, 2012). Making room for anonymity in the comment section was tricky, because the comment application provided by Wix requires a name to post a comment. My solution was to add a note in the commenter terms of use beside the comment field which explains that if someone would like to post anonymously they may use a pseudonym. Comments were intended to be analyzed and applied to the final deliverable of this research methodology, the Future Implications document.

Website Jargon

To stay consistent with my practice of outlining the privacy rights of participants, I created terms of use and privacy policy pages on the website for gallery viewers. Legal jargon was created for each of the website's interactive functions. A content warning message appears when you first land on the website's home page explaining that the gallery contains works that could be triggering to some viewers ([See Appendix F](#)). Next to the comment box, there is a brief description of the community guidelines for the use of the comment box, and a link to a Terms of Use page ([See Appendix G](#)) which fully outlines commentor's privacy rights . The Privacy Policy page ([See Appendix H](#)) can be accessed from the site menu.

Future Implications

Future Implications

The information gathered in this research cumulates to an informative document that is meant to be shared within the discourse of transhumanists, healthcare policy writers, and biomedical innovators ([See Appendix I](#)). This document shares the implications of what our actions can create, and areas within a social system where efforts can be placed to ensure the emergence of inclusive and accessible futures for those social systems.

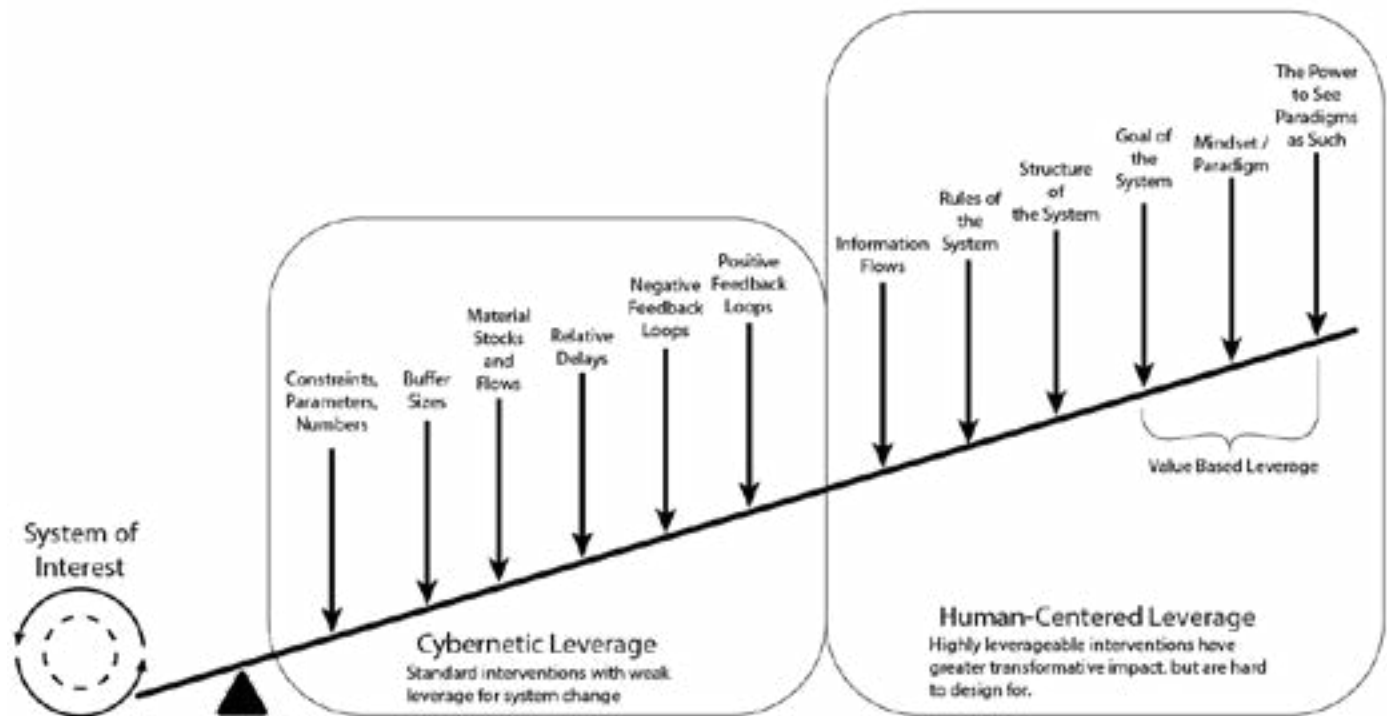
With so many social movements being discussed on social media, I have seen the rise of informative posts where someone will share a short infographic explaining a social problem, and best practices to avoid perpetuating that problem. This only works to a degree, because the content is too short to describe a problem in full. The Future Implications document follows the logic of a TedTalk, where the content is not so long that people won't retain information, but not so short that there won't be enough information shared for people to grasp the concepts (Gallo, 2017).

Analysis Through the System Thinking Lens

When working to create change in systems it helps to know where in the system to start. Efforts on all levels of a system will create some amount of change eventually, and some levels of the system will require more effort than others. Donella Meadows outlines 12 points in a system (see Figure 6) where different types of system change can take place. Meadows describes these as *leverage points* and provides insights for each one. She lists the leverage points in ascending order of leverageable system change. This list also describes the ease of implementation in descending order - meaning that the easiest points leverage create the least amount of system change (Meadows, 1999).

Future Implications

Figure 7. System Leverage Points



Note. Adapted from Meadows' (1999) *Leverage Points*

Meadows list of leverage points are as follows:

Places to Intervene in a System

(in increasing order of effectiveness)

12. Constants, parameters, numbers (such as subsidies, taxes, standards)
11. The sizes of buffers and other stabilizing stocks, relative to their flows.
10. The structure of material stocks and flows (such as transport networks, population age structures)
9. The lengths of delays, relative to the rate of system change
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against

7. The gain around driving positive feedback loops
 6. The structure of information flows (who does and does not have access to what kinds of information)
 5. The rules of the system (such as incentives, punishments, constraints)
 4. The power to add, change, evolve, or self organized system structure
 3. The goals of the system
 2. The mindset or paradigm out of which the system—its goals, structure, rules, delays, parameters—arises
 1. The power to transcend paradigms.
- (Meadows, 1999, p. 3)

Future Implications

These system leverage points can help guide anti-oppressive practice efforts to create impactful change in social, economic, innovation, and governmental systems.

Conclusion

Conclusion

This research project analyzes past and current schools of thought surrounding the Transhumanist movement, and attempts to understand how oppressive systems are made. Looking at the overlaps of the systems of this topic, the research points to where efforts should be placed to make these systems more equitable, and shares schools of thought that are already working in these spaces to make the futures more inclusive for the people these systems should serve. This project explores a methodology of various foresight tools, with globally accessible collaborative platforms to see how co-creation can be implemented to designing inclusive futures. The insights gathered through this research show how schools of thought built on inclusive practices can be implemented into methodologies used to leverage system change and promote the emergence of inclusive and equitable systems. The methodologies that were created for this project and the schools of thought that have been shared are intended to be used by the global community, and not just people in transhumanist circles, to create futures that are anti-oppressive and free of racism, sexism, and classicism.

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Appendices

Appendix A: Workshop Participant Consent Form

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The Ethical Cyborg: The Futures of Transhumanism and Inclusivity

Are you interested in the futures of Transhumanism, healthcare policy, biomedical innovation, and creating inclusive and accessible systems for the people they serve?

This workshop is part of a Major Research Project which aims to identify the plausible futures of the Transhumanist movement, and offer future implications for policy creators and biomedical innovators to avoid creating systems that marginalize the people they are meant to serve, and products that are unattainable.

During the workshop you will be engaging in a question-storming session to discuss important questions or concerns when thinking about the aforementioned topics.

You will then collaborate on creating a set of plausible futures for these topics through the 2x2 Matrix Foresight Scenario Building method.

This workshop will be broken into two sessions. The first session will take place on Wednesday, September 22, and the second session will take place on Wednesday 29. Both sessions will be at 1pm EST

You are cordially invited...

You are invited to participate in a virtual workshop for a Major Research Project called 'The Ethical Cyborg: the Futures of Transhumanism and Inclusivity.' This workshop is led by Trevor Bell, a master's student at OCAD University, in the Strategic Foresight & Innovation Program. The purpose of this project is to explore the plausible futures of the biomedical field in regards to healthcare policy, biomedical innovation and the Transhumanist movement. Transhumanism is a field of study that "seeks to continue the acceleration of evolution of intelligent life beyond its current human form and human limitations by means of science and technology guided by lifepromoting principles and values (More & Vita-More, 2013, 3)."

Potential Benefits and Risks

Possible benefits of participation include gaining a deeper understanding of the current trends and emerging

issues regarding Transhumanism, healthcare policy, biomedical innovation and futures studies. This

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represents an opportunity to speak up and provide your own perspectives and concerns about a topic that could potentially affect us all in the future. In addition, you can benefit from participating in a design thinking methodology and learn from the process. There are no foreseeable risks associated with your participation in this workshop. This project has gone through an approval process with OCAD U's Research Ethics Board (REB) to mitigate any risk that could be incurred through this research. If you have questions regarding your rights as a participant in this project please contact:

Research Ethics Board c/o Office of the Vice President, Research and Innovation

OCAD University

100 McCaul Street

Toronto, M5T1W1

416 977 6000 x4368

research@ocadu.ca (mailto:research@ocadu.ca)

The REB number assigned to this project is 2020-86

Confidentiality

All information, thoughts, and opinions will be considered confidential and grouped with responses from other participants in separate workshops. Given the online format of this workshop, we ask that you respect any fellow participants by keeping all information that identifies, or could potentially identify a participant and/or any thoughts they share, private. Data collected from this workshop recruitment form will be stored in a password protected Microsoft OneDrive. Data will be kept until the end of the project in December, 2021, at which point all files will be permanently erased. Access to this data will be restricted to the Principal Investigator, and will only be shared verbally with the Principal and Secondary Advisors. Participants will be asked to share their occupational title, and given the option to have their name added to the list of contributors, or may choose to have all or part of their identity remain private. The option to remove identifiers from the list of contributors will remain open until the completion of the project.

Voluntary Participation

Participation in this workshop is voluntary. If you wish, you may decline to answer any questions or participate in any component of the study. Further, you may request to have any information data you create removed from the study until Friday, October 1, 2021. You may request to have any identifiers you provide removed from the list of participants before the project document is submitted in December, 2021.

Publication of Results

Data from these workshops will be used to inform the creation of a set of plausible futures for the Transhumanist movement, and will inform future implications for the fields of healthcare policy, and biomedical innovation. The final deliverables for this project will be published on the project website in November, in the forms of a report and an online virtual gallery space. In any publication of this project,

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data from these workshops will only be shared in an aggregate view, with no quotations, links to, or mentions of personal information.

Contact Information

If you have any questions about this study or require further information, please contact the Principal Investigator, Trevor Bell, through email: trevor.bell@student.ocadu.ca (<mailto:trevor.bell@student.ocadu.ca>), or the Principal Advisor, Greg Van Alstyne, through email: gvanalstyne@faculty.ocadu.ca (<mailto:gvanalstyne@faculty.ocadu.ca>)

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Consent

If you choose "No" for any of the following answers, it will be understood that you no longer wish to participate in the research workshop.

1. I agree to participate in this study, as it has been described. *

Yes

No

2. I have made this decision based on the consent information previously displayed. *

Yes

No

3. I understand that I can receive additional details about the project, and ask questions until the project is completed in December, 2021. *

Yes

No

4. I understand that I may withdraw this consent at any time, including during, and after the workshop. *

Yes

No

Registration

5. Your Name *

6. Email Address *

7. Are you 18 or older? *

Must be 18 or older to participate.

Yes

No

8. What is your area of work or professional/academic background? *

This information will appear on the list of project contributors.

9. Would you like any identifiers removed from the list of contributors that will be included in the final deliverable?

First Name

Last Name

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10. Please indicate which workshop(s) you will be attending *

	Sept. 22, 2021 1pm EST	Sept. 29, 2021 1pm EST	Both
Workshop	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. If you have any concerns with the times listed, or accessibility to the workshop, please let me know!

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

 Microsoft Forms

Appendix B: Trends and Emerging Issues

[Jump back to text.](#)



**THE
ETHICAL
CYBORG**

**The Futures of
Transhumanism and Inclusivity**

Project Overview

**Trevor Bell
Major Research Project
Strategic Foresight & Innovation
OCAD University
September 19, 2021**

Project Rational

This project addresses the possible futures of transhumanism, and the cultural and societal effects those futures could represent. History has shown us that when social and political systems are not created for, and by, the people they serve, they often do not serve those people's best interests, and turn into sexist, racist and classist systems. The wishes and concerns of the people who will be integrating future biomedical devices into their bodies should inform the directions biomedical designers and engineers pursue. Similarly, policy makers should work closely with people seeking to improve their lives through bionic integration, so that the system is not accidentally designed to exclude people in need who are otherwise already disadvantaged, and only provides to a privileged few. This project aims to create a set of future implications which will help guide, and decolonize the future of healthcare policy, biomedical design, and the transhumanist movement as a whole.

Research Question

How might we use planning and design to decolonize the futures of transhumanism through the lens of healthcare policy and biomedical innovation to promote the emergence of inclusive and accessible social systems that are anti-oppressive and free of sexism, racism and classism?

Trends and Emerging Issues

Its a love-hate relationship

Signals show that there are polarized opinions on the integration of bionics, and the notion of the transhumanist movement.

Description: The split between opinions on tech integration with the body places the conversation in a right-vs.-wrong position, and leaves little room for discussion and compromise. Some religious groups are against it, saying that to integrate tech into the body is to play God, and condemning those who integrate in a manner that nears hate speech. Other religious groups have their own sect of transhumanism, and embrace the movement as part of their belief system. There are individual champions of transhumanism who believe that the movement is the next logical step in human evolution, while other individuals believe that the movement is a conspiracy by the elite to become biologically superior.

Signals:

- Hollywood's Transhumanist Agenda, Kardashians Clone & 13 Satanic Illuminati Bloodlines ¹
- What is Mormon Transhumanism ²
- Whole Body Prosthetic ³
- Can we build AI without losing control over it? ⁴
- Body by Design ⁵
- Neil Mackay's Big Read: The Dawn of Transhumanism - Conversations with Dr David Eagleman ⁶
- The most advanced prosthetic in the world ⁷
- Can we create new senses for humans ⁸
- Pope Francis urges followers to pray that AI and robots "always serve mankind" ⁹

Implications:

- The transhumanist movement appears to some as a means to control by the "elite"
- Though traditionally secular, branches of transhumanism are appearing in popular religious circles.
- With the development of AI being formed in the context of a global race, will it be fully safe for neural implantation?
- Will the distribution of neural implants leave disenfranchised groups far behind?
- Affordable and accessible prosthetics will bring newfound ability to those who need it.
- Creating new sensors will drastically change the experience of one's Umwelt. Will interactions between people change when they do not share the same understanding of the world?

Extrapolations (15 years ahead):

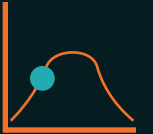
- The transhumanist movement will be more present in society, being largely accepted in political and religious circles.
- Neural and subdermal implants are commonplace.
- Disparities between economic groups now include integrated biotech which increases accessibility to the user.

Counter Trends:

- Anti-oppressive practices are being implemented more broadly, and will begin to be considered common practice. This makes accessibility tech more available to all demographics.

Trend Type: Technological, Social, Values

Maturity: Growing



1. Breaking the Matrix. (2020, June 10). *BTM Podcast S01E02: Hollywood's Transhumanist Agenda, Kardashians Clone & 13 Satanic Illuminati Bloodlines* [Audio Podcast]. Retrieved from <https://www.open.spotify.com>
 2. Cannon, L. (2015). What is Mormon Transhumanism?. *Theology and Science*, 13(2), 202-218.
 3. [Singularity Weblog]. (2013, September 4). *Transhumanist Natasha Vita-More on Whole Body Prosthetic* [Video]. YouTube. <https://youtu.be/8LucitzhNQ8>
 4. [TED]. (2016, October 19). *Can we build AI without losing control over it?* | Sam Harris [Video]. YouTube. <https://youtu.be/8nt3edWlglg>
 5. [TEDx Talks]. (2014, March 28). *Body by design - An iteration for life: Natasha Vita-More at TEDxMünchenSalon* [Video]. YouTube. <https://youtu.be/kwboDqrDm4g>
 6. Mackay, N. (2021, June 27). *Neil Mackay's Big Read: The dawn of transhumanism - conversations with Dr David Eagleman, the scientist creating a world of real superhumans in his laboratory*. The Herald. <https://www.heraldscotland.com/news/19401897-neil-mackays-big-read-dawn-transhumanism---conversations-dr-david-eagleman-scientist-creating-world-real-superhumans-laboratory/>
 7. [TEDx Talks]. (2018, July 24). *The most advanced prosthetic in the world | Ablert Chi | TEDxPortland*. [Video]. YouTube. <https://youtu.be/1KZfoS6moLA>
 8. [TED]. (2015, March 18). *Can we create new senses for humans?* | David Eagleman [Video]. YouTube. <https://youtu.be/4c1qFXHvqI>
 9. Vincent, J. (2020, November 11). *Pope Francis urges followers to pray that AI and robots 'always serve mankind'*. The Verge. <https://www.theverge.com/2020/11/11/21560076/pope-franciscan-ai-for-good-pray-serve-mankind>
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Adams, T. (2017, October 29). *When man meets metal: rise of the transhumans*. Retrieved September 18, 2021 from <https://www.theguardian.com/technology/2017/oct/29/transhuman-bodyhacking-transspecies-cyborg>

Decolonizing the Cyborg

Signals are showing that there are schools of thought that are more inclusive, and ethical than those at the forefront of transhumanism.

Description: Transhumanism is predominantly led by white and wealthy individuals. In the western world there are many examples of systems designed by the white ruling class which are self serving. Schools of thought like those found in afrofuturism offer human centered approaches to social movements like transhumanism. When a movement is led by the wealthy, its innovations are largely only attainable to the wealthy. Frugal innovation practices ensure the accessibility of emerging products.

Signals:

- Does Africa Dream of Androids? ¹
- Engaging the Black Ethos: Afrofuturism as a Design Lens for Inclusive Technological Innovation ²
- AfroFuturism as Intersectional Transhumanism ³
- Frugal Innovation ⁴
- UTSA alum takes next step in developing affordable bionic prosthetics ⁵
- Nature Offers Clues to Designing for Health ⁶

Implications:

- The African approach to biomedical innovation offers a human centered, and inclusive methodology to the implementation and utilization of technology with the body.
- Afrofuturist design frameworks can be used as exemplary means to accessibility and ethical innovation.
- Without a more human centered approach, transhumanism, as it largely functions now, will likely fail to consider disenfranchised groups as core members of the movement. .
- Innovators should consider what parts of their designs are bells-and-whistles vs. a needed function.
- Material costs should be kept in mind if bionics are intended for the masses.
- The prosthetics market will start to see quality prosthetics at lower prices.
- More people being able to afford limbs means more feedback for product improvements.
- Biomimicry can inspire the creation of 3D printed joints which are more complex than other manufacturing procedures.

Extrapolations (15 years ahead):

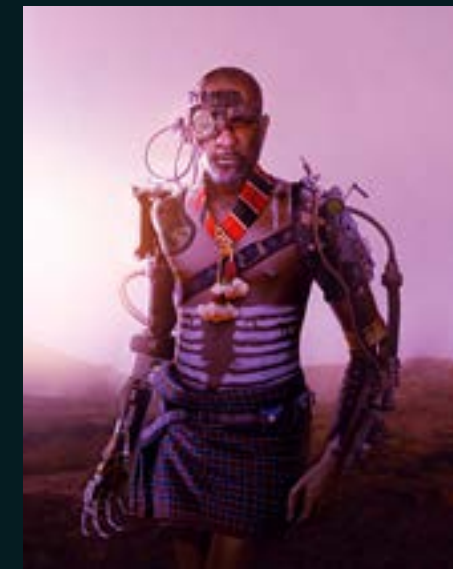
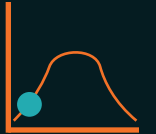
- AfroFuturist values are visible in transhumanist practice.
- Biomedical innovations are made affordable, leveling the disparities between prosthetics users from differing economic classes.

Counter Trends:

- High-end prosthetics and implants can only be afforded by the wealthy, further disenfranchising lower-class individuals seeking care.

Trend Type: Technological, Environmental, Economic

Maturity: Emerging



1. Okoye, F. (2017). Does Africa Dream of Androids?. *Disability and the Global South*, 1(1), 64-84.

2. Winchester III, W. W. (2019). Engaging the Black Ethos: Afrofuturism as a Design Lens for Inclusive Technological Innovation. *Journal of Futures Studies*, 24(2), 55-62.

3. Okoye, F. (n.d.). *AfroFuturism as Intersectional Transhumanism*. [Lecture].

4. [Frugal Innovation]. (2016, June 30). *Frugal Innovation*. [Video]. YouTube. <https://youtu.be/DnQ17ndgx3Y>

5. SBG San Antonio Staff Reporters. (2020, November 3). *UTSA alum takes next step in developing affordable bionic prosthetics*. <https://news4sanantonio.com/news/local/ut-sa-alum-takes-next-step-in-developing-affordable-bionic-prosthetics>

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Photo retrieved from:

Feyissa, S. (2020, June 24). *Serengeti Cyborg*. Flickr. Retrieved September 18, 2020 from. <https://www.flickr.com/photos/solen-feyissa/5004011491/>

Accessible Policy

Signals are showing that healthcare systems for access to prosthetics are not attainable to the majority of people seeking care.

Description: Current western health policy does not ensure patients will receive the quality care they need. More work needs to be done to understand a patient's experiences after amputation, or during rehabilitation across all levels of healthcare. Closed-system innovations or policies subject patients to those service systems, which can incur unaffordable costs, or exclude those who can't afford to buy in.

Signals:

- The Role of National Culture in Shaping Public Policy: A Review of the Literature ¹
- Cyborgs and Stigma: Technology, Disability, Subjectivity ²
- Understanding the unintended consequences of public health policies: the views of policymakers and evaluators ³
- DUCKWORTH, BLACKBURN INTRODUCE BIPARTISAN BILL ENSURING ACCURATE DATA ON ACCESS TO PROSTHETICS FOLLOWING THE AMPUTATION OF A LIMB ⁴
- Ethics in Rehabilitation: Access to Prosthetics and Quality Care Following Amputation⁵

Implications:

- Policy makers have to understand how to develop policy that seems counter to the cultural majority - Policy that supports minority groups more than the majority.
- Policy workers should work alongside innovators as new tech emerges to regulate adverse uses.
- Stakeholder-led evaluation of policy could help reduce unintended consequences.
- To improve current access to care systems of amputation care and education would have to provide more locations capable of assessing and handling different treatment regimens.

Extrapolations (15 years ahead):

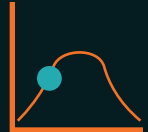
- Policy workers have reduced the pain points felt by patients navigating the healthcare system.
- Policies are put in place to make prosthetics and implants more accessible to people with limb loss and limb difference.

Counter Trends:

- Emerging prosthetic innovations take time to become available to patients with basic health coverage, and remain unattainable when they do.

Trend Type: Environmental, Social, Values

Maturity: Growing



1. Coombs, H. C. (2014). THE ROLE OF NATIONAL CULTURE IN SHAPING PUBLIC POLICY: A REVIEW OF THE LITERATURE KATHERINE DANIELL.
 2. Cromby, J., & Standen, P. (1999). Cyborgs and stigma: technology, disability, subjectivity. In *Cyberpsychology* (pp. 95-112). Palgrave, London.
 3. Oliver, K. et al. (2019) Understanding the Unintended Consequences of Public Health Policies: the views of policymakers and evaluators. *BMC Public Health*, 19(1057). <https://doi.org/10.1186/s12889-019-7389-6>
 4. Tamy Duckworth U.S. Senator for Illinois. (2021, April 14). DUCKWORTH, BLACKBURN INTRODUCE BIPARTISAN BILL ENSURING ACCURATE DATA ON ACCESS TO PROSTHETICS FOLLOWING THE AMPUTATION OF A LIMB. <https://www.duckworth.senate.gov/news/press-releases/duckworth-blackburn-introduce-bipartisan-bill-ensuring-accurate-data-on-access-to-prosthetics-following-the-amputation-of-a-limb>
 5. Pasquina, P. F., Carvalho, A. J., Sheehan, T. P. (2015, June). Ethics in Rehabilitation: Access to Prosthetics and Quality Care Following Amputation. *American Medical Association Journal of Ethics*, 17(6), 535-546.
- Photo retrieved from:
Ledbetter, S. (2021, January 7). *Does Medicare cover prosthetics*. Medical News Today. Retrieved September 18, 2021 from. <https://www.medicalnewstoday.com/articles/does-medicare-cover-prosthetics>

Birth of Systemic Problems

Signals are showing that portrayals of the lives of people using prosthetics do not accurately convey their living situation.

Description: The media showing stories of people using prosthetics only show part of the story. Quick transition shots between gestures and function hide the time it takes even the most advanced prosthetics to assist the user with a task. These portrayals create a false sense that prosthetic innovations are creating a great difference in the lives of users, when really the true difference would come from designing the lived world to be more accessible. Part of that includes the design of policy which makes prosthetics more accessible.

Signals:

- COVID-19 Disproportionately Affects Limb Loss and Limb Difference Community¹
- 452 - The Lows of high Tech²
- Reality, Just Out of Frame³
- Dublin dad's struggle to afford new prosthetic leg after his broke⁴
- Ethics in Rehabilitation: Access to Prosthetics and Quality Care Following Amputation⁵

Implications:

- In times of crisis, such as COVID-19, people who are dependent on care systems are unable to access them.
- The assumption from able-bodied people and designers is that bodies need to be fixed with a prosthetic, instead of designing the world to be more accessible.
- Able-bodied people have a false understanding of the limitations experienced by people using prosthetics.
- With the growing number of people needing prosthetics, assistance from healthcare is likely to become more scarce.

Extrapolations (15 years ahead):

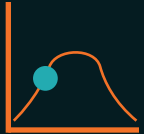
- Investors with interest in the pursuit of longevity research and assistive implant innovations put funding into this research, but do not focus their investments in accessible systems.
- The growing number of people with limb loss and limb difference outgrows the capacity of healthcare programs and prosthetics manufacturers.

Counter Trends:

- Investors focus on making the lived world accessible.
- Healthcare policy brings patients from amputation to prosthetic fitment and upkeep at affordable rates.

Trend Type: Environmental, Social, Values

Maturity: Growing



1. Amputee Coalition. (2021). *COVID-19 Disproportionately Affects Limb Loss and Limb Difference Community*. [White Paper]. Amputee Coalition. <https://www.amputee-coalition.org/wp-content/uploads/2021/04/COVID-19-Disproportionately-Affects-Limb-Loss-and-Limb-Difference-Community-.pdf>
 2. 99% Invisible. (2021, July 27). *452 - The Lows of High Tech*. [Audio Podcast]. Retrieved from <https://open.spotify.com/episode/ohDKuySLzZjPsXq9pERFko?si=87c2544d09c74da2&nd=1>
 3. Hussaini, A. (2021, May 26). *REALITY, JUST OUT OF FRAME*. Amplitude. <https://livingwithamplitude.com/truth-in-advertising-prosthetics-amputees-reality-just-out-of-frame/>
 4. Walsh, K. (2021, February 23). *Dublin dad shares struggle to afford new prosthetic leg after his broke*. RSVP Live. <https://www.rsvplive.ie/life/dublin-dad-shares-struggle-aford-23518049>
 5. Pasquina, P. F., Carvalho, A. J., Sheehan, T. P. (2015, June). Ethics in Rehabilitation: Access to Prosthetics and Quality Care Following Amputation. *American Medical Association Journal of Ethics*, 17(6), 535-546.
- Photo retrieved from:
Caldwell, A. (2020, December 29). *Even after long-term exposure, bionic touch does not remap the brain*. UChicago News. Retrieved September 18, 2021 from <https://news.uchicago.edu/story/even-after-long-term-exposure-bionic-touch-does-not-remap-brain>

Appendix C: Foresight Scenarios for the Future of Transhumanism in 2036

[Jump back to text.](#)



**THE
ETHICAL
CYBORG**

**The Futures of
Transhumanism and Inclusivity**

World Building & Scenario Writing

**Trevor Bell
Major Research Project
Strategic Foresight & Innovation
OCAD University
October 15, 2021**

Scenario 1: Accessibility in All the Right Places

Healthcare & Disruptive Tech are Accessible

The Covid-19 pandemic not only exposed the societal crack that was the state of eldercare, it chiseled it wide open. If the oldest among us weren't dying horrifically, they were stranded and isolated, left to fend for themselves physically, emotionally, and socially with whatever strength they had. In the aftermath, Gen X, Millennials, and even a young Gen Z vowed they'd never go through what their parents and grandparents did. In response to preparing for future pandemics, they screamed "We will not be left to rot!"

This meant getting strong. So strong that even the invisible could not take them down. This was especially important in countries with aging populations in which the future elderly would have fewer younger people to help them in a crisis.

The momentum that pushed record-breaking development and implementation of the Covid-19 vaccine sent a wave barreling through every technological industry. While some of the post-pandemic tech renaissance continued to send billionaires into space, the average citizen set its sights on transformed healthcare, human resilience, and longevity, and to this industries and governments listened! By 2027, 25% of adults over 65 proactively integrated some form of technology with their bodies to enhance their physical performance. Just three years later, this was also true of adults over 45.

In 2036, technological body modifiers have proliferated beyond what mostly started as mobility and health enhancers. Immediately post-pandemic, the top modifiers included exoskeleton limb stability for people with mobility challenges, organ supports to keep hearts and lungs pumping long after they would have normally worn out, and neuron reinforcers for those predisposed to dementia and Alzheimer's. In the present world, body modifiers go beyond maintaining what humans have been able to do in the past, and instead help us realize our greatest biotech dreams. Interestingly, these biotech dreams are increasingly inspired by the natural world that is rapidly vanishing amidst climate change.

Examples of these are the rise of Marsupialism and Trans-Specieism. The Marsupialism movement was driven by those (mostly female-bodied people) who wanted to be able to share the pregnancy experience with their partners and those who wanted the experience but lacked a functioning uterus, or a uterus altogether. The body modifier that allows partners to share the experience and responsibility of gestation resembles a marsupial's pouch. When this technology is integrated, it allows parents to pass the fetus back and forth within a seamless nurturing environment.

Like Marsupialism, Trans-specieism also looks to innovations in non-humans to develop beneficial body modifiers. Embracing features from outside our species has also eliminated negative attitudes towards what used to be termed "species dysphoria" (i.e. the belief that one has been born with the body of the wrong species). In 2036 it is normal to not only identify with an animal or a plant, but also to bear some physical and behavioral characteristics of that species through body modifiers. Overall, body modification has become an important outlet for self-expression which, in turn, is seen as a necessity for wellness.

"Aging" is no longer synonymous with the body breaking down. Wrinkles, stooped posture, and reduced coordination and strength are rare in 2036. Instead, you might get an indication of how long someone has been around by how many modifications they possess. By no means is this a rule though, as integrating body modifiers starts at a young age, with many doing so when they are still minors. As such, life expectancy has been repositioned to 120 years. But "life expectancy" is a tricky concept. With a seemingly endless stream of new body modifiers capable of prolonging "life", how will we determine when someone has in fact died, or is just in need of an overhaul? This and many other questions are at the heart of public debate and policy development in 2036.

Day in the Life

Day in the Life

"Hello, thanks for switching to video"

"Hi, no problem"

"Do you mind if I put you on universal screen? No one else is here."

"Yeah, sure."

"Great. How can I help you?"

"I'm need some support with a body modification. It's the Co-Ala 2."

"Ok, yes, I have your file here. What's the problem?"

"It's a bit convoluted, but basically I just found out that the fetus daycare we're hoping to use isn't compatible with it, but I can't do the Roo or the Walla-BB because the positioning of the opening doesn't work with another one of my body modifications. I have a custom core strengthener that needs an extra 3 inches below my ribcage."

"I see. Your file shows that there are two other carers sharing the external womb experience with you. Do they have any body modifications that need to be accommodated?"

"They do but they don't affect the area. Mostly limb modifiers."

"Ok, great. Are you able to show me your core strengthener? I'd just like to get a look at the position of the lower penetrations...ahhhh...yeah, ok. I see exactly what you mean. The up-facing pouch won't work. Are you familiar with the Womb-At? It's now authorized at all daycares."

"No, I thought it was still pending."

"Yeah, it's good to go now. It's the same lower opening as the Co-Ala, so it should work for you."

Everything else is pretty much the same. Do you want to give it a go? I can schedule the refresh for you."

"Yes please. All three of us are unable to carry next week so we definitely need to do daycare. When can it be done?"

"We can schedule it anytime really. We'll do it in two batches. Two of you will go first while one of you continues to carry. Once everything is ready to go with the other two, you'll do a transfer and then we'll refresh the last one. We just need to know who will be carrying during the first refresh and when you want it to begin."

"Ok, we'll sort that out on our end here and let you know. I assume I can just create a request in the system like I did last time?"

"Yes, exactly. And of course, if you need any help with anything, let us know. We're happy to help."

"Ok, thanks. I'm just relieved we have a solution. Thanks again."

Scenario 2: Healthy and Wealthy Cyborgs

Healthcare is Exclusive & Disruptive Tech is Accessible

In 2036 cultural debates in the western world about inclusivity are sparked by the lack of accessibility to prosthetics and implants through healthcare, and the growing disparity between classes as services cater more to transhumans.

With the ever increasing number of products requiring internet connectivity, the need for data farms grew. This combined with the increased number of people purchasing electric vehicles put a strain on electrical grids. Though many countries are turning to green energy sources, the use of fossil fuels is still needed to fulfil the demand for energy. The creation of computer chips has also contributed to environmental damages. The process of mining for resources, such as silica, pollutes the air and water. After El Salvador's successful switch to crypto currency in the 20's, more countries followed suit. This switch increased the value of IoT (Internet of Things) for their bitcoin mining capabilities, some of which now include the wearable tech and implants on the market. Many governing bodies pass healthcare policies that prevent disruptive technology from being offered by health providers. This sparks a debate about the ethics of transhumanism, and the autonomy to choose what to do with your body. The inability to acquire affordable implants through healthcare opens the door for a market for wearable smart tech that fulfills the needs of people looking to become transhuman. This inaccessibility also creates a culture of backdoor procedures using innovations from small scale operations or self made devices.

The unattainable nature of smart prosthetics and implants makes transhumanism a status symbol. Services cater to those with implants by creating preferred access that helps users bypass system pain points. This improvement of quality of life for those who can afford implants and wearable tech broadens the wealth and opportunity gap between classes. Now we see exclusive membership clubs and institutions like private schools for transhumans. Now we are starting to see private health organizations offering implant services at high rates. Funding from the super rich fuels fast innovation to improve upon the market of high end implants, and strays away from the frugal innovation that make these technologies affordable for those who need them but can not currently access them.

Day in the Life

Jacob absentmindedly turned the wheel of his car as he made his way through the hills of Upstate New York. He stared through the passenger window, mesmerized by the rows upon rows of wind turbines, not worried about the road before him - the car mostly drove itself after all. Jacob's focus returned as the car started to make its ascent up a winding mountain road, signaling the last leg of his trip.

Appointments with this sort of clientele always put him on edge, and he had to mentally prepare himself. As he approached the front gates, Jacob couldn't help but notice the grandiose changes to the property and mansion since his last visit 3 years ago. A wave of his wrist at the gate's intercom opened the doors, and the home's AI said, "Welcome Mr. Richards. I will notify Michael of your arrival."

As the car pulled around the drive to the front door, Jacob checked the contents of his scrub bag one last time, and got out to unload his luggage. With a downward flick of his wrist he locked the car, and swept his arm to summon his bags to follow him. Jacob noticed a teen sitting on the flagstones of the garden, leaned up against a fountain. Their eyes were glazed over, and they were talking to no one Jacob could see, no doubt using a neural link to chat with a friend. "Prolly one of those cyborg private school students," Jacob thought, observing their school uniform. "Classist. Does them no good to separate them from kids without implants."

The front door opened and Michael yelled "Hey, Jacob! Come on in. I gotta show you my new collection of NFTs. Going to be selling some to a museum later this year. I've got several from the 20's that'll go for a couple billion."

"There's nothing I'd like less," Jacob thought. "I'm actually on a tight schedule," he said, "Gotta make it back to the city before morning."

"Well, I appreciate you coming on short notice," Michael said, "I'm going to an off-grid retreat where I won't be able to charge my chip. Got a couple NFTs on here that I'm not ready to release to the public yet, so I gotta keep 'em close. I also have it mining for bitcoin, and I wouldn't want to pause that. Always stay on the grind, am I right, Jacob? Oh, this is my new partner, Emily."

"Yes, Sir." Jacob replied as he greeted Emily, though he saw little resemblance of Michael's work in what he would consider 'grind'.

"I couldn't help but notice the lack of "Dr." in your title, Mr. Richards." Emily said, with a skeptical gaze.

"Medical school was just a little too much money. And there's a couple loopholes that allow me to do what I do." Jacob explained as he searched his luggage for the device he would be implanting.

"Jacob is the best of the best when it comes to personalized devices," Michael assured Emily, "He started out by revolutionizing the prosthetics game. Made it to the big leagues now though, eh Jacob?"

"This is your new charger," Jacob explained to Michael, ignoring the comment, "I'll implant it in your Ulnar artery, next to your chip. When it needs to charge, your blood flow will turn a hydraulic turbine, and you'll feel a slight tingling in your fingers since the blood flow to them will be slowed. Nothing crazy though."

Jacob set up and sterilized his mobile surgical tent and began the procedure. He had only developed this turbine charger a month ago, but had already performed the procedure a dozen times on various members of high society, so the process was familiar and didn't take long. As Michael recovered from the anesthesia, Emily transferred a large sum of crypto to Jacob's account, and he went out to his car. He laid out on the reclined seat and prompted the car's AI, "Back to the Big Apple car, and can you make the usual crypto transfer, please."

"Alright," said the AI, "Off we go. Making a crypto currency transfer to Bronx Amputee Coalition."

Scenario 3: Black Market Body Mods

Healthcare is Accessible & Disruptive Tech is Inaccessible

It seems we've managed to provide accessible healthcare for all – to a certain degree. Although basic healthcare needs are accessible – available amenities, procedures, and facilities are crude and outdated. That said, they'll keep you fit and healthy enough to show up to work tomorrow. A small, affluent portion of the population appears to be able to access the most cutting edge in disruptive health-tech technology. While the government does allot a few giveaways each year through a lottery system, the maintenance and upkeep costs will eat away at your retirement.

Decision making appears to be relegated to those with tech-enhanced decision-making skills. It used to be that the Ivy League produced the elite of society. That's still the case, except now, its white, male, tech-infused Harvard grads. You rarely see a non-augmented CEO or senior politician these days. The rich seem to live forever. Well, it's unclear if they are, but they definitely don't seem to look or act older. They're all so smart and full of life. It's...kind of weird. AI enhanced vision, improved memory and recall, bionic joints – the 1% is increasingly superhuman.

We used to bet on younger generations assuming influential positions, but that doesn't seem to be the case anymore. Not only are they not retiring, 70-year-old politicians and business moguls are challenging each other to boxing matches on pay-per-view streaming. Trump would've been all over it if he was still alive. Speaking of which, that last US presidential debate was something – it was like they were speaking at warp speed.

The likes of Elon and Bezos have been busy funding outlandish health-hacking technology – integrated right into your body. They've exploited loopholes in developing countries to extract, pollute, and hire low-wage workers. You can snag a special discount on some packages with the purchase of a Tesla Model XIX Smart Home, or a premium Amazon Nano-Bio-Club Membership. As for the rest, you just might be able to snag a few of the beta-testing models off of the black market. Proceed at your own risk however, some of these implantation procedures have resulted in some unfortunate accidents.

Day in the Life

Eren awoke in a hospital bed, having just undergone an appendectomy. Attached to the foot of the bed are several screens displaying various messages. One reads that the operation was successful, while the other displays a countdown timer. The timer reads "HOSPITAL DISCHARGE: 8:27:01". "Rough..." Eren mutters. Eren closes their eyes to rest.

Eren wakes up again, this time involuntarily due to an alarm. The timer has reached zero, it's time to leave the hospital. The display then reads another message "DON'T FORGET YOUR MEDICATION". Below the message is an arrow, directing Eren to look leftwards. "Ah...these should help me get by". With everyone working from their own home's, most workplaces allowed only 2 days of sick leave. Eren takes a painkiller, and awkwardly stumbles out of the hospital.

Riding the bus home, Eren passes by a billboard advertising Amazon's Preventative Health Analytics Suite, "99% Percent Accuracy, Easy Implantation!". The device integrates right into the central nervous system. It not only serves as an early warning system; it directly communicates with the brain – signaling it to instruct certain cells to behave a certain way; thereby avoiding illness all together. "Too bad I'll never be able to afford that", Eren says as they clutch the pack of painkillers.

Now at home, Eren checks their email. Surprise surprise...it's a message from the company CEO. Last quarter's earnings were low, so we're expected to work overtime to make up for it. "These guys don't get it anymore", Eren mutters, "We're already working overtime...Ever since productivity health-tech implants came out, it's like some people have forgotten what it's like to be human."

Fed up, Eren spends the afternoon browsing the deep web in search of black-market health-tech products. "I'll bite the bullet; I don't have much to lose anyways." That night, Eren finds their way to an apartment complex to meet a black-market health-tech dealer. The man online said that they perform the implantation operations in the same place and on the same day...Seems suspicious, but it's a good deal compared to what's out there. The next morning, Eren wakes up – this time in another hospital bed. Eren can think, but they can't move or speak.

Scenario 4: Piracy and Privatization of Health

Healthcare is Exclusive & Disruptive Tech is Inaccessible

Over the last decade and a half, healthcare has lost public funding. The healthcare sector is swallowed whole by corporations like Amazon Health, IBM Watson Health, and others. Because of this, the system can no longer offer what it once could, accessible and affordable care. By 2036, this field is completely privatized and aims to solely provide care, research, and resources to the people who fund it.

But how?

In the early 2020s, the Covid-19 pandemic placed an enormous strain on healthcare services and assistive technology practitioners. During these early years, we saw market growth with orthosis, prosthetics, and human enhancements. There was an increasing need to promote health coverage and support to amputees and patients with disabilities, creating a large emphasis on quality maintenance and development.

However, the pandemic pushed an already financially unstable world over the edge, forcing governments to cut public funding and support programs for their citizens and work towards more privatized healthcare systems. During this process, governments found it helpful to change policies and lift restrictions that existed over large corporations to allow them to lead innovative development, creation, and research in many of the public sectors. And although this act of freeing corporations at the time seemed to be the right move for the western world, it hurt citizens more.

Over the next few years, the development of wearables, haptics, prosthetics, and bio interfaces technology for human enhancements increased. And while the development of technology increased so did pollution and a rise in the consumption of plastics. This assisted in an escalation in the detrimental climate crisis. Throughout the mid-2020s, governments implemented policies in an attempt to slow climate change, but they created these changes without a transition and implementation plan to sustainable living. Because of this, natural resources for development were scarce.

Governments did not think about the short-term effects of rushed policy changes and reaped the repercussions of being unable to afford the resources needed for development. Large corporations, on the other hand, had no problem at all. Because of their size, influence, and funds they were able to transition into green living and development with ease - limiting competition in the market. This difference in affordability highlighted the disparities between lower and upper-class increases.

Due to the increase of natural disasters (flooding in southern Canada, forest fires on the east coast of North America, and Hurricanes on the west coast), diseases and illnesses, and injuries, there is an increased need for human enhancements. Because of inaccessible healthcare and the need for enhancements, more and more citizens are forced to underground facilities that practice outdated and impractical supports or are forced into guinea pig trials for new enhancements for the rich.

Day in the Life

Rae sits in a dimly lit studio apartment on the east side of Brampton. The eerie grey sky seeps in through her blinds onto the kitchen floor. Her leg tremors as she nervously sips from her glass of water. She was unable to sleep throughout the night because her shakes seem to worsen when she sits still or tries to. She begins to swipe through her tablet looking at headlines about new Amazon Health Inc. prosthetic enhancement being released in the next month. Rae was optimistic when she joined the trial sessions for the leg prosthetic last year. For \$2,000 CAD and a new prosthetic, it seemed like a pretty good deal, and although it was great at the beginning, the glitches, bruising, rashes, and tremors that followed were not worth the money. And now after a few months, Rae can barely stand on her own for longer than 20 minutes. But she needed the money and the prosthetic. Anything less than the model 8 isn't given a second glance in the streets, and she was sick of being overlooked.

Rae gets up from the kitchen table, picks up her keys, and leaves the apartment. Jogging down the flight of stairs and out the foyer, she sees rain clouds up above. Rain droplets fall gently onto Rae's cheek as she runs across Bramalea road. It's the first time in almost two weeks that she has been able to go outside without an umbrella and not get drenched. She despises the smell of a rainy city, the sewer system is unable to maintain last weeks' worth of rain, so the city smells like shit and wet pavement.

She was heading to Amazon Health Inc. for her weekly assessment and to finally receive her new upgrade for being with the project for the last year. And for every assessment she attends she's paid another \$50 CAD, money she can't afford to turn down.

As she walks through the front entrance her attention is turned to the screen above the registration table. Another flood in western Toronto. She's surprised people still live there, with the amount of injuries flooding causes each year she wonders how any of these people will afford enhancements and upgrades, how can they if she can't afford them? Luckily, she joined the trials.

The receptionist asks for her name, age, and address, Rae obliges, "Rae Castillo, 31, 1546 Dixie Road" "Oh, and you're here for the assessment and upgrade I see... well you won't be receiving the upgrade and today will be your last assessment."

"Wait, what do you mean?" Rae was in disbelief.

"I mean that this trial is for 18 to 30-year-olds and you're 31." The receptionist said with a smirk. She carried herself with entitlement, Rae hated that.

"By 3 days! And I stated that at the beginning of the trial, I was told because we were ending the same week it would be ok!" Rae was furious, she double-checked, she was sure of it.

"I can't help you, there is nothing here in your records that state that."

"Please, I need this, I can barely stand with this fucking glitch!" Rae pleaded. There was no other option, Amazon Health Inc. was an exclusive corporation for enhancement development and distribution, even the underground market would not have the resources to fix this for another few months.

"Too bad there is no record of it in our system. We thank you for being a part of our trial and please feel free to review our website for other upcoming trials." The receptionist had determined that the conversation was finished and continued with another client.


"I'm fucked with this defect and no money to fix it," Rae thought to herself as she defeatedly sat down in the waiting room, awaiting her last assessment and \$50.

Appendix D: Creatives Consent Form

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Call for Artists and Designers

You have been contacted by what we call a creative in the process of the digital gallery of futures at the University of Sussex. This is a Major Research Project which aims to identify the plausible futures of the transformation of movement and offer future implications for healthcare, creative industries and general social innovation towards creating systems that will generalize the people they are most to serve and products that are unattainable.

* 

What's Involved

As a co-creator you will be creating a 3D Object from the future that will be produced what the world would be in different plausible futures concerning the climate and ecosystem. Workshops on this subject (September 20-21) will create the future scene drawing that you will use as a model for your work. You will have a 10 October 2023 to create a proposal and until November 10 to submit your completed work. A winner will be digitally reproduced into a virtual gallery of the original investigator's project website for public viewing on November 10.

The final work of the 3D Object is a public art piece. The cost of creating the final 3D art of the future will be paid in accordance with ARPA 2024. The material cost will be £100. About 1000 CAD/CAM the gear produced in the museum project is a 3D print. The printing institution will pay the cost of the print. It is £1000. This means that the single work cost will be £1000. The maximum fee of \$15,000.

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Potential Benefits and Risks

Now we describe the potential benefits of this project. It has a clear potential to contribute to the development of a health care policy that is fair, innovative and future-oriented. This subject presents an opportunity to use your creative talents to provide your own perspectives and future recommendations that could fundamentally affect us all in the future. There are no foreseeable risks associated with your participation in this project. Our Creative Commons license will be sent to you to protect your rights to your work. Before it is processed in the form of your report, the information will be given a thorough approval process with OIAAP and Research Ethics Board to mitigate any risks that could be incurred through this research. Your time and expertise is being valued as a participant in this important social and

research ethics board are chairs of the vice President, Research and Innovation

U. of T. Toronto

100 McCaul Street

Toronto, M5T 1A5

416-977-8000 x1369

For more information contact: info@oiaap.utoronto.ca

The PTE number assigned to this project is 2020-18

Appendices

Voluntary Participation

Participation in this project is voluntary. If you wish, you may choose to withdraw from this project at any time, or to request withdrawal of works submitted prior to November 22, 2017.

Appendices

Contact Information

For more information on this study or any of our other research, please contact the Research Coordinator, Research Management, ResearchAssistant@hawaii.edu or 10960@hawaii.edu or the Project Assistant Coordinator, 10960@hawaii.edu or 10960@hawaii.edu.

Appendices

Consent

If you choose "No" for any of the following answers, it will be understood that you no longer wish to participate in the research workshop.

1. I agree to participate in the project as described above *

- Yes
- No

2. I have made this decision based on the consent information previously displayed *

- Yes
- No

3. I understand that I can receive additional details about the project, and ask questions until the project is completed in December, 2021 *

- Yes
- No

4. I understand that I may withdraw from the project prior to the launch of the Virtual Gallery on November 22, 2021. *

- Yes
- No

5. I understand that I may request to have my work removed from the Virtual Gallery at any point, and that the Principal Investigator will remove my work from the Virtual Gallery within one month of my request. *

- Yes
- No

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6. I understand that the Principal Investigator has the right to remove any works from the Virtual Gallery space, after the project launch, that are deemed offensive by the public, and hurt the projects credibility. *

Yes

No

7. Name *

8. Email Address *

9. Are you 18 or older? *

Must be 18 or older to participate.

Yes

No

10. What is your area of work or professional/academic background?

This information will appear on the list of project contributors. *

Appendices

11. Would you like any identifiers to be removed from the list of contributors that will be included in the final deliverable, or from the artifact descriptions in the Virtual Gallery?

First Name

Last Name

This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

 Microsoft Forms

Appendix E: Creative Commons Form

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Loan and License Agreement for Virtual Display of Artwork

This Loan and License Agreement is made by and between Trevor W. Bell (hereafter referred to as "Trevor") and the artist, designer or creative (hereafter referred to as "Lender") concerning the Lender's rights to their artwork (hereafter referred to as "Work").

About

Trevor wishes to launch a public virtual gallery on their project website, ethicalcyb.org, consisting of photographed art pieces, written work, digital analog (such as film), and other art deemed appropriate for the context of the project. Artworks will be uploaded in or around November 2021, with virtual viewing of the gallery space to begin after the project launch. The Lender wishes to participate in the project by submitting Work(s) to Trevor for the purposes of displaying the Work in the project's virtual gallery space. Now therefore, in consideration of the foregoing and the promises contained herein, Trevor and the Lender mutually agree as follows:

1 Authority to Enter into Agreement

The Lender warrants that the Lender is the sole and exclusive original artist of the Work and retains all rights associated with ownership, including the authority to license the use of the Work.

2 Ownership of the Work

The Lender retains all rights, including copyright and other intellectual property rights, to the Work. The Lender retains the right to reproduce, modify, print, enter into other non-exclusive licenses, or sell the Work or copyrights in the Work. Trevor expressly acknowledges that he has no rights to the Work, except those rights agreed to in this Agreement.

3 Nature of Exhibition

The virtual gallery will be launched on the project website, ethicalcyb.org. Trevor reserves the exclusive right to amend, shorten, extend, or terminate the virtual gallery at any time in his sole discretion.

4 Use of the Work

The Lender grants Trevor a non-exclusive and royalty-free license as follows: (A) To reproduce, publish, use, broadcast, publicly display the Work in its entirety or in any portion, individually or in a collective work or other compilation in any form, including but not limited to, the exercise of such rights through internet or intranet sites, computer on-line services, and all other media and distribution mechanisms now known or later developed, for use solely in conjunction with any project purpose. (B) To reproduce, print, copy, broadcast, and distribute the Work for marketing and promotional purposes by any method that Trevor, in his discretion, deems appropriate, including both electronic and physical reproduction and distribution (without geographical limitation) and also gives permission for Trevor to display the Work on the project website, ethicalcyb.org. (C) To use Lender's name, voice, photograph, biographical information, and likeness in connection with the Agreement provided that any such uses are in connection with Trevor's purposes.

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5 Location of the Work

(A) The Lender expressly acknowledges that Lender will have no choice, say, control, direction, input, or otherwise into the virtual location of the Work. The Lender expressly acknowledges that Trevor shall retain sole and complete discretion and control over the location of the Work. The Lender recognizes that the Lender's Work will be located on the project website, ethicalcyb.org. (B) Should the Lender object to, or disapprove of, the virtual location of the Work, the Lender may demand the virtual removal of the Work as set forth in this Agreement.

6 Loan Period

(A) The loan period shall be deemed to commence upon the digital submission of the Work to Trevor at a time agreed upon by both parties. The loan period shall terminate upon the conclusion of the virtual gallery exhibition (this loan period shall be referred to as the "Loan Period"). (B) Each Work shall be deemed on virtual loan to Trevor during the Loan Period. Either the Lender or Trevor may terminate the Loan Period at any time. Upon termination of the Loan Period this Agreement shall also terminate.

7 Compensation

The Lender agrees to loan Trevor the Work during the Loan Period free of charge. The Lender agrees that Trevor is not responsible for any costs, rents, expenses, fees, royalties, or otherwise associated with the display of the Work.

8 Safekeeping, Security, and Risk

The Lender expressly acknowledges that the Work will be located on a virtual platform.

9 Integration

This Agreement is an integrated contract and sets forth the entire agreement between the Parties hereto with respect to the subject matter contained herein. All agreements, covenants, representations and warranties, express or implied, oral or written, of the Parties hereto with regard to such subject matter are contained in this Agreement.

Title of Work

Lender Name

Lender Signature

Date

Borrower Name

Borrower Signature

Date

Appendix F: Website Content Warning

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Appendix G: Website Comment Box Terms of Use

[Jump back to text.](#)

Terms and Conditions for Submission of Comments

The following describes the terms and conditions to your use of the “comments” submission service on the Ethical Cyborg website.

By clicking the “Submit” box for your comment, you agree to be bound by these terms and conditions and abide by the rules and policies set forth herein. If you do not agree to these terms and conditions, do not submit your comment to the Ethical Cyborg website.

Trevor Bell owns and operates the ethicalcyb.org site. Your use of the features on the website allowing for submission of a comment is subject to the following terms and conditions.

You must be 18 years of age or older to submit a comment to the website. By submitting a comment and accepting these terms through your clicking of the “submit” box, you represent that you are at least 18 years old.

You understand that Trevor Bell does not pre-screen comments posted on the website by individual authors. Trevor Bell has the right, in his sole unfettered discretion, to remove any comments, without providing prior notice, that contain any of the following characteristics:

Is defamatory, offensive, sexist, homophobic, obscene, harassing or threatening

Is in breach of (i) anyone’s privacy, or (ii) confidentiality

Infringes any third parties intellectual property rights

May cause anxiety or encourage racial violence

May prejudice legal proceedings

You retain the copyright in any comment you submit to The Ethical Cyborg. By submitting a comment to The ethical Cyborg, you agree to grant Trevor Bell an irrevocable, non-exclusive, royalty free, perpetual license to use the material or commentary that you have submitted, in any medium and in any manner that Trevor Bell may, in his sole unfettered discretion, choose.

Appendix H: Website Privacy Policy

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The Ethical Cyborg Privacy Policy

The creators of The Ethical Cyborg seek to help individuals consider how the actions of the industries they work in create systematic changes which impact culture, and how through planning and design, inclusivity and accessibility can be practiced to promote the creation of systems that can be decolonized, and do not emerge as sexist, racist or classist. We want you to understand how we handle your data. We also want you to know your rights and choices.

This policy describes how we handle your data when you interact with the virtual gallery and post public comments.

Information Collected Automatically

With Tracking Technologies in Your Browser

This website collects personal data to power our site analytics, including:

Information about your browser, network, and device

Web pages you visited prior to coming to this website

Your IP address

This information may also include details about your use of this website, including:

Clicks

Internal links

Pages visited

Scrolling

Searches

Timestamps

We share this information with Wix, our website analytics provider, to learn about site traffic and activity.

This information is also collected by the Virtual Gallery host, Ikonospace. To see their Privacy Policy, and how they handle gallery visitor data, [click here](#).

Appendix I: Future Implications

[Jump back to text.](#)

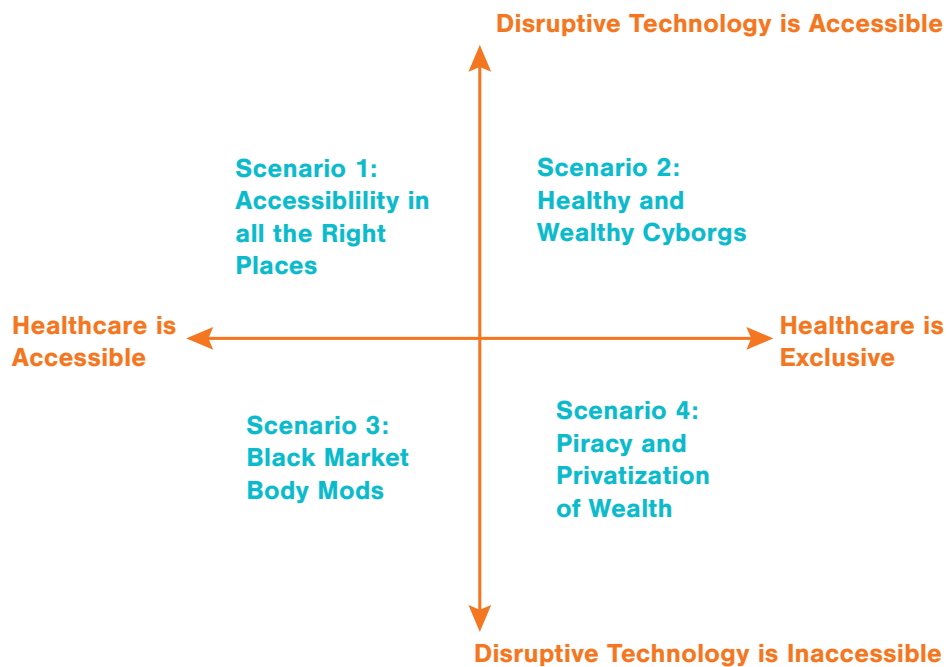
The Ethical Cyborg Presents:

Future Implications for changemakers in the circles of
transhumanism, healthcare policy creation, and biomedical
innovation

Appendices

The intentions of this document are to provide insights for Transhumanists, healthcare policy writers, and biomedical innovators to direct where efforts can be placed for anti-oppressive practices (AOP), with the hope of promoting the emergence of systems that are free from racism, sexism, and classism. AOP focuses on how systems foster and protect the unearned privilege of some groups of people while perpetuating oppressive conditions for many others, and applies a number of critical theories to promote inclusivity, equity, fairness and social justice (Baines, 2017).

This document is part of a larger research document, *The Ethical Cyborg: The Futures of Transhumanism and Inclusivity*, which can be viewed on ethicalcyb.org. The research looks to the year 2036 and explores 4 possible futures.



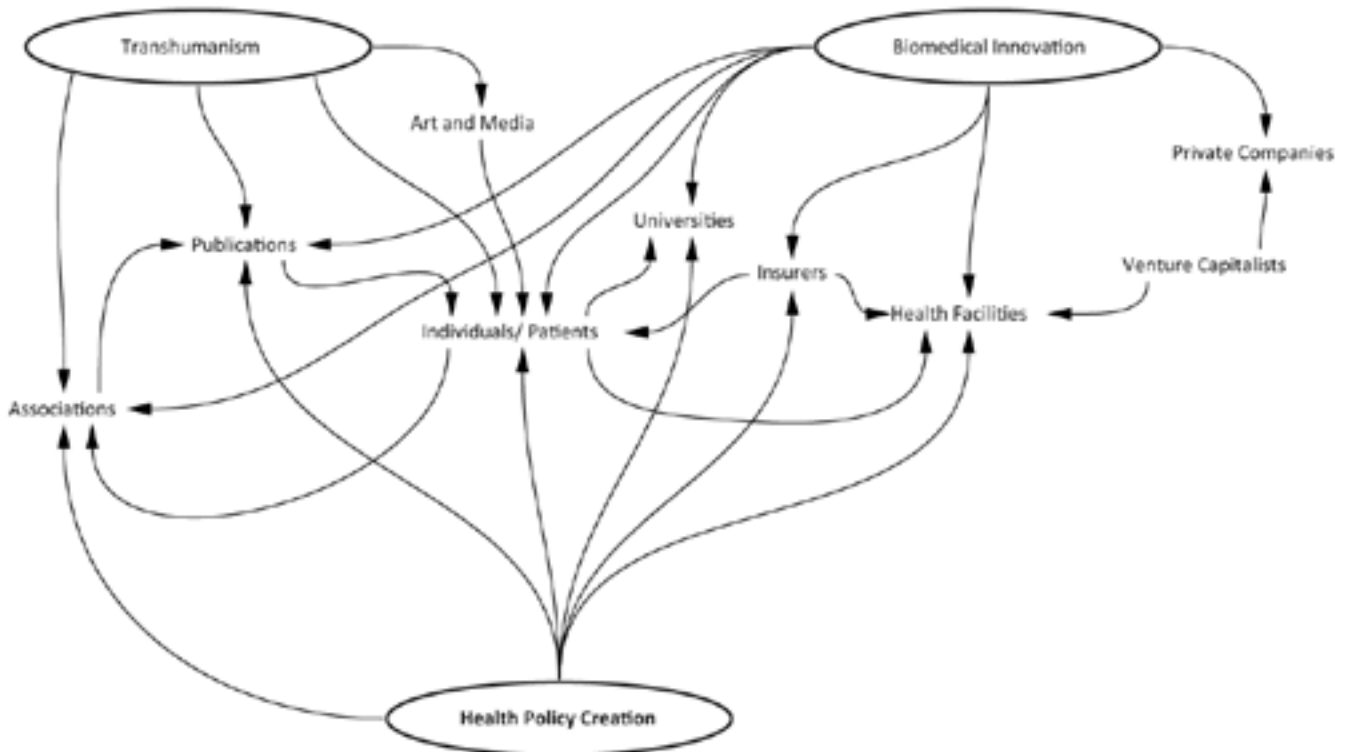
Each foresight scenario presents unique problems that can be mitigated through planning and design.

Understanding the System of Interest

To understand how to ensure the emergence of inclusive systems, we have to understand the system of interest and the intersectionality of its elements.

Figure 2.

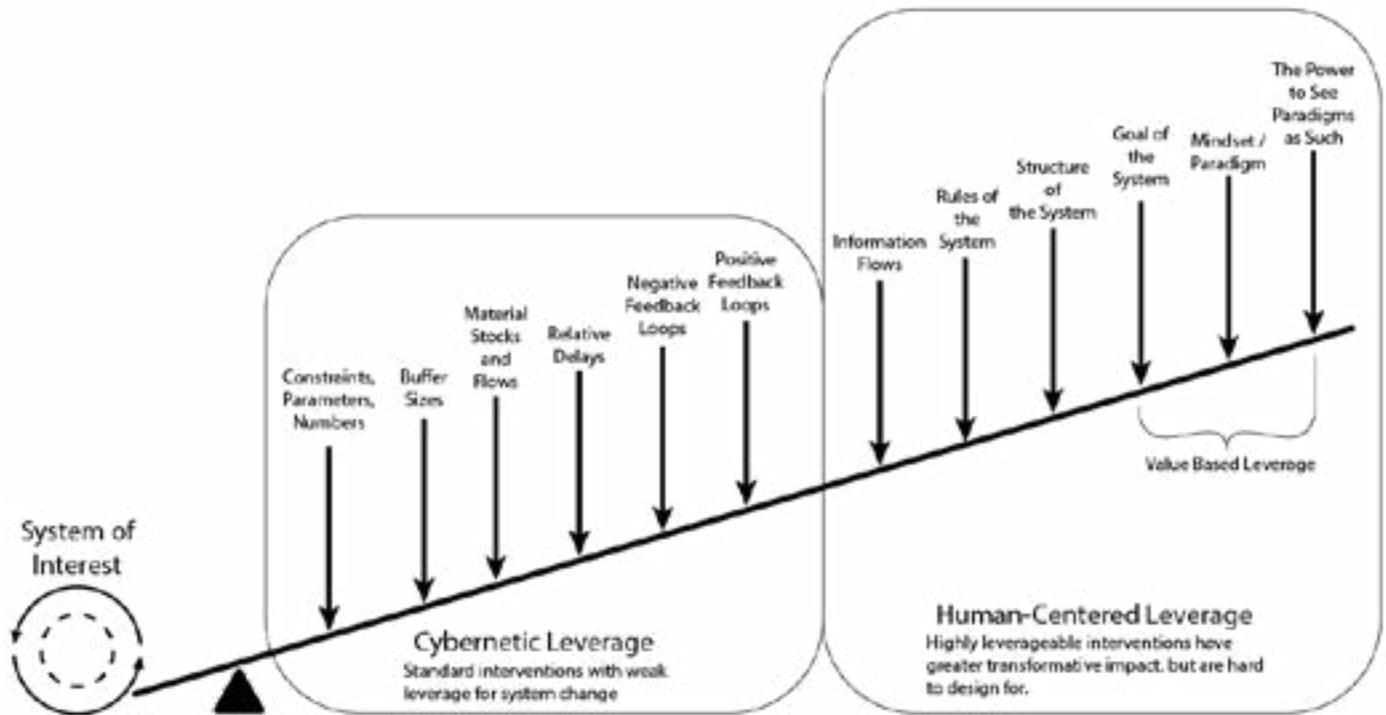
The System of Interest. Developed by Trevor Bell



We can see that this system of interest is largely centered around individuals and patients. As such, best practices would dictate a human-centered design approach be used to ensure that the needs of the people affected by this system are met.

The parts of our system of interest through the lens of Leverage Points

When doing anti-oppressive work, it is important to know where to place efforts to create change in a system. The environmental scientist, Donella Meadows, outlined 12 points in a system where one can create change (Meadows, 1977).



Note. Adapted from Meadows' (1999) *Leverage Points*

These 12 leverage points are listed in ascending order of leverageable system change, and descending order of ease of implementation. Examples from our system of interest are listed with their respective leverage points.

12. Constants, parameters, numbers (such as subsidies, taxes, standards)

Grants for funding innovation

11. The size of buffers and other stabilizing stocks, relative to their flows.

10. The structure of material stocks and flows (such as transport networks, population age structures)

9. The lengths of delays, relative to the rate of system change.

8. The strength of negative feedback loops, relative to the impacts they are trying to correct against

Appendices

7. The gain around driving positive feedback loops

6. The structure of information flows (who does and does not have access to what kinds of information)

Delays in information flows due to knowledge gates

Subscription costs for medical and tech journals

5. The rules of the system (such as incentives, punishments, constraints)

4. The power to add, change, evolve, or self-organize system structure.

3. The goals of the system

Evaluating

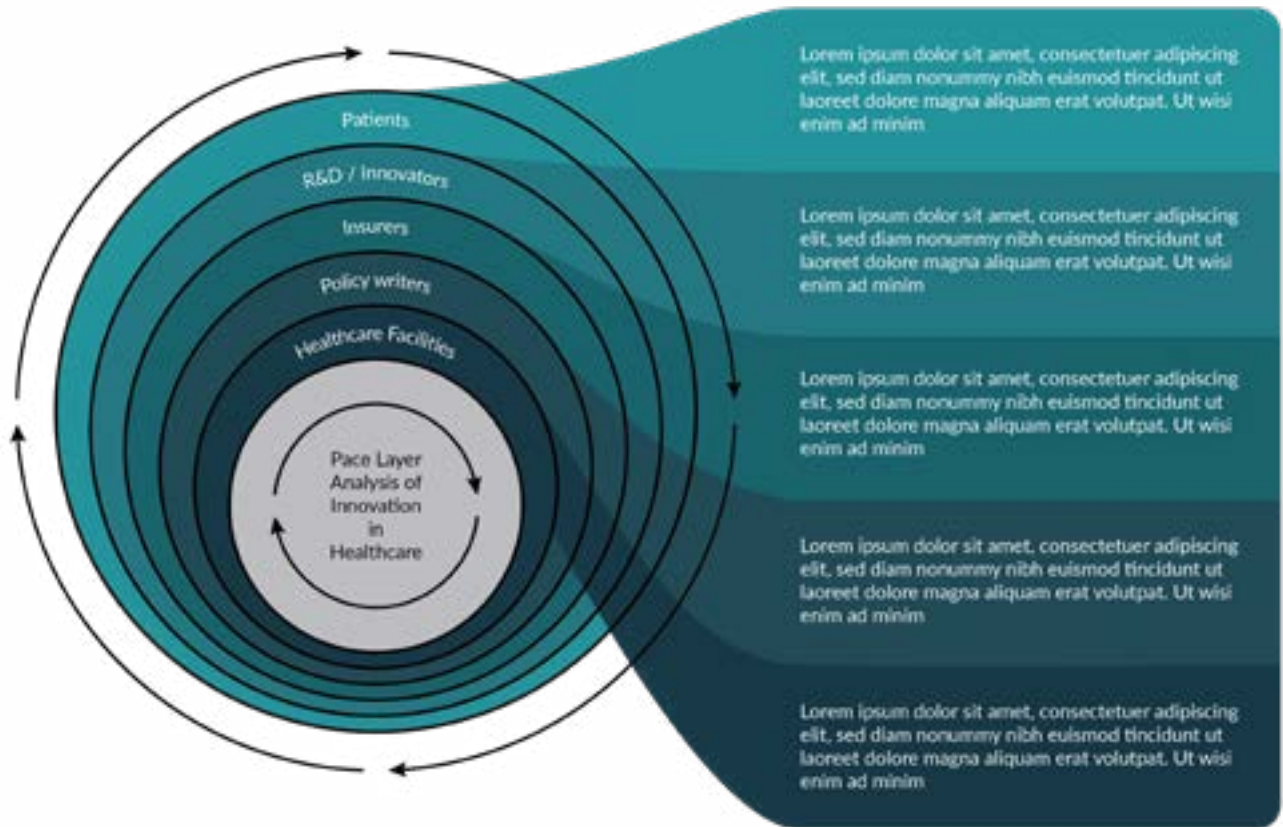
2. The mindset or paradigm out of which the system - its goals, structure, rules, delays, parameters - arises.

1. The power to transcend paradigms

Understanding the flow of information in the healthcare system

Knowing the ebbs and flows of knowledge transfers between actants and actors allows for better adaptation to changes. Stewart Brand, writer and co-chair of The Long Now Foundation, created a method of system analysis called Pace Layering, which places the system components in layers. These layers separate the system components by their rate of change. While each layer functions differently and independently, they still influence their neighboring layers through knowledge transfer channels and feedback loops which create resilience in the system. Brand illustrates the layers with the fastest moving layer at the top and the slowest at the bottom (Brand, 2017). Figure 4 uses a pace layered analysis to illustrate layers of information flows in the healthcare system.

Moonshots in Healthcare:
How Innovation Spaces in the Healthcare System are Made, or Broken



Recursive questions to ask yourself while doing anti-oppressive work.

- 1) What are my biases in the context of my work?
- 2) Who is the work for?
 - a) Are their voices informing my work?
 - b) Does my work serve their best interests?
- 3) Does my work oppress or displace other groups?
- 4) Who else is working in my system of interest that I need to communicate with?

