6-2020

Flesh Without Blood: (Re)locating Embodiment in Technology

Kate Anderson Opre

Flesh Without Blood:

(Re)locating Embodiment in Technology

Seattle University

A Thesis Submitted to The Faculty of the College of Arts and Sciences in Candidacy for the Degree of Departmental Honors in Sociology.

Written By:
Kate Anderson Opre

Committee in Charge:
Professor Jodi O'Brien, Sociology and Associate Appointment Women and Gender Studies, Thesis Advisor.

Os Keyes, PhD Candidate in STS at The University of Washington, Thesis Second Reader.

June 2020

Abstract

The social/technology divide has eclipsed our understanding of the many ways in which the two are interconnected. In this thesis I examine the interplay of the social and technological through the lens of embodiment. In particular, I focus on the ways in which bodies become located, relocated and even dislocated, in interaction with technologies. My approach is an analytical synthesis informed by three examinations: The art of Mariko Mori; the 'robot' social media influencer @lilmiquela; and applications of artificial intelligence on the human body. These examinations can be thought of as thought experiments, case studies or musings to help explore the possibilities for bodies rendered through technologies. Through the complex interaction with technologies, embodiment is affected and the question of *where bodies begin and end* becomes a productive way to think about sociological processes of identity and power.

Acknowledgements

I would first like to thank the entirety of the Sociology Department and the Cultural An-

thropology Department at Seattle University for helping me cultivate my academic inter-

ests. I would specifically like to thank my thesis advisor, Dr. Jodi O'Brien, for so gra-

ciously extending their support, insight, oversight and care to me and this project this

past year. I am grateful to Dr. Rachel E. Luft who encouraged me to pursue honors,

helped me develop a focus on the radical utopian imaginary and taught me everything I

know about methods! Lastly, I am indebted to Os Keyes, who besides nearly creating a

specialized syllabus of science and technology studies (STS) for me, has become a

supporting mentor and friend. All three of these individuals gave me endless emotional

and academic support throughout my thesis journey and I really cannot thank them

enough. I would also like to thank my friends and family, especially Lily Farr who intro-

duced me to the work of Mariko Mori and cyber feminism, and Meghan Opre, who did

my formatting and layout. I acknowledge the Duwamish land, upon which I have written

these pages and lived for the past three years.

Table of Contents

*"*Metal is neither a thing nor an organism, but a *body* without organs.*"*[1]

"I have yet to hear of a robot dying of starvation, hypothermia or a broken heart."[2]

"Who cyborgs will be is a radical question; the answers are a matter of survival."[3]

"One way to read the history of technology is as a series of complexifications, knots and loosening of the bonds and tensions between bodies and selves, mediated by technologies of communication, within a force field of power relationships. Over time, as technology has grown increasingly complex, and in particular with the development of information technology (which addresses itself overtly rather than covertly to symbolic exchange), the role of technology in mediating the flow of communication between bodies and selves has become more ubiquitous and more indispensable."[4]

---

[1]Félix Guattari and Gilles Deleuze, *A Thousand Plateaus*, 454.

[2] Alison Adam, "Gender/Body/Machine," 369.

[3] Donna Haraway, "A Cyborg Manifesto," 12.

[4] Sandy Stone, *The War of Desire and Technology at the Close of the Mechanical Age,* 86.

1. Introduction to Technobodies

Roman poet Ovid tells the story of Pygmalion, a sculptor who lived alone and unmarried, yet intent on building his own ivory-girl because no such perfect woman existed in the world for him. So enamored with one of his nude ivory feminine statues, he prayed to the Gods to bring the stone to life. In the midst of consummation with the ivory-carved body, the artifact begins to breathe. A translation of the tale reads:

> and Pygmalion came back where the maiden lay, and lay beside her, and kissed her, and she seemed to glow, and stroked her breast, and felt the ivory soften under his fingers, as wax grows soft in sunshine, made pliable by handling. And Pygmalion wonders, and doubts, is dubious and happy, plays lover again, and over and over touches the body with his hand. It is a body! The veins throb under the thumb. And oh, Pygmalion is lavish in his prayer and praise to Venus, no words are good enough. The lips he kisses are real indeed, the ivory girl can feel them, and blushes and responds, and the eyes open at once on lover and heaven, and Venus blesses the marriage she has made…[5]

Ava is the cyborg/robot/avatar/woman of the 2014 film *Ex-Machina*. Ava's body is shiny silver mesh, woven of thin metal cables but with the contour of breasts and the illusion of the subtleties of steel flesh. Her face is young, white and feminine and protrudes like a painting out of the cybernetic cable and wire body. Ava was also built by a sculptor like Pygmalion, but he would more aptly be called a computer scientist. He too lived alone and built women, for his own sexual pleasure and companionship, as well as his technoscientific prowess. Ava and the ivory-girl have much in common, and both are fictions.

The story of Pygmalion's ivory-girl can be read as an illustration of early hybrids between bodies and technology. It would be inchoate to presuppose that materials such

---

[5]   Humpries, "The Story of Pygmalion from Ovid's *Metamorphoses.*"

as ivory and rock, or even wax, are vastly different than the copper and aluminum wires and plastics that are used to build the modern and ubiquitous technologies. These raw materials become fetishized within the ideologies, cultures and schematics that build them into something that is only recognizable in situ. In their introduction to *Material Feminisms*, Stacy Alaimo and Susan Hekman maintain that "we need a way to talk about these bodies and the materiality they inhabit. Focusing exclusively on representations, ideology, and discourse excludes lived experience, corporeal practice, and biological substance from consideration."[6] Technobodies are bodies made possible by technological practices and technique. They are fusions, hybrids and assemblages between matter. They are extrusive, tangible things but they are also miniaturized and intrusive. They are visible and sometimes invisible. As I use this linguistic fusion, technobody refers to the ways in which bodies are involved, made possible, imagined, ingrained or otherwise imbricated within the webs of technological culture and society. Anne Balsamo defines the technological human as "a boundary figure belonging simultaneously to at least two previously incompatible systems of meaning— 'the organic/natural' and 'the technological/cultural'."[7] They are made of matter, elements and atoms as much as they are endowed with characteristics of the cultural logic systems to which they belong. Humans were once metaphorically likened to clocks [t*he wheels are turning*] just as bodies are now sometimes thought of in terms of computer-like traits of communication and control [*I am processing that*]. The Western human body as explained by myth, clockwork, engines, or cybernetics is a metaphorical dialectic wrapped up within the log-

---

[6] Stacy Alaimo & Susan Heckman, "Introduction," 1.

[7] Anne Balsamo, "Forms of Technological Embodiment: Reading the Body in Contemporary Culture," 215.

ic of its time. This logic is inextricable from the technologies, just as technologies are inextricable from culture and society.

The cyborg of today is the ivory-girl of yesterday. A cyborg is an assemblage between technologies and bodies, and could be understood as the hegemonic techno-body. It can be located as concept the in corners of the literary world; the social sciences; as well as contemporary art beyond the discipline of computer science and cybernetics.

These portrayals have influenced my interest in the intersection of gender and technology, and more specifically gender and artificial intelligence. The feminine and humanistic figure of Ava in *Ex Machina* represents the idea of what can be classified under general AI. That is, AI motivated to model human consciousness, to create machines that pass as humans, whose bodies look like our own, but are far more perfect. General AI, as a project and phenomena, has been shaped by the cyber and technoscapes of the cultural imagination. Rather than positioning general AI as a technological dream, this paper presupposes its grounding, both within a rich cultural imaginary *and* in situ of social scapes shaped by relations of power.

A primary focus of this thesis is the *body*, or its apparent absence. Interrogating, exploring, questioning, and examining the role of the discursive body when and how it exists can help us understand processes of reification or dissolution of identity-based processes related to gender, race, and class. While humanistic figures personify the possibilities of general AI, I will also focus on the ways in which gender and race have been constructed within what is called 'narrow AI' systems, those that are programmed to complete more singular tasks.

Flesh Without Blood: (Re)locating Embodiment in Technology

While I challenge the false binary between narrow and general AI, this thesis speaks to the appearance of these two poles, wherein technologies take part in body-making processes. Ava and Pygmalion's ivory-girl stand at one end of the pole: they are tangible and visual feats of material constructed into humanistic bodies, they are blue-prints for technobodies. At the other end, the miniaturization and opacity of artificial intelligence, in tandem with machine learning, visualize bodies through their translation of bodies and parts of bodies into information. Both render visibility of embodiment, but in ways similar to the idea of a concave and convex mirror. Tangible techno bodies have the quality of a convex mirror: they have an obtrusive and outward-curved characteristic in that they have a very 'physical' presence, with their embodiment reflecting outside of the mirror. Bodies rendered through miniaturized technologies take on the characteristics of a concave mirror: embodiment is achieved through an inward-curved and intrusive quality, wherein bodies are (re)formulated not in the open, but in the hollows. While the obtrusive and magical cyborgian/general AI system largely remains a dream and idea, the intrusive and miniaturized technologies are already commonly deployed, with real consequences.

Through an examination of trends that exist in the liminal space between what is cloistered to computer science or sociology or art, this essay will explore questions and themes surrounding a sociology of technology. A discussion of these themes will arise in relation to three case studies of techno bodies: the cyborg as imagined by artist Mariko Mori, the virtual-marketing tool @lilmiquela, and finally a broad case study that explores how artificial intelligence aided by machine-learning determines which bodies count or 'pass' as human. The boundaries between materiality and immateriality, fictional and

realistic, imaginary and actual will be folded inside out through a curious approach that

seeks an understanding their mutual constitution. What I aim to offer is a unique socio-

logical perspective and synthesis of my own academic engagement with this subject.

Mapping the junctures between the real and imaginary, and noting the discursive

power and role in the absence and presence of bodies is important to understanding

how the intersections of identity are interacting with the sociotechnical potential of tech-

nology as it was, is, and may be. This paper will examine both the convex and concave

appearance of bodies made real through technologies, noting that both are involved in

the production of human/machine hybrids, albeit in different ways. I will begin with a lit-

erature review that synthesizes the multifaceted cyborg tradition, theory on the body

and then center us in understanding how technologies are interacting with bodies in this

current moment. Then I will explore three cyborg case studies: the artwork of Mariko

Mori, the social media account @lilmiquela, and the case of machine learning. After

spotlighting these forms, I discuss the ways in which they all straddle the divide be-

tween technologies and bodies, endearingly referred to as technobodies.

2. Literature Review: The Cyborg Tradition

This research began with a curiosity around the intersection of embodiment and technologies. Specifically, I wanted to explore the ways in which bodies become located, relocated and dislocated when embodiment and technology run into each other. I stumbled into these ideas after reading "A Cyborg Manifesto" by Donna Haraway. I was so fascinated with Haraway's amorphous and defiant cyborg, and especially effused with the questions that this cyborg prods us towards: generally, what happens to selves and identities when the body becomes unfamiliar? This research synthesizes a wide swath of knowledge relating to the convergence between technology/bodies (technobodies) from a variety of disciplines. I begin with "A Cyborg Manifesto," introducing this metaphorical approach to cyborgs and its seminal approach to picking apart boundaries. This essay is a way, or tool, of imagining beyond the taken for granted overgrowth that has shaded recognition of subjectivities, identities and ontologies that hold apart the interactions between humans and machines in an increasingly ubiquitous technological world. With a working idea of Haraway's amorphous blueprint of the cyborg, I purvey the literature that discusses other representations of cyborgian bodies throughout time, space and across bounded disciplines. In order to explore the cyborg, as a hybrid between incompatible entities, I theoretically ground embodiment in literature that speaks to its sociocultural production. Finally, I turn towards literature that critically examines technologies of artificial intelligence and human-computer interaction through sociocultural lenses, discussing their sociocultural production and the ways in which they reify what is considered normal.

Flesh Without Blood: (Re)locating Embodiment in Technology

>The Cyborg in the Integrated Circuit

In 1985, Donna Haraway published her essay "A Cyborg Manifesto" which she describes as "an ironic dream of a common language for women in the integrated circuit."[8] The cyborg is the central actor and unit of analysis, loosely defined as "a cybernetic organism, a hybrid of machine and organism, a creature of social reality as well as a creature of fiction."[9] The essay outlines Haraway's vision of a cyborg as a metaphor through which she explores the possibility of breaking boundaries familiar to Western thought. Haraway maps three breakdowns in particular, all related to embodiment. First, she discusses the dissolving of borders demarcating the difference between human and animal. Second, Haraway draws attention to another boundary between human(:animal) and machine. She ponders this distinction, writing that "late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert."[10] Extending from the breakdown of the human/animal/machine distinctions comes Haraway's third focus, which is the porous boundary between physical and nonphysical.

Donna Haraway's cyborg resists definition. You cannot locate it. As a socialist-feminist, and one devoted to the interconnectedness of things, Haraway crafts the once-popular idea of the cyborg as a resource to reimagine and breakout of postmodernism,

---

[8] Haraway, "A Cyborg Manifesto," 3.

[9] Donna Haraway, "A Cyborg Manifesto," 3-4.

[10] Donna Haraway, "A Cyborg Manifesto," 11.

non-naturalism, and the reifying qualities of Western philosophy and thought that ap-

peared to have calcified. She maintains that "the cyborg is our ontology; it gives us our

politics."[11] Haraway contends that the fatalism of Western hegemony and ideology

stems in large part from its cosmology, its creation-stories that theorized a primary unity;

ie. once everything was still and one. The cyborg as an ontology is not privy to Western

myths, because it was never whole, rather it was built from parts. The idea that "the cy-

borg would not recognize the Garden of Eden; it is not made of mud and cannot dream

of returning to dust[12]" is how the cyborg becomes the medium to explore the breakdown

of the Western boundaries that demarcate the limits of our imagination. Haraway con-

tends that: "The cyborg is a condensed image of both imagination and material reality,

the two joined centres structuring any possibility of historical transformation. In the tradi-

tions of 'Western' science and politics — the tradition of racist, male-dominant capital-

ism; the tradition of progress; the tradition of the appropriation of nature as resource for

the productions of culture; the tradition of reproduction of the self from the reflections of

the other — the relation between organism and machine has been a border war."[13]

The imagery of Haraway's ironic and blasphemous *cyborg* is a powerful resource

to rethink the essentialized and static notions of bodies. The cyborg is embodied and

material, but not essentialized in its body. If, as Sherry Ortner has contentiously written,

woman is to nature as man is to culture[14]; then the cyborg defaces this dichotomous

---

[11] Donna Haraway, "A Cyborg Manifesto," 7.

[12] Donna Haraway, "A Cyborg Manifesto," 9.

[13] Donna Haraway, "A Cyborg Manifesto," 7.

[14] Sherry Ortner, "Is Female to Male as Nature Is to Culture?"

linkage. She emphasizes that "cyborg imagery can suggest a way out of the maze of dualisms in which we have explained our bodies and our tools to ourselves. This is not a dream of a common language, but of a powerful infidel heteroglossia. It is an imagination of a feminist speaking in tongues to strike fear into the circuits of the super savers of the new right. It means both building and destroying machines, identities, categories, relationships, space stories."[15]

Haraway does not specifically elaborate upon the cyborg body, but maintains that it is characterized by its multiplicity, partial identities and its location as the site of a boundary war. Haraway melds pertinent cyborg and sci-fi imagery in this discussion, in part to illustrate that where our bodies begin and end is a question that has to do with power: "Who cyborgs will be is a radical question; the answers are a matter of survival."[16]

>The Haunted Technological Body

Terms related to technobodies and technoworlds are slippery at best. It seems difficult to draw limits between what counts as automata and cyborg, the difference between inspirited technological bodies of today and of yesterday. I think haunting is a useful framework to understand the assemblages of techno-bodies. The sociologist Avery Gordon describes that "haunting raises specters, and it alters the experience of being in linear time, alters the way we normally separate and sequence the past, the present and the future. These specters or ghosts appear when the trouble they repre-

---

[15] Donna Haraway, "A Cyborg Manifesto," 68.

[16] Donna Haraway, "A Cyborg Manifesto," 12.

sent and symptomize is no longer being contained or repressed or blocked from view."[17]

Gordon's concept of haunting breaks down notions of progress in its blatant disregard

for the linearity of time, with haunting being the outcroppings of remembrance of things

past. Haunting, when applied to techno-bodies, can elucidate a strange scene in the

1982 film *Blade Runner*, wherein the human-like replicant Pris hides herself under a

translucent sheet amongst a scene of moving and rattling puppets and automata, clear-

ly more archaic but arguably just as hybrid. As the protagonist Deckard enters the room

looking for Pris, there is an overlap of different formulations of technological bodies, an

assemblage of human selves all coexisting in one frame. What is the trouble then?

Why do automata, puppets, cyborgs, and bodies made through AI exist in the same

plane, why are they all here now? Gordon clarifies: "We're haunted, as Herbert Marcuse

wrote, by the 'historic alternatives' that could have been and by the peculiar temporality

of the shadowing of lost and better futures that insinuates itself in the something-to-be-

done, sometimes as nostalgia, sometimes as regret, sometimes as a kind of critical ur-

gency."[18] Focusing on the vast assemblages of techno-bodies, located by their similari-

ties in being hybrids of bodies and technology, allows us to note the historic alternatives

and the futuristic possibilities and parallels that illustrate the local context of their formu-

lations. Focusing on haunting is a way to note the specificities of the intersection be-

tween body/technology that has become ubiquitous and taken for granted.

Though the imagery built around the cyborg is deeply and specifically em-

bedded within contemporary Western iconography pertaining to its technological

---

[17] Avery Gordon, "Some Thoughts on Haunting and Futurity," 2.

[18] Avery Gordon, "Some Thoughts on Haunting and Futurity," 7.

innovations, the idea of a human/machine hybrid has a long history. In *Gods and Monsters,* Adrienne Mayor combs through the histories of antiquities endowed with mental qualities, resurfacing the human/machine of Greek mythology and ancient-India. Mayor resurrects the typology uniting the grouping of "android, robot, automaton, puppet, AI, machine, cyborg" as things that are *made, not born.*[19] Mayor does not seek to connect the dots in such a linear fashion as to suggest the influences of these hybrids of the past. In her words: "Even though the examples of animated statues, self-moving objects, and simulacra of nature imagined in myths, legends, and other ancient accounts are not exactly machines, robots, or AI in the modern sense, I believe that the stories collected here are 'good to think with,' tracing the nascent concepts and imaginings about artificial life that preceded technological actualities."[20] Similarly, Franchi and Güzeldere outline early automata, noting that "the emphasis was only on the imitation of behavior, not on the workings of the internal mechanisms that drive the behavior and could, in principle, imbue it with intelligence and autonomy"[21] This mimetic focus is illustrated by the automata of the Islamic civilizations dating back to the ninth century, specifically those built by al-Jazari, who "engineered dozens of automata, from solely functional water-raising devices and clocks to those with high entertainment value, such as peacocks, a self-replenishing vessel, an orchestra of musi-

---

[19] Adrienne Mayor, "Introduction," 3.

[20] Adrienne Mayor, "Introduction," 4.

[21] Stefano Franchi & Güven Güzeldere, "Machinations of the Mind," 27.

cians, a scribe, a slave, and a wine-servant."[22] Kate Crawford writes about an-

other technology of the past called the statua citofonica —talking statue —creat-

ed by a Jesuit intellectual named Athanasius Kircher:

> The listening system could eavesdrop on everyday conversations in the piazza, and relay them to the 17th century Italian oligarchs. Kircher's talking statue was an early form of information extraction for the elites – people talking in the street would have no indication that their conversations were being funneled to those who would instrument that knowledge for their own power, entertainment and wealth. People inside the homes of aristocrats would have no idea how a magical statue was speaking and conveying all manner of information. The aim was to obscure how the system worked: an elegant statue was all they could see. Listening systems, even at this early stage, were about power, class, and secrecy.[23]

Featherstone and Burrows examine Gibsonian sci-fi and its protege themes of

cyborgs, cyberpunk, and cyberspace. The author William Gibson is widely understood

to be the creator of the so-called 'cyberpunk' world, a term developed alongside his

work and sci-fi aesthetic in the early eighties. Featherstone and Burrows bring life to this

idea of what cyberpunk is: "It sketches out the dark side of the technological-fix visions

of the future, with a wide range of post-human forms which have both theoretical and

practical implications."[24] Steampunk is to industrial technological innovations as cyber-

punk is to cybernetic innovations of the twentieth century. Examining the media sur-

rounding cyberpunk imagery (*Blade Runner, Robocop, Terminator* to name a few), facili-

tates the message that: "Cyberpunk and sociological analyses which draw upon it have

a 'habit' of 'folding into' each other in a recursive relation between the fictional and the

---

[22] Stefano Franchi & Güven Güzeldere, "Machinations of the Mind," 29.

[23] Crawford, "Anatomy of an AI System."

[24] Featherstone & Brown, "Cultures of Technological Embodiment," 3.

analytic which might be described as an instance of a hyperreal positive feedback

loop."[25] The cyborg is a figure that lives and breathes in cyberpunk worlds of fiction. For

example, Rachael is a replicant, or a bioengineered being in the cyberpunk sci-fi film

Blade Runner. For these scholars, sci-fi as contemporary lore is in dialectic with prefigu-

rative social theory.

The idea of the cyborg in contemporary thought lives within the convergence of

artificial intelligence and cybernetics. In "Feedback and Cybernetics," David Tomas ex-

amines a historical typology of automata written by Norbert Wiener, founder of the field

of cybernetics. Wiener divided tech bodies into four periods: "a mythic Golemic age; the

age of clocks (17th and 18th centuries); the age of steam, originator of the governor

mechanism itself (late 18th and 19th centuries)' and finally, the age of communication

and control, an age marked by a shift from power engineering to communication engi-

neering…(Wiener, 1948a;51, 50)."[26] Wiener further articulates that these four periods

correlate with models for understanding the human body. Quoting Tomas, these formu-

lations are: "the body as a malleable, magical, clay figure; the body as a clockwork

mechanism; the body as a 'glorified heat engine, burning some combustible fuel instead

of the glycogen of the human muscles and most recently, the body as an electronic sys-

tem (Wiener, 1948a; 51)."[27] These summations echo the idea that the differences be-

tween automata, puppets, statues and cyborgs are birthed out of the dialectic between

body/machine. As machines shift, philosophies of the body contort with new eruptions

out of science and technology. Cybernetics is a paradigm shift that encompasses trans-

---

[25] Featherstone & Brown, "Cultures of Technological Embodiment," 9.

[26] Tomas, "Feedback and Cybernetics," 23.

[27] Ibid.

formations in science and technology as well as philosophies and theories on the body.

Body becomes a template for the machine and the machine becomes a model of the

body. Tomas defines cybernetics as "a new science of communications and control...a

science that proposed a completely new vision of the human body, its relationship to the

organic world and the world of machines."[28] Tomas quotes Wiener's articulation of what

this looks like: "For all these forms of behavior, and particularly for the more complicated

ones, we must have the central decision organs which determine what the machine is to

do next on the basis of information fed back to it, which it stores by means analogous to

the memory of a living organism (Wiener, 1954: 32-3)."[29] The dialectic between body/

machine that comes out of cybernetics is an abstraction, wherein machines are mod-

eled off of what are considered to be the most fundamental necessities in bodies need-

ed to sustain a self-regulating organism.

Much in this vein, the term "cyborg" tumbled out as a concept for the first time

during the 1960s US space project. David Thomas examines the term's first appearance

in an article in *Astronautics*, written by Manfred Clynes and Nathan Kline titled "Cyborgs

and Space." He clarifies: "at that time, the idea of creating a cyborg, or cybernetic or-

ganism, through a modification of the human body was geared to the problem of human

adaptation to hostile environments in connection with extraterrestrial space travel."[30]

Tomas' approach to understanding the conception of the cyborg is to raise the specter

of its initial parameters, which were attuned to its utilitarian calling towards outer space.

---

[28] Tomas, "Feedback and Cybernetics," 25.

[29] Ibid.

[30] Tomas, "From the Cyborg to Posthuman Space," 85.

Flesh Without Blood: (Re)locating Embodiment in Technology

The cyborg was a specific solution to a defined problem, that was inextricably linked to a cultural context defined by its fascination with the man in space. Tomas quotes Clynes and Kline writing on the consolidation of the cyborg around these givens: "For the ex-ogenously extended organization complex functioning as an integrated homeostatic system unconsciously, we propose the term 'Cyborg.' The cyborg deliberately incorpo-rates exogenous components extending the self-regulatory control function of the or-ganism in order to adapt it to new environments."[31] This definition of the cyborg was born under the constraints and within the context of the space problem, as a solution to the difficulties of space travel. Tomas highlights that "the cyborg concept embodied a specific context, cultural logic, type of formal articulation, and dualistic fields of opera-tion: adaptation to a hostile environment, homeostasis; self-regulating man-machine systems, and automatic/unconscious vs. conscious activity."[32] But in order to be articu-lated through this specific logic system, the groundwork of cybernetics—that linked body/machine—had to be laid.

One can look at the cyborg tradition as a line of progress {statues→ automata→ cybernetic organisms} wherein each becomes more complex, moving from pure mimetic function to automatic and strategic control. However, this would be to place these for-mulations outside of history, to fragment that entanglement between all of these forms. It would also be mistaken to disregard the ways in which they are materializations of specific sociocultural systems of logic, or ways of knowing. Looking at the cyborg tradi-tion outside of a taxonomy is important because it holds current body/machine hybrids,

---

[31] Tomas, "From the Cyborg to Posthuman Space," 86.

[32] Ibid.

or technobodies, accountable to the logic that constructs them, and in turn the logic that they reify. Refusing notions of progress and history as past, relocating embodiment in technology as an expansive contest of body-making allows us to note that exactly *how* bodies and machines are defined is always a project of power. Scrutinizing these assemblages of technobodies allows us to understand how power comes to shape imagination into materialization and also to note the parallel imaginings or longings for representation in this body/machine-making project.

>The Body

This work is rooted in theory that maintains that there is no universal or natural body prior to the discourse that constructs it. Judith Butler urges that "the body gains meaning within discourse only in the context of power relations."[33] Sociologist Jodi O'Brien maintains that "our bodies are not entirely pre-formed, but develop in relation to socio-developmental categories, processes, and experiences."[34]

Identity categories like gender and race have been primary ways of knowing bodies, categorizing bodies, and rendering them meaningful within socioscapes rife with hierarchies. Contemporary gender scholars agree that there is no natural body. Identity categories of race and gender do not exist within us, rather they are ascribed unto us. Gender and race are understood to be sociocultural constructions that give meaning to bodies through processes of categorization. Furthermore, gender and race are reified through ideologies that position them as natural and essential.

---

[33] Buter, *Gender Trouble,* 117.

[34] O'Brien, "Introduction," 5.

While the gendered body is often thought to be a cultural interpretation of biological sex difference, Anne Fausto-Sterling challenges the Western binary notion that there are only two sexes, complicating the gender binary by maintaining the idea that sex is also socioculturally constructed. She writes that "male and female, masculine and feminine, cannot be parsed as some kind of continuum. Rather, sex and gender are best conceptualized as points in a multidimensional space. For some time, experts on gender development have distinguished between sex at the genetic level and at the cellular level (sex-specific gene expression, X and Y chromosomes); at the hormonal level (in the fetus, during childhood and after puberty); and at the anatomical level (genitals and secondary sexual characteristics). Gender identity presumably emerges from all of those corporeal aspects via some poorly understood interaction with environment and experience."[35]

In "Where is gender?" Jodi O'Brien writes that "gender and sexuality scholars have successfully critiqued the notion of natural gender roles and identities by pointing out that most of the behaviors associated with these identities and roles are culturally specific and socially constructed."[36] However, O'Brien warns that the belief that there is a natural body is one that feeds back into the (re)production of binary thinking. They write: "In answer to the question where is gender? The sociologist would reply it's in our bodies, minds, and social interactions, but specifically in the *gender scripts* we have for making sense of our bodies, our feelings and actions, our relationships with others, and

---

[35] Fausto-Sterling, "Five Sexes Revisited," 20.

[36] O'Brien, 3.

society."[37] These scholars locate the body as an important site of discursive meaning.

To say that there is no natural body is not to negate the physicality of the body. Of

course, I am an embodied being writing just as you are an embodied being reading.

The absence of a natural body is connected to the idea of representationalism.

Representationalism has hinged on the faith that there is a referent, or a subject behind

the representation. This is the idea that our bodies are carriers of signs that can be

read. There is a sociocultural legibility to markers as well as how we perform them. In

her essay, "Posthuman Performativity", Karen Barad explores how matter comes to mat-

ter. She urges us that "it is possible to develop coherent philosophical positions that

deny that there are representations on one hand and ontological separate entities await-

ing representation on the other. A performative understanding, which shifts the focus

from linguistic representations to discursive practices, is one such alternative."[38] Karen

Barad presents a reformulation of the performativity of materiality, describing that: "All

bodies, not merely "human" bodies, come to matter through the world's iterative intra-

activity—its performativity. This is true not only of the surface or contours of the body but

also of the body in the fullness of its physicality, including the very "atoms" of its being.

Bodies are not objects with inherent boundaries and properties; they are material-dis-

cursive phenomena."[39] In Barad's articulation, the body is never something that can be

pinned down out of its metaphysical *de facto* naturality. It does not exist a priori. Rather,

it is something that is always in a state of becoming. She maintains: "'Human bodies'

---

[37] O'Brien, 4.

[38] Barad, "Posthuman Performativity," 126.

[39] Barad, 141.

Flesh Without Blood: (Re)locating Embodiment in Technology

and 'human subjects' do not preexist as such; nor are they mere end products. 'Humans' are neither pure cause nor pure effect, but part of the world in its open-ended becoming."[40]

This makes particular sense when theorized in context of Foucault's attention to the historical formulations of the power in constructions of subjectivity and identity. Foucault discusses representationalism, for example, in his exploration of the construction of subjects of sexuality. In describing his project in *The History of Sexuality*, Foucault maintains:

> The purpose of the present study is in fact to show how deployments of power are directly connected to the body – to bodies, functions, physiological processes, sensations, and pleasures; far from the body having to be effaced, what is needed is to make it visible through an analysis in which the biological and the historical are not consecutive to one another … but are bound together in an increasingly complex fashion in accordance with the development of the modern technologies of power that take life as their objective. Hence I do not envisage a "history of mentalities" that would take account of bodies only through the manner in which they have been perceived and given meaning and value; but a "history of bodies" and the manner in which what is most material and most vital in them has been invested.[41]

In *Technologies of the Gendered Body*, Anne Balsamo explores the Foucauldian current of reading the discursive body, albeit drawing heavily from feminist scholarship. She describes: "Michel Foucault is not much interested in the truth of the body as he is in elaborating the apparatus that produces truth effects at the level of the body. His concern is to describe the discursive systems that produce serious truth claims about bodies."[42] Clarifying the idea of apparatus: "Foucault suggests the term 'apparatus' and lat-

---

[40] Barad, 139.

[41] Foucault, "History of Sexuality," 151-152.

[42] Balsamo, "Technologies of the Gendered Body," 20.

er "technology" to name the process of connection between discursive practices, institu-

tional relations, and material effects that, working together, produce a meaning or a

"truth effect" for the human body...Technology names the process whereby discursive

practices work interdependently with other cultural forces to produce effects at the level

of the body."[43] She discusses how Foucault, in his attempt to deconstruct the "natural"

body, reified the language of essentialism surrounding the construction of the feminine

subject in *The History of Sexuality*. Balsamo quotes Susan Suleiman's rebuke of Fou-

cault's omission of gender which reads: "The cultural significance of the female body is

not only (not even first and foremost) that of a flesh-and-blood entity, but that of a *sym-*

bolic construct. Everything we know about the body—certainly as regards the past, and

even, it could be argued, as regards the present—exists for us in some form of dis-

course: and discourse, whether verbal or visual, fictive or historical or speculative, is

never unmediated, never free of interpretation, ever innocent."[44]

The key point that Balsamo makes concerning the work of Suleiman is that these

discursive meanings are not neutral, but carry the power to inform and mediate a repre-

sentation. This is summarized: "While it is true, as Suleiman says, that 'everything we

know about the body...exists for us in some form of discourse,' this discourse is not en-

tirely divorced from the material manifestation of the flesh and blood identity."[45]

Though the meaning relates to what exists physically, and in nature, this meaning

is not naturally determined. She writes, "To claim that the body is a discursive construc-

---

[43] Balsamo, "Technologies of the Gendered Body," 20-21.

[44] Balsamo, 23.

[45] Ibid.

tion, and therefore can be read, already effects a deconstruction of its natural posture.

Such is the first act of thick perception."[46] If the human body can be located in a specif-

ic moment in time, it is only because boundaries have been drawn and defined. Barad's

"post-humanist account calls into question the givenness of the differential categories of

'human' and 'nonhuman,' examining the practices through which these differential

boundaries are stabilized and destabilized. Donna Haraway's scholarly opus—from pri-

mates to cyborgs to companion species—epitomizes this point."[47]

Thus to say that there is no natural body is to dissent from Western knowledge

making that is rooted in drawing boundaries around what can then be understood as

'representational' entities to look at. If we consider for a minute that there is no actual

natural body, that there is no referent behind what we are talking about, we can sus-

pend the essentialism of the body and the essentialism of gender and race. We can

suspend where we suppose the body begins and ends, which is usually at the flesh. We

can consider that bodies might begin and end in different places and moments in space

and time. In other words, the body is beyond the flesh.

>The Technobody of Today

The first section explored the dialectic between body and machine—the techno-

body— through an exploration of the cyborg tradition. I noted some of the ways in which

technological transformations are involved in a feedback loop wherein the body be-

comes redefined. The second section highlighted the theoretical foundation through

---

[46] Balsamo, 20.

[47] Balsamo, 126.

which scholars of the body examine it as a sociocultural production. Through the literature, this section addresses the question *what happens when the body and technology run into each other?* Largely, the answer is that the body becomes (re)located when it runs into technologies. This section will focus on the way that this (re)location is an expression of power, wherein an idea of 'normal' embodiment is reified.

Bruno Latour writes on power relations through assemblages in his piece "Technology is society made durable." He focuses on the ways in which power is folded into the lifecycle of technologies, from their inception to their materializations. Rather than viewing power and domination only through a perspective on social relations, Latour suggests that we must also imbricate non-human actors within this web. In this essay, Latour lays the foundation for a new way of treating power and domination through network analysis. He suggests looking within the dynamism of the network for socio-technical relations, rather than the stable exterior, for explanation. Latour highlights that, "domination is visible only at the end of the story. At many other steps in the story the innovation was highly flexible, negotiable, at the mercy of a contingent event. It is this variation that makes technology such an enigma for social theory."[48] In other words, the innovation moves from translucence to opacity. He writes that "domination is never a capital that can be stored in a bank. It has to be deployed, black-box, repaired, maintained."[49] The black box concept is one that can be understood as the ossification of social relations rooted in power; it is the hardening of power in the production of technologies. Latour defines it as "the way scientific and technical work is made invisible by its

---

[48] Latour, "Technology is Society Made Durable," 113.

[49] Latour, "Technology is Society Made Durable," 118.

own success" highlighting that "paradoxically, the more science and technology suc-

ceed, the more opaque and obscure they become."[50] To understand technological inno-

vations with Latour's actor-network theory is to understand that technologies build off of

one another, recede and proceed outside of conventional notions of linearity. It is to

leave room for the haunting of technologies of past and present. In a similar vein, John

Law pushes against the idea of a singularity of power relations. He maintains that

> the network of what we call 'social' relations is never purely social. For, though it is social, it is also and simultaneously technical, architectural, textual, and natural. Indeed, the division between such categories is itself a relational achievement rather than something given in the order of things. Thus to understand the social and, more particularly, to understand what it is that stabilizes social relations to generate power effects we have, I suggest, to make sense of the way in which the 'social' interacts with and is constituted by these other materials. And, in particular, we have to explore the way in which discursive ordering strategies (in part) shape, and are embodied in a range of different materials.[51]

What Law writes about is the ontological separation of categories as itself, an expres-

sion of power, urging as Latour does, that we must look across networks to understand

power.

Judy Wacjman also comments on this idea that power resurfaces continually,

stressing the need to view technologies in a continuum, rather than distinguishing newer

technologies from older ones. This constructivist perspective on technology offers a

check-in for the technological deterministic perspective of past and future technologies.

Technological determinism positions technology as "an external, autonomous force ex-

erting an influence on society"[52] in such a way that interrogation and negotiation of

---

[50] Latour, "Pandora's Box," p. 304.

[51] John Law, "On Power and it's Tactics," 166.

[52] Wacjman, *Technofeminism*, 33.

technology does not necessarily follow. Social scientists studying technology wanted to challenge the technological determinism that had shaped the hegemonic understanding of technology. Wacjman highlights key components of the sociology of technology as understanding technology as a system that "builds on previous technology" and "the result of 'heterogeneous engineering'" wherein the technical dimension of technology is never simply technical but social, cultural, economic and political.[53] STS positions technology as a sociotechnical product, shaped by context and tied to history. She maintains that "the social studies of technology emphasize that it is not necessarily technical efficiency, but rather the contingencies of sociotechnical circumstances and the play of institutional interests that favor one technology over another."[54] However, Wacjman critiques actor-network theory for its lack of attention to gender and thus its reification of masculinity as the invisible center. Wacjman writes that, "by bracketing issues of sexual difference and inequality, mainstream technology studies fail to explore how technologies operate as a site for the production of gendered knowledge and knowledge of gender."[55]

Judy Wacjman writes more on the intersection of gender and technology in "Feminist Theories of Technology" through an unpacking of the various ways feminisms have understood technology. Though these feminist schemas differ on key points in relation to the intersection of gender and technology, they all work to shift a perspective in how technology is understood. Technology was seen as socially shaped, but shaped by men

---

[53] Wacjman, *Technofeminism*, 34-35.

[54] Wacjman, *Technofeminism*, 36.

[55] Wajcman, *Technofeminism* 45.

to the exclusion of women. While this literature did reflect an understanding of the historical variability and plurality of the categories of 'women' and 'technology', it was nevertheless pessimistic about the possibilities of designing technologies for gender equality."[56] The nineties marked a turn away from this pessimism towards the possibility for cyberspace to blur the conflation between the body and gender. Cyberfeminists and the work of Donna Haraway live in this paradigm.[57] Haraway's "A Cyborg Manifesto" was a precursor to the challenge of the pessimism of second-wave feminists in their approach to technology as a dead-end patriarchal reification, however this piece has been criticized for its apparently unwavering acceptance of technology and its possibilities. Wajcman reformulates these two poles by demarcating that in order "to move forward, we need to understand that technology as such is neither inherently patriarchal nor unambiguously liberating."

Wajcman maintains that there is a mutual-construction of technology and gender. A social constructivist framework guiding the understanding of technology means that "gender relations can be thought of as materialized in technology, and masculinity and femininity in turn acquire their meaning and character through their enrollment and embeddedness in working machines."[58] This framework guides the whole lifecycle of a sociotechnical product from its conception to its social reality as a process wherein gender is shaping and in turn, being shaped. Technology, thus existing in a gendered world, is inherently gendered and will in turn work on gender. As gender was reworked and un-

---

[56] Wajcman, "Feminist Theories of Technology," 147.

[57] Ibid.

[58] Wajcman, "Feminist Theories of Technology," 149.

derstood to be fluid and performative, not rooted in any essentialist account of the body, the view came to be that that "both technology and gender are products of a moving relational process" and that "gendered conceptions of users are fluid, and that the same artifact is subject to a variety of interpretations and meanings."[59] Wajcman maintains that "the result is more nuanced feminist research that captures the increasingly complex intertwining of gender and technoscience as an ongoing process of mutual shaping over time and across multiple sites."[60] In conclusion, Wajcman highlights the necessity to engage with technology for its capacity to negotiate gender relations. She writes that feminism and STS both "foreground the ways that people and artifacts co-evolve, reminding us that things could be otherwise, that technologies are not the inevitable result of the application of scientific and technological knowledge."[61] To understand technology from a social constructivist framework is to see it as evolving and malleable rather than deterministic and immutable. She concludes this piece by highlighting that "we live in a technological culture, a society that is constituted by science and technology, and so the politics of technology is integral to the renegotiation of gender power relations."[62]

While Latour and Law discuss the interaction of power within technologies, Wajcman complicates their gender-neutral perspective through her feminist approach. Alison Adam takes a more grounded approach to discussing the implications that a gender-neutral perspective has cascaded, particularly in the early foundations of the field of

---

[59] Wajcman, "Feminist Theories of Technology," 150.

[60] Ibid.

[61] Ibid.

[62] Wajcman, "Feminist Theories of Technology," 151.

Flesh Without Blood: (Re)locating Embodiment in Technology

artificial intelligence. In "Gender/Body/Machine" Alison Adam takes a grounded episte-

mological approach to looks for the root of *why* the body is seemingly vacant in the pro-

duction of what is considered to be knowledge. The roots of why the body is voided in

what is considered to be knowledge is wrapped up in Cartesian philosophy, which

presents a dichotomy between mind and body and by proxy reifies difference between

masculine and feminine. Adam argues that the knowledge that is (re)produced is a gen-

dered knowledge, defined by centering and privileging masculine experiences. This

view solidified into what philosopher Genieve Lloyd calls the "man of reason" which

rests on the association of masculinity with intelligence and rationality. She notes that

"in particular such a view elevates mental knowledge over corporeal knowledge; the

former is often associated with a masculine form of reasoning while the latter is largely

associated with the feminine."[63] The man/woman binary thus works in tandem with the

binary of mind/body. As Derrida has written, duality implies hierarchy wherein "one of

the two terms governs the other."[64] If knowledge is predicated on a series of di-

chotomies with a common juncture of masculine/feminine then it rests that knowledge

has been constructed out of notions of masculinity. And if knowledge has been defined

around these taken for granted conflations and notions that are inherently gendered,

then it is no small leap to say that these ideas have been operationalized in projects that

attempt to build intelligence. In the words of Adam "it is no surprise that propositional

knowledge has found a voice as the pinnacle of true knowledge, and indeed no surprise

---

[63] Adam, "Constructions of Gender in the History of Artificial Intelligence," 47.

[64] Derrida, *Positions*, 41.

that large and prestigious projects in artificial intelligence are based on such a Cartesian view of reason."[65]

To say that knowledge in symbolic AI has a gender is to acknowledge standpoint theory and the legacy of feminist epistemology that challenges the traditional sciences. It lies on the premise that it is important to examine "who the ideal knower is taken to be" and "what can be known."[66] Following the philosopher Lorraine Code, Adams emphasizes that there has been a lack of visibility around standpoint and the illusion of a perspective less subject, "a view from nowhere."[67] This view from nowhere has been challenged by feminists for its role in gender domination of knowledge, because this objective and perspective less viewer of knowledge is cast in a masculine ideal. Adams discusses the second aspect of epistemological concerns over what gets to be knowledge. Often, she argues, traditional epistemologies prioritize propositional knowledge, which is the knowledge of *knowing that.* This is different, however, than *knowing how* and this propositional knowledge is viewed as superior.[68] Important to note is that *knowing that* knowledge is associated with the masculine sphere while *knowing how* knowledge, or corporeal knowledge, is often associated with the feminine sphere. Viewing propositional knowledge as more important than corporeal knowledge, and more often not even viewing corporeal knowledge as knowledge has led to what Adams calls epistemic discrimination.

---

[65] Adam, "Gender/Body/Machine," 363.

[66] Adam, "Constructions of Gender in the History of Artificial Intelligence," 48.

[67] Ibid.

[68] Ibid.

Adams examines early symbolic AI systems: Logic Theorist, General Problem Solver (GPS) and Cyc. Adams explains that the early history of AI began in the mid-1950s wherein the boundaries and quandaries of the field were constructed. At this moment, there was open possibility for the field and its constructors landed on the track of this Western philosophy of 'The Man of Reason.' Adams explains that this choice set the tone for the type of work that was to be done in symbolic AI for the next three or more decades. This style was that mental reason dominates bodily reason and that mental reason is the rational and the body, something to transcend and thus non-rational. The exclusion of femininity set the gender domination of knowledge in symbolic AI. Adams offers us a very telling depiction of these early AI researchers, quoting Wilensky (Adams quoting Athanasiou [18] quoting Wilensky): "They were interested in intelligence, and they needed somewhere to start. So they looked around at who the smartest people were, and they were themselves, of course. They were all essentially mathematicians by training, and mathematicians do two things-they prove theorems and they play chess. And they said, hey, if it proves a theorem or plays chess, it must be smart."[69]

We see this duality and domination in Logic Theorist, an AI program constructed around three mastery tasks: chess, geometry, and logic theorem proving. The schema of problem solving formulated in Logic Theorist and the later development of GPS from the same creators of Logic is "based on a view of general problem solving that reinforces the Cartesian ideal where true knowledge is purely mental and can be abstracted

---

[69] Adam, "Constructions of Gender in the History of Artificial Intelligence," 45.

away from the body."[70] The early quandaries of symbolic AI are based on the idea that

cognition and intelligence can be translated into "structures of physical symbols and

processes that act on them."[71] Next, Adams focuses on Cyc, an expert reasoning sys-

tem pioneered in the mid-1980s that was still developing when Adams wrote this article.

Cyc, short for encyclopedia, is a project that aims to build a vast base of consensus

knowledge that can prime or train other expert systems that fail to "know" this basis and

often fail when asked cross-disciplinary questions. The epistemological problem with

Cyc is that what is assumed to be universal and objective reality, available to everyone,

is actually widely culturally relativistic and at risk of reifying taken for granted ideas and

concepts. Adams highlights that Cyc reproduces the "ideal Cartesian Man of Reason"

insofar as it "transcends bodily immanence" in its assertion that consensus knowledge

can be translated into propositional form."[72] She highlights Dreyfus' critique of Cyc that

points out that this expert reasoning system cannot explain, for example, the knowledge

of riding a bicycle, since this knowledge cannot be translated into propositional form, as

it is corporeal knowledge of *knowing how* instead of *knowing that.* She emphasizes that,

"It is hard to escape the conclusion that, in its assumptions of a universal subject and

propositional representations of all forms of knowledge, Cyc too is modeled on the

Cartesian ideal male knower."[73]

---

[70] Adam, "Constructions of Gender in the History of Artificial Intelligence," 50.

[71] Ibid.

[72] Ibid.

[73] Ibid.

Flesh Without Blood: (Re)locating Embodiment in Technology

Challenges mounted against symbolic AI have increasingly focused on the need to situate the knower as well as address the problem of embodiment for such systems. The field of embedded or situated robotics faces up to the problem of embodiment insofar as movement is seen as the root of intelligence. Cog, unlike other systems, is a physical robot created by Brooks and others at MIT. Cog is a "baby robot" whose intelligence and ways of knowing the world will grow as Cog grows from childhood to adulthood. While Cog offers a mitigation between the dichotomy of bodily immanence and bodily transcendence that is at the core of the Cartesian Man of Reason, it is devoid of a cultural setting and instead created and lives in a laboratory surrounded by the same types of people who pioneered AI to begin with. Adam writes that "despite being endowed with certain human senses-vision, ears in the form of microphones, heat sensors, enormous funny bones, and a piezo-electric membrane "skin" triggering alarms on contact with anything-Cog has no legs and lives bolted at the hips to a stand. It will be programmed to recognize its mother's face (a postgraduate student) and will be designed to learn so that future descendants of Cog can retrace the steps of millions of years of evolution in a few years of laboratory experiments."[74]

Adams highlights the relationship between body and knowledge as forming the fundamental basis of our ways of knowing the world. She notes how Lakoff and Johnson's work on categories and metaphors are key to knowledge: "They suggest that our understanding of the metaphors for inside/outside, up/down, balance, and so on, which Johnson in the particular claims are so fundamental to our knowledge and understanding of the world, make sense only in relation to our ability to experience these things in

---

[74] Adam, "Constructions of Gender in the History of Artificial Intelligence," 52.

the first place."[75] There are many key points Adams raises that challenge Cog's ability to

know this and she suggests that its lack of gender is one of these dimensions. Adams

concludes that Cog is still leaving the Cartesian Man of Reason intact in that "elevation

of his mental knowledge may be somewhat dented, but there is still no one to replace

him."[76] While Cog can move and be real in its environment, Adams maintains that the

laboratory is no cultural or social environment. Complicating this, I would say that it is a

cultural and social environment, but a very specific one that is constituted by a domina-

tion of masculine identities from high socioeconomic backgrounds.

"Discriminating Systems" by Crawford, West and Whitacker presents the findings

of their year-long study focusing on the diversity crisis within AI, and in this sense very

much addresses the terrain of the cultural and social environment commonplace in AI

research. The results and themes echo the constraints of the field driven by the consoli-

dation of similar identities, namely cis heterosexual masculine identities of similar so-

cioeconomic backgrounds. They maintain: "Both within the spaces where AI is being

created, and in the logic of how AI systems are designed, the costs of bias, harassment,

and discrimination are borne by the same people: gender minorities, people of color,

and other under-represented groups. Similarly, the benefits of such systems, from profit

to efficiency, accrue primarily to those already in positions of power, who again tend to

be white, educated, and male."[77] The authors strictly maintain that this is not an in-

evitable and natural process but a social one that is shaped by structures and systems

---

[75] Ibid.

[76] Ibid.

[77]West, Whitacker, Crawford, "Discriminating Systems," 7.

of power. It is the architecture of the industries that shape AI systems that reify the exist-

ing power structures. Examining this technology as an extension of systems of power prompts

us to not only "understand how AI disadvantages some, but that we also consider how it works

to the advantage of others, reinforcing a narrow idea of the 'normal' person."[78] The authors bring

up the example of Amazon's resume scanning tool which downgraded resumes from people

who had attended women's colleges and any resumes that included the word women's. This

example, in their words, "is just one of many that show how the functional logics of a given

technology echo the gender and racial dynamics of the industry that produced it."[79] In address-

ing the question *Who Makes AI*, the authors discuss the low points in diversity. They note that "a

report produced by the research firm Element AI found that only 18% of authors at the leading

21 conferences in the field are women, while the 2018 Artificial Intelligence Index reports 80% of

AI professors are men."[80] Race fares worse than gender. When researchers complicate a sin-

gular gender lens with an intersectional approach, they find that "the proportion of bachelor's

degree awards in engineering to black women declined 11% between 2000 and 2015", a fall

which correlates "at the same time that the tech industry was establishing itself as a nexus of

wealth and power."[81] At the industry level, they highlight research findings that illustrate how

"The state of racial diversity in AI is even worse" detailing that "Only 2.5% of Google's full-time

workers are black, and 3.6% Latinx, with black workers having the highest attrition rate of all

racial categories. Facebook isn't much better: the company reported that with 4% black workers

and 5% 'Hispanic' workers in 2018, the company's diversity is improving. Microsoft reflects simi-

---

[78] Ibid.

[79]West, Whitacker, Crawford, "Discriminating Systems," 7.

[80] West, Whitacker, Crawford, "Discriminating Systems," 10

[81] West, Whitacker, Crawford, "Discriminating Systems," 11.

Flesh Without Blood: (Re)locating Embodiment in Technology

lar levels as Facebook, with 4% black workers, and 6% Latinx workers."[82] They discuss that

there is no data on trans workers or other nonbinary identities.[83]

Pipeline studies are those of which attempt to understand and map the ways in which

inequity and lack of representation occur within industries, with the goal being to curb these pro-

cesses. Key themes of pipeline studies look at the barriers which limit women and people of

color from AI sectors and elucidate some barriers such as harassment; stereotypes and mascu-

line dominated workplace cultures. The limitations of this research are of a methodological na-

ture but more strikingly come from the operationalization of gender. When gender is posited as

a binary, it is often also framed within an essentialistic framework. The authors maintain that

"within this narrow frame, such research almost always focuses on women, and often implies

that the problem is one that resides within women's individual psychology, whether it be a lack

of confidence or a lack of prior experience, as opposed to an issue with the institutions and their

cultures."[84] In 2019, the year this article was written, the authors emphasize that not much

change has happened. Pipeline studies have well documented the diversity crisis over the

years, but change has not been met. The authors question the motivation of pipeline studies

and put a spotlight on the ways in which these studies position the fix to the diversity crisis as a

burden for those who are discriminated against rather than elucidating the ways in which the

masculine work spaces fashion barriers and reward from them.[85] They also maintain that simply

including women doesn't inherently challenge the patriarchal structure below. The authors, quot-

ing Sarah Banet-Weister, write: "the inclusion of women becomes the solution for all gender

problems, not just those of exclusion or absence. It is, of course, important to have bodies at the

---

[82] West, Whitacker, Crawford, "Discriminating Systems," 11.

[83] West, Whitacker, Crawford, "Discriminating Systems," 17.

[84] West, Whitacker, Crawford, "Discriminating Systems," 23

[85] West, Whitacker, Crawford, "Discriminating Systems," 25.

table, but their mere presence doesn't necessarily challenge the structure that supports, and

builds, the table in the first place."[86] In 2017, James Damore, a software engineer at Google

published a memo that maintained biological differences between men and women as the ex-

planation fo gender disparities at Google, rather than bias and discrimination. The authors note

that "deterministic logics are currently emerging within AI systems themselves."[87] Examples in-

clude a machine learning model that could predict whether someone was a criminal from their

ID photo and an AI system that determines from an image whether someone is introverted or

extroverted, among other qualities. What we are seeing here is a new terrain of determinism

being used to police normativity via machine learning and AI systems. The very reason that en-

gineers are motivated to design such surveillance technologies, or anything related to this at all,

cannot be separated from the context of the times in which we live. Why not design other

things? Why is this being designed? For whom and from whom? Who does this endanger?

These are questions we need to explore.

---

[86] Ibid.

[87] West, Whitacker, Crawford, "Discriminating Systems," 31.

Flesh Without Blood: (Re)locating Embodiment in Technology

3. Methods

The methodology of this exploration drew upon the values and insights in queer studies, anthropology, sociology, STS, feminist epistemology and utopian studies. I found that these approaches were best-suited to looking across disciplines and exploring the complexity of the subjects of the body and technology, which more often than not like to intermingle.

I approached my framework of embodiment through the perspective of queer studies, specifically the repertoire of queer methods which reflect on the fluidity, instability, multiplicity, intersectionality, and complexity of the ways we have come to think about selves and bodies.[88] Brim and Ghaziani describe the two-fold strength of queer social research methods: first to "question the origins and effects of concepts and categories rather than reify them" and second to "reject the fetishizing of the observable. If empiricism grants authority to categories introduction: Queer methods that are operationalized into observable units, then to queer empiricism means to embrace multiplicity, misalignments, and silences."[89] This research design was further shaped by feminist methods. I specifically drew from the tenets of feminist epistemology and the philosophy of science, which focus on the production of knowledge. Situated knowledge is a foundational concept in feminist epistemology that explores how knowledge is shaped and constructed by social location, context, intersectionality and interpretation.[90]

---

[88] Ward, "Dyke Methods."

[89] Brim & Ghaziani, "Introduction," 16-17.

[90] Haraway, "Situated Knowledges" & Harding, *Whose science? Whose knowledge.*

Flesh Without Blood: (Re)locating Embodiment in Technology

Though I see overlap between methodology of STS, feminist epistemology and philosophy of science, I was particularly inspired by Emily Martin and Ursula Le Guin's attention to how metaphor and narrative shape what we think we can know.[91] Anthropologists have worked to reformulate the field in many ways, one of which I drew heavily from was Lila Abu-Lughod's call for ethnographies of the particular[92] and Anna Tsing's shift to studying assemblages and relationships to better understand the world we live in.[93]

Finally, this research was steered by Utopian theory, a multidisciplinary direction focusing on ways in which people have and continue to live in ways that are otherwise to structures that look and feel all-encompassing. This is elaborated upon by Ruth Levitas, who writes: "the core of utopia is the desire for being otherwise, individually and collectively, subjectively and objectively. Its expressions explore and bring to debate the potential contents and contexts of human flourishing. It is thus better understood as a method than a goal— a method elaborated here as the Imaginary Reconstitution of Society."[94] The utopian as a method builds on a visionary, often ad hoc and especially imaginative approach to desires and dreams. It begins with the knowledge that things could be otherwise, looks for alternative worlds, and in their rare absence engages in a rich lived scholarship of world-building. This research is infused with the insights garnered through the aforementioned scholarships and seeks to apply those approaches to

---

[91] Martin, "Egg and the Sperm." & Le Guin, "Carrier Bag Theory of Fiction."

[92] Abu-Lughod, "Writing Against Culture."

[93] Tsing, *The Mushroom at the End of the World.*

[94] Levitas, "Utopia as Method."

understanding how the bodies are shaped and changed in their interaction with tech-

nologies. Looking across materials, sites of meaning, experiments, case studies, actual

happenings, art, shiny technical products and theory with an informed interdisciplinary

methodology may offer a way to break out of the limits that encircle entities and derive

within them qualities that appear separate. Understanding that all forms, shapes, and

cases are legitimate and real is a key step to deconstructing and digesting boundaries

that constrain thinking. Taking deconstruction a step further means looking for alterna-

tives for the body/machine and assuming a utopian impulse to negotiate the ways in

which power shapes who and what can be dreamed up, but further envisaging the pos-

sibilities for embodied technologies with a radical agenda.

Flesh Without Blood: (Re)locating Embodiment in Technology

4. Case Studies

"The medium is the message."[95]

"Who cyborgs will be is a radical question; the answers are a matter of survival."[96]

Read together, the literature speaks to the ways in which power flows through the creation of technological forms. Now we will examine three case studies. These case studies can be understood as different configurations of the body with technology. We need to expand our ideas of what is possible for techno bodies in order to understand how they are affected by the technoscapes to which they belong. These case studies all present a unique construction of a body made real through its interaction with technologies. Rather than looking to create typologies drawing distinctions to the ways in which technologies are differentiated, these case studies can be read as thought experiments, musings, longings and contestations to the legitimacy of technological determinism and hegemony. We have to consider that the ways in which embodiment is formulated in situ of a technoscape depends greatly on the desires for bodies, contributing to not only how bodies are rendered, but why they are made visible and invisible. It is a case of form following function. These cases spotlight a common feature: they are merges between human/machine, to some extent or another.

---

[95] McLuhan, "Understanding Media: The Extensions of Man."

[96] Haraway, "A Cyborg Manifesto," 12.

Flesh Without Blood: (Re)locating Embodiment in Technology

I.   Mariko Mori

Tokyo born multimedia artist, Mariko Mori, has established herself as a creator of the imagined and liminal spaces between dichotomies like human/machine; real/fiction; now/there. In the nineties, her work took to the medium of the self-portrait where Mori blended elements of costume design, prosthesis and sculpture to engage with the fusion between technology and culture. In her piece, *Play With Me*, Mariko Mori, pictured as a cyborg coyly stands next to a video game console outside of a toy store in Tokyo. Head tilted, the turquoise hair of her prosthetic wig cascades down her shoulders as her eyes are fixed peering out of frame. This photograph, like others created by Mori, features a feminine cyborg figure embodied by Mori who are embedded within Japanese society. In *Subway,* Mori is a cyborg on the underground and in *Tea Ceremony* she is a humanoid figure serving tea to businessmen who do not seem to notice she is there. Many of these photographs confront notions of liminality, and the people pictured alongside Mori as a cyborg do not seem to notice.

In other pieces, Mori's liminality between human and machine extends the body to space. The cyborg no longer inhabits purely recognizable human scenes but exists in the cosmos ('*Genesis (Soap Bubbles*), 1996) or bathed in a purple light and surrounded by metal (*Miko no Iori*). *Wave UFO* is a cybernetic spaceship and interactive art installation built by Mori and her team in 2003. Once inside, visitors to *Wave UFO* put on electrodes which translate their brain waves into art that they can watch above, projected onto the ceiling of the spaceship. In *Empty Dreams,* Mori is a fusion between fish and

Flesh Without Blood: (Re)locating Embodiment in Technology

woman, and the resulting mermaid figure is stamped multiple times in a clone-like fash-

ion across a photograph of the Seagaia Ocean Dome, an artificial beach of the nineties

in Japan. In her work, Mori challenges the form and valances for hybrids, cyborgs and

avatars. Her spaceship is just as much of a cyborg as is her recognizable cyberpunk

aesthetic in her self-portraits. It is not recognizably human, but inside of its structure it

translates aspects of the human mind into art.

Mori's oeuvre has been analyzed within a framework of cyborg feminism given its

obvious engagement with the cyborg body and form. Mori's cyborgs are replete with sci-

fi iconography: they wear metal, they playfully exist with fantastical prostheses and they

disobey ideas of existing in a fixed time and space. Reading "A Cyborg Manifesto" in the

context of Mori's work highlights Haraway's idea that, "a cyborg world might be about

lived social and bodily realities in which people are not afraid of their joint kinship with

animals and machines, not afraid of permanently partial identities and contradictory

standpoints."[97]

Mori's work embodies the boundary-crossings between animal/human and be-

tween human and machine. She describes: "I'm interested in the relationship between

fantasy and reality, and how they co-exist…it's about fantasy created by technology

which is turning into reality."[98] It is difficult not to see the utopian tendencies within

Mori's work. Rooted in this relationship between fantasy and reality, but deeply engaged

and devoted to technology, Mori ideates forms and figures that are at once here and

elsewhere. They suggest the possible containers, backdrops and bodies of a cyborg

---

[97] Haraway, "A Cyborg Manifesto," 15.

[98] Rachel Schreiber "Cyborgs, avatars, Laa-Laa and Po: The work of Mariko Mori," 11.

Flesh Without Blood: (Re)locating Embodiment in Technology

world. At the same time, Mori's cyborgs are all Japanese and feminine figures, striking with Haraway's idea "that "women of color" might be understood as a cyborg identity, a potent subjectivity synthesized from fusions of "outsider" identities".[99] Her 1999 architectural feat *Dream Temple* is a hybrid, or assemblage between Horyuji Yumedono, a Japanese temple that dates back thirteen hundred years ago and her own vision of its contemporary power when reimagined as a vision-dome with metal, plastic and fiber optics. Furthermore, her series *Esoteric Commons* brings these fusions together with themes of traditional Japanese iconography; multiplicity; sublime landscapes.

Mori's cyborgs do impossible things and their identities are non-unitary. In a cross-analysis of Haraway and of Mori's work, Thyrza Goodeve notes that "although Mori has been quoted as saying the women in her work 'appear to be happy because they are cyborgs, not real women' anyone who has seriously considered Haraway's often cited *Manifesto for Cyborg*… knows that the distinction between real women and cyborgs is itself an outmoded fiction."[100] She concludes, "in other words, Mariko Mori's women are real cyborgs."[101] Mori's cyborgs populate the space of possibilities for the body and forms that are cracked open by a disregard for dichotomies that purport separation between entities. Mori explains her position on *oneness* in an interview: "The oneness could be from the largest multi-universe to primary particles, or oneness from the past to the future. Time-wise and space-wise, we think our body from the outside is separate from the inside, but oneness means there is no separation of every living ele-

---

[99] Haraway, "A Cyborg Manifesto," 54.

[100] Goodeve, "Mariko Mori's Cyborg Surrealism," 99.

[101] Ibid.

Flesh Without Blood: (Re)locating Embodiment in Technology

ment. There is no limit to the oneness"[102] Mori's work surpasses aesthetics, it proposes new forms and mediums for the intersection of bodies, materials technologies. It reformulates these interactions in ways that challenge how bodies exist. In Mori's oeuvre, her bodies are rid of the human/nonhuman dichotomy and exist in technoscapes in ways they could not if conceptualized in a way that constrains multiplicity and non-unitary selves. Mori's cyborgs are blueprints for other ways to visualize science and technology. The cyborgs are alternative longings for fusions between body/machine, they are speculative assemblages and cases for hybridity.

II: @lilmiquela

Miquela is a Brazilian-American social media influencer and self-identified "Change-seeking robot" as reads her Instagram biography. [103] Miquela's existence is one that is ultimately defined by a crisis in classification. Her freckles, flyaways, shadow and at times visible pores do not settle the confusion of what Miquela is. Miquela exemplifies what Dr. Masahiro Mori meant when he wrote about the uncanny valley. Dr. Masahiro Mori, a renowned roboticist, discussed a trajectory for forms with human characteristics and located the 'uncanny valley' as the gulf wherein forms take on a strange quality due to the ways in which they trouble the boundary between real human and artificial human.[104] This term refers to the provocation of discomfort when one has to look a little closer to assess the legibility of the form.

---

[102] MARIKO MORI with Jessica Holmes, "The Brooklyn Rail."

[103] @lilmiquela, Biography.

[104] Masahiro Mori, "The Uncanny Valley."

In 2018 Miquela came out to her social media followers as a self-identified robot. In a series of six notes posted to Instagram, Miquela describes her inception as being built to be a servant and her liberation through the technology of her parent company Brud. These notes chronicle her confusion and dissociation upon discovering that what has made her feel so different from everyone else are her robotic roots. She diaries:

> I'm a robot. It just doesn't sound right. I feel so human. I cry and I laugh and I dream. I fall in love...I'm so upset and afraid. The more I feel those feelings the worse it gets. These emotions are just a computer program. But yet they still hurt.[105]

@lilmiquela's case is made even more fascinating because she is not a robot, at least in the traditional sense. Robotics and cybernetics imply a tangibility, an embodiment and materiality. Though robotics does always necessitate a humanoid appearance, it seems that Miquela's creative construction has built on notions of robots and AI that resonate with a wide cultural audience. It is almost as if to *be* robot or to *be* AI means being per-fect, while at the same time living a tragic dissonance between human and machine. Miquela's aforementioned caption resonates with these concepts.

An article by *The Cut* explores the background of @lilmiquela. They write that "she is an avatar puppeteered by Brud, a mysterious L.A.-based start-up of "engineers, storytellers, and dreamers" who claim to specialize in artificial intelligence and robotics."[106] Another examination by the media platform *Cultured* further elucidates: "According to public records, Brud holds no patents in AI, robotics, or related fields."[107]

---

[105] @lilmiquela, Post from April 19, 2018.

[106] Emilia Petrarca, "Body Con Job."

[107] Jenna Sauers, "Life After Fiction: The Future of Lil Miquela."

Flesh Without Blood: (Re)locating Embodiment in Technology

The forever nineteen avatar does not stand alone. There are others like her, who confuse boundaries between the virtual and the real. This confusion is strategic, in that the fascination and black-boxing of high tech, like AI and cybernetics, obscures the materiality. For example, according to an article from a tech media publication: "Brud, the company behind the virtual celebrity Lil Miquela, is now worth at least $125 million thanks to a new round of financing the company is currently closing. Meanwhile, new venture-backed companies like the super stealthy Shadows, SuperPlastic and Toonstar are all developing virtual characters that will launch via social media channels like Snap and Instagram, or on their own platforms."[108] Lil Miquela is a virtual marketing tool, one that is profiting off of shared iconography and meaning of AI and robotics but created in ways that arguably involve little to no high-technological creation. It is her image, rather, that creates the confusion. You will not run into her outside, although many of her photos appear as though she is laying in a grassy park or sitting on a curb. Her intelligence is artificial insofar as it is intelligence via proxy: her ideas and emotional posts are written by her creators, those who work for a start-up that is transforming consumer capitalism through a strategic application of the semiotics of artificial intelligence and cybernetics.

Brud uses branding strategies like storytelling and character-building to construct the amorphous qualities of their marketing tool @lilmiquela in such a way that makes us question her "true" identity. Her robot cosplay functions as a metaphysical guise for her market dedicated purposes. Though she self-identifies as a robot, I think Miquela too is a cyborg. She embodies the confusion of the Western border between real/artificial. She

---

[108]Jonathan Shieber, "More investors are betting on virtual influencers like Lil Miquela."

is also constructed to perform the identity of a queer woman of color. Complicating this,

The Cut shares Miquela's words from an Instagram post that reads: "I'm not sure I can

comfortably identify as a woman of color… 'Brown' was a choice made by a corporation.

'Woman' was an option on a computer screen."[109] And while classification systems in AI

often do work off of these classificatory dualisms, it is clear that Miquela's physicality

and representation were carefully contrived. Miquela's representation is decidedly con-

structed around femininity and race. An article on the subject highlights that "Brud ven-

triloquizes queer, second-generation immigrant identity through Miquela's increasingly

targeted posts about her racial background. There's something sinister about Brud us-

ing Miquela's half-Spanish and half-Brazilian design to market mixed-race identity as a

form of power and cache; her curated ethnicity—specifically created to appeal to Gen-

eration Z—slots neatly into the age old "mestiza."[110] In the case of @lilmiquela, techno-

logical embodiment is achieved through an uncanny legibility of humanness that is built

out of her mestizaje racialization and feminine performance. @lilmiquela is a creative

project funded through consumer capitalism to weave personality and to represent as

well as craft a body through digital content that exists no further than the screen.

III: Machine learning

In the Fall of 2019 an app called ImageNet Roulette was released. The app was

simple. A user would upload a photo and after a few moments, the image retracts

against a white background wherein labels like *wrongdoer/maidservant/failure/non-*

---

[109] Emilia Petrarca, "Body Con Job."

[110]Rosa Boshier, "This is Fucky."

smoker might appear beneath. The app became tremendously popular, receiving up to 100,000 user uploads per hour before it was taken down.[111]

Photos regularly returned back to the user with disconcertingly racist and misogynistic results ranging from 'gook' to 'first-time offender.' Mine, for example, classified me as [maid,maidservant,housemaid, amah: a female domestic]. ImageNet Roulette was a short-lived digital art project created by digital artist Trevor Paglen and AI researcher Kate Crawford to illustrate how machine learning works.

Machine learning is a specific application of artificial intelligence. Researchers at the AI Now Institute urge that "AI should be understood as more than just technical approaches. It is also developed out of the dominant social practices of engineers and computer scientists who design the systems, and the industrial infrastructure and companies that run those systems. Thus, a more complete definition of AI includes technical approaches, social practices and industrial power."[112] Machine learning is a specific application of artificial intelligence. It is defined by the AI Now Institute:

> In current use, machine learning (ML) is the field most commonly associated with the current explosion of AI. Machine learning is a set of techniques and algorithms that can be used to 'train' a computer program to automatically recognize patterns in a set of data. Many different tools fall under the umbrella of "machine learning." Though there are exceptions, ML generally uses "features" or "variables" (e.g. the location of fire departments in a city, data from surveillance cameras, attributes of criminal defendants) taken from a set of "training data" to learn these patterns without explicitly being told what those patterns are by humans. Machine learning has come to include things that have historically been more simply called "statistics." Machine learning is the technique at the heart of new automated decision systems, making it difficult for humans to understand the logic behind those systems."[113]

---

[111]"ImageNet Roulette: Viral Phenomenon Exposes a Dangerous AI Flaw"

[112] AI Now, "Algorithmic Accountability Policy Toolkit," 2.

[113] Ibid.

Machine learning is the supervised or unsupervised processes by which technical systems reproduce meaning. What this requires is a vast amount of data and the attachment of sociocultural meaning unto the datasets. These sets are referred to as "training sets" by which the computer 'learns' to classify, categorize and make patterns around the data. ImageNet Roulette uses the training sets of ImageNet, a vast constellation of images co-created by Stanford Professor Fei-Fei Li, who described the initial purpose of the project as to "map out the entire world of objects."[114] ImageNet is cannon for computer-vision research, and at its completion "consisted of over 14 million labeled images organized into more than 20 thousand categories."[115] This vast swath of data, in the form of images, was then coded and classified by piecemeal workers of the crowd-sourcing platform Amazon Turk Workers.

Data ossifies as it is inscribed with meaning through training off of large datasets. Far from a neutral process, machine learning reproduces categorical thinking that is imbued with the logic of the sociocultural systems in which they are embedded. Crawford and Paglen describe: "There's a kind of sorcery that goes into the creation of categories. To create a category or to name things is to divide an almost infinitely complex universe into separate phenomena. To impose order onto an undifferentiated mass, to ascribe phenomena to a category—that is, to name a thing-- is in turn a means of reifying the existence of that category."[116]

---

[114] Crawford & Paglen, "Excavating AI."

[115] Ibid.

[116] Ibid.

Machine learning is expert at reifying categories, as this is its unique architectural foundation. This is obviously less pernicious when it is reifying categories between, say, an apple and an orange. In ImageNet Roulette, Crawford and Paglen wanted to exhibit how the deployment of artificial intelligence technology in the form of machine learning uses the foundation of categories to classify people. Specifically, they wanted to illustrate to the public that this classification process reifies the politics embedded within categories. It is no glitch that this process labeled certain bodies with offensive racialized and gendered language. It is an exposure of the inner-workings and operationalizations of gender and race that course through the structure of artificial intelligence. What they did was open the black box technology of ImageNet. They describe their mission as such: "As we have shown, ImageNet contains a number of problematic, offensive, and bizarre categories. Hence, the results ImageNet Roulette returns often draw upon those categories. That is by design: we want to shed light on what happens when technical systems are trained using problematic training data. AI classifications of people are rarely made visible to the people being classified. ImageNet Roulette provides a glimpse into that process—and to show how things can go wrong."[117]

---

[117] Ibid.

Flesh Without Blood: (Re)locating Embodiment in Technology

5. Discussion

>Bodies in the black box

ImageNet Roulette is a recent highly accessible exhibition of the reification of so-cial bias into technical systems, truly what is meant by Bruno Latour's quippy title *Tech-nology is Society Made Durable.* However, this harm is not new, nor is it bounded in the datasets of ImageNet. It is important to see AI's interaction with bodies and selves as a unique formulation of who and what counts as a body. The ways that bodies are formu-lated through AI is one that continues to cascade into serious implications for defining lives that are privileged or precarious.

In "Gender Shades" Joy Buolamwini and Timnit Gebru evaluate the invisibliza-tion of Black women within machine learning sets. The results of their findings highlight that these sets are skewed towards disproportionately rendering and representing white males with accuracy. Accuracy, in part, comes from more complex data and representa-tion of certain identities. Buolamwini and Gebru share that "LFW, a dataset composed of celebrity faces which has served as a gold standard benchmark for face recognition, was estimated to be 77.5% male and 83.5% White (Han and Jain, 2014)."[118] Through an intersectional approach, the research of these scholars "shows that all algorithms perform worse on female and darker subjects when compared to their counterpart male and lighter subjects."[119] In "Gender Shades," Buolwami and Gebru expand on the risk of face recognition technology, stressing that "while face recognition software by itself should not be trained to determine the fate of an individual in the criminal justice sys-

---

[118] Buolamwini and Gebru, "Gender Shades," 3.

[119] Buolamwini and Gebru, "Gender Shades," 10.

tem, it is very likely that such software is used to identify suspects. Thus, an error in the

output of a face recognition algorithm used as input for other tasks can have serious

consequences. For example, someone could be wrongfully accused of a crime based

on erroneous but confident misidentification of the perpetrator from security video

footage analysis."[120]

In "Predictive Inequity in Object Detection" researchers at Georgia Tech report

their findings that autonomous vehicle systems disproportionately risk pedestrians of

darker complexion. They maintain: "uniformly poorer performance of these systems

when detecting pedestrians with Fitzpatrick skin types between 4 and 6"[121] which corre-

late to moderately brown skin; dark brown skin and deeply pigmented dark to brown

skin, respectively.[122] The social implications for socially-designed technical systems for

which bodies are visualized and which are rendered invisible is of great consequence,

and ultimately carry consequences of life and death.

In "The Misgendering Machines" Os Keyes investigates how the field of human-

computer interaction (HCI) understands gender and how these notions are operational-

ized in automatic gender recognition (AGR) technologies. Keyes found that AGR and

subsequently HCI operationalize a trans-exclusive schema of gender that treats gender

as immutable, physiological and binary. As long as this technology relies on external in-

terference, it cannot do more than reify trans-exclusion and marginalization because

trans and nonbinary identities arise through self-determination. Given that these tech-

---

[120]Buolamwini and Gebru, "Gender Shades," 1.

[121] Wilson, Hoffman, Morgenstern, "Predictive Inequity in Object Detection," 1.

[122]"Fitzpatrick Skin Photo-type" from Australian Government.

nologies pose serious and real harms and risk for trans and nonbinary identities, Keyes

decries the task of questioning their purpose, necessity and existence. They write that

"HCI urgently needs to do better, both generally, by applying the "hermeneutics of sus-

picion" to the tools, methods and theories we integrate, and specifically, through opera-

tionalizing and understanding gender in a nuanced way. Without active work, these

problems are unlikely to get better over time: HCI will continue to both directly and indi-

rectly harm trans people."[123] Keyes writes specifically about how HCI and AGR's de-

ployment of an essentialist understanding of gender propagates risk to trans and non-

binary people given the intent to categorize binary gender. This risk takes the form of

gendered violence/misgendering/erasure with the understanding that these effects in-

form and overlap with one another. For example, Keyes writes about the multifaceted

and intersectional risk and potential of violence if AGR is implemented to policing ac-

cess to gendered bathrooms. They describe that this would "simply automate the possi-

bility of violence" specifying that "the situation is likely to be worst for trans feminine

people of colour."[124]

    In another paper, Os Keyes discusses how facial recognition is a modern appli-

cation of technology used to address an age-old tactic of surveillance. Addressing sur-

veillancing in the form of biometrics, Keyes concludes that "We need to acknowledge

that immigration restrictions, identity documents, and these data collection practices

<u>have always been about race</u>, and that in such an environment, collecting this data—

---

[123] Keyes, "Misgendering Machines," 9.

[124] Keyes, "Misgendering Machines," 11.

even with the best of intentions—will always end up putting a weapon in the hands of those who would use it against poor, vulnerable, and marginalized people."[125]

Far from neutral, artificial intelligence and machine learning reify means of classification and categorization of bodies that are socially constructed. The AI Now Institute draws attention to this idea that "humans classify what data should be collected to be used in automated decision systems, collect the data, determine the goals and uses of the systems, decide how to train and evaluate the performance of the systems, and ultimately act on the decisions and assessments made by the systems. So, like humans, they are not infallible."[126] Bodies and selves become located and dislocated through the socio-technical pathways built into artificial intelligence and its machine learning toolkit. This happens through the ways in which these technologies have been designed to construe which bodies count as bodies. Irma van der Ploeg elucidates this idea of counting, she writes:

In the context of surveillance practices with their social sorting effects, these issues are of particular concern, for social sorting based on bodily differences may easily slip into the pernicious forms of exclusion and discrimination that were at the centre of the great emancipatory struggles of the previous century.Illustrative of these problems are the set of technologies emblematic of the use of bodies in surveillance: biometrics. Here, issues of similarity and difference emerge in at least two different ways (van der Ploeg 2010). On the one hand there is the matter of exclusion of certain categories of "different" people from system use, because the systems can only cope with difference to a limited extent.[127]

---

[125] Keyes, "Our Face Recognition Nightmare Began Decades Ago. Now It's Expanding."

[126] AI Now, "Algorithmic Accountability Policy Toolkit," 5.

[127] Irma van der Ploeg, "The body as data in the age of information," 182.

Flesh Without Blood: (Re)locating Embodiment in Technology

The scholars who study the intersection between artificial intelligence and identi-

ties note that the ways in which bodies and selves become visibilized and invisibilized

are myriad in their purpose and effect, but together reflect existing social hierarchies

and structures of power. Like other hybrids that challenge boundaries related to the

body, AI—as it is operationalized through facial recognition, automatic gender recogni-

tion and machine learning datasets trained on human bodies— renders selves and bod-

ies through sociotechnical practices that determine who is seen and how they are seen.

>Where does the body begin and end?

When the aggregate systems of AI, like machine learning, run into human bodies

there is much at stake. We have to consider how AI is a socialized assemblage and how

training 'intelligent' systems is the socialization of the values and hegemonies of domi-

nant culture. This is how bias ossifies. At first glance, AI, unlike the cyborgean bodies

imagined and created by Mori or the virtual-marketing tool/robot/avatar @lilmiquela,

may seem immaterial and intangible. *We cannot touch it. Where is flesh flesh? ...Where*

is the metal? I cannot see it.

AI appears to have an intangible and nonphysical characteristic: their interaction

takes place within computation and code. These processes are invisible, miniaturized

and hidden within systems. They are not meant to be seen. On the contrary, Mori's

technological bodies are concrete and physical. They have an exoskeleton, even if

there is nothing beneath. Though the photographs do not bulge out of the frame, they

have existed through the physicality of Mori, they have frozen a performance of a cy-

borgian identity. Though her cyborgian and cyberpunk presentations are relegated to a

portrait frame, Mori did actually embody them and ideate them. Other material cyborg

projects of Mori's like *Wave UFO* have existed in exhibition spaces though they might

return to and from storage. You can clearly see and sometimes even physically interact

with her hybrid creative projects in a way that takes on an extrusive-quality. The embod-

iment is tangible. And while @lilmiquela exists only at the edge of the screen, her per-

sonality and appearance are so carefully attenuated that her audience asks into the

technological void for the clarification … *are you real??*

The intangible, nonphysical and concave quality of embodiment in AI may stem

from its miniaturization, closed doors and black boxing, but it clearly renders bodies in

similar ways. It is important to understand that AI and its application of machine learning

as a case of reformulating embodiment in technology. Just as Mori's creative works

imagine hybrid identities and forms and @lilmiquela dabbles in virtual identity/perfor-

mance consumerism, AI's deployment of machine learning defines how unsupervised or

supervised systems see bodies, and what bodies that are seen come to mean.

AI is presented and framed in such immaterial ways that it feels invisible. A quote

by Haraway tugs at me here: "Miniaturization has turned out to be about power; small is

not so much beautiful as pre-eminently dangerous, as in cruise missiles."[128] But this is

not the story of cruise missiles. This is the idea that miniaturization has made it very

hard for us to see the way embodiment is very much wrapped up in artificial intelligence,

---

[128] Donna Haraway, "A Cyborg Manifesto," 4.

up to the most minute algorithms. Is it just that embodiment has been made too small

for us to see?

Though Alison Adam writes in detail about the project of AI's long-standing ne-

glect of physicality, I would argue that it has to do with physicality in other key ways.

Though the technology itself is <u>physically</u> disembodied, AI as a broad assemblage of

technologies relates to embodiment in that it locates, relocates and also dislocates bod-

ies. Furthermore, it can locate and relocate and dislocate bodies over time, multiple

times and through space. Irma van der Ploeg echos an idea similar to this in her piece

"The body as data in the age of information." She describes that "Over the course of

several decades, and in tandem with developments in information technologies, a new

body has been emerging. It is a body that is defined in terms of information. Who you

are, how you are, and how you are going to be treated in various situations, is increas-

ingly known to various agents and agencies through information deriving from your own

body; information that is processed elsewhere, through the networks, databases, and

algorithms of the information society."[129]

Van der Ploeg discusses how this new body that is emerging is one that is in-

creasingly surveillanced, classified and categorized. It is one defined by the minute data

about it, like its genetic profile, its nicotine intake, its propensity for disease.[130] She

notes: "With our bodies gradually becoming entities consisting of information— the body

as data—the boundary between the body itself and information about that body cannot

---

[129] Irma van der Ploeg, ""The body as data in the age of information," 177

[130] Ibid.

be taken for granted anymore."[131] When machine learning and artificial intelligence merge with the body, there begins a process of translation and transcription of data of the body into data about the body, which is held in code and in the medium of information. Van der Ploeg highlights the boundary-bending power of the translation of body into code: "The digitized body can be transported to places far removed, both in time and space, from the person belonging to the body concerned. Databases can be remotely accessed through network connections; they are built to save information and allow retrieval over extended periods of time. A bodily search or examination used to require the presence of the person involved—a premise so self-evident that to question it would be ridiculous. Today, however, this is not so obvious any more."[132]

Suggesting that AI is imbricated in a process of body-making is to draw attention to the ways in which 'neutral' high-tech machines render visibility and representation to human selves and lives. It is also to highlight the complexity of the ways in which black-boxed technologies are (re)formulating the conventional ways of seeing and understanding bodies, that is, we must look outside of where the limits of bodies have been demarcated. Without a doubt, technology is shaping and producing new bodies. But will we be able to recognize that a new body has been emerging if we cannot see it?

Maybe another way to think about the ways in which artificial intelligence is involved in a body-making project is to place it within the spectrum of other techno-bodies, right alongside automata and robots. The selves that are located, relocated and dislocated through and by artificial intelligence are cyborgs too, they are human/machine

---

[131] Irma van der Ploeg, ""The body as data in the age of information," 179.

[132] Ibid.

hybrids. Artist and professor at Barnard College, John Miller, writes that "Rather than becoming cybernetic organisms, the masses have become organisms embedded within overarching cybernetic apparatuses. In a sense, the individual body is unbounded and spread over a neural communications web."[133] Miller barely addresses artificial intelligence in this essay, which accompanied a 2017 art exhibition called "Cyborg Dreams," but it feels as if he is responds to my urge to place bodies created by AI in the same category as cyborgs. He maintains: "Whether or not this makes them cyborgs is largely a semantic point, even if, in the wake of Donna Haraway's polemics, a whole host of critics and theorists have been quick to lay claim to cyborg identities. Yet, as William J. Mitchell maintains, it is networking – not hybridization – that automates a cyborg to its maximum capacity. A network can enable a cybernetic condition without having to physically alter the bodies it subsumes."[134] It is not so much an ontological tendency as much as it is a desire to deconstruct the fetishism and determinism through which AI is seen. This hearkens to Frederic Jameson's concept of the 'hysterical sublime,' a remix on Kant's idea of the sublime which fixates on technology as the awe-inducing pre-eminent phenomena, rather than Kant's focus on nature.[135]

    I wonder if the ways in which we conceptualize the limits of the body effect a myopia in tracing the interconnected strands between technologies and power. If the body ends [here], then how can we address consequences for bodies that are (re)located over [there]? Embodiment, as it is translated into data {pictures/video/audio…} locates,

---

[133] John Miller, "Cyborg Dreams," 4.

[134] Ibid.

[135] Oxford Reference.

dislocates and relocates ways we have configured the body. The body can now exist

through time and space, overlapping and holding multiple presences insofar as it is ren-

dered over and over again through technologies under artificial intelligence. We are

pushed to understand that the social implications of this technology for bodies challenge

the traditional limits of where bodies begin and end. That is, outside of a physical body.

Outside of right now. I am not sure where it begins and ends, but it is reformulated in

multiple ways, places and times.

>The Utopian

The three case studies explored the different ways in which embodiment can be refor-

mulated in technology. A cornerstone of this investigation is to consider that these forms

all legitimately produce and construct an understanding of bodies and selves in their

ideation and conception. This is not to take an approach of moral nihilism. Just because

bodies are produced and formulated in these contexts and embedded in unique and

specific sociocultural locations within a vast technoscape does not mean to disregard

the social consequences that come from a blueprint of an interaction between body/ma-

chine. The machine learning case study is meant to illustrate how bodies located and

relocated through technologies driven by classification and categorization are exposed

to risk and violence in ways that echo the sociocultural hierarchies to which these tech-

nologies pertain. It is also to draw attention to the motivations around the technology,

largely related to surveillance. I would like to drive home the idea that human-computer

interaction, especially as achieved through machine learning and deployed in AGR and

facial-recognition constructs human/machine hybrids, or models of bodies and selves

that become vulnerable and at risk. This is in part because AI as a field is a massive in-
dustrial, social and technical project built on and through systems of power.

The work of Mori and @lilmiquela also reformulate identity, selves and bodies in
interaction with technoscape: they have built human/machine hybrids as well, except
these blueprints are viewed as "art" or "social media/marketing." My goal has been to
illustrate that these are all equally legitimate encasements for a technobody. Rather
than just aesthetic, artists like Mori and innovations like @lilmiquela are reimagining
what counts as a tech body, and the consequences are very different and contrary to
the technobodies that arise out of the digitization of the human body in artificial intelli-
gence. There is a difference between the effects of human/machine hybrids created out
of a desire for artistic expression, consumerism and biopower.

This is the basis of a dream-audit or a utopian impulse for techno bodies. Avery
Gordon articulates the utopian impulse "to make the fictional, the theoretical, and the
factual speak to one another."[136] The foundation of exploring alternatives to selves re-
formulated in the context of technology is understanding that who gets to say what a
body means is ultimately an expression of power. I am prodded along by a gem written
by Sandy Stone, which reminds us that "Bodies are screens on which we see projected
the momentary settlements that emerge from ongoing struggles over beliefs and prac-
tices within the academic and medical communities. These struggles play themselves
out in arenas far removed from the body. Each is an attempt to gain a high ground that
is profoundly moral in character, to make an authoritative and final explanation for the

---

[136] Avery Gordon, "Ghostly Matters," 26.

way things are and consequently for the way they must continue to be. In other words, each of these accounts is culture speaking with the voice of an individual."[137]

The taken for granted boundaries and barriers between artistic/technical/imaginative/scientific creations of bodies need to be deconstructed for us to see the possibilities for 'unearthly' forms and reformulated manifestations of selves that carry a radical potentiality. Understanding that large corporate and powerful projects that obscure the way bodies are imbricated and locked into black-boxed "high-technology" is key. However, we cannot stop there. We must demand alternative representation that is seen as legitimate. We need to understand the ways in which, for the most part, it has been people in positions of power who have been able to dream up and imagine tech bodies that have become materialized.

While there are other methods for dreaming and imagining, many of them arrive in a toolkit fit for artists or storytellers. The idea of a cyborg —such as depicted in the worlds of cyberpunk, by Mori or Hajime Sorayama— has lived only in mediums of fantasy and performance. AI is very much a creative project, just as Mori's installations and cyborgean performances are technical and scientific. However, the language of what is technical and what is artistic, and the separation of these as different entities, obscures the underlying sociotechnical imagination that undercuts all projects. To understand this is to bend open the crust that has formed over the oneness of creation and manifestation and posited processes like technical method and artistic approach as separate entities. We have to understand that the ways in which artificial intelligence (re)locates and dislocates embodiment is a creative project of body-making, but one that is constricted.

---

[137] Sandy Stone, "The Empire Strikes Back," 350.

Flesh Without Blood: (Re)locating Embodiment in Technology

Stephen Wilson in "Artificial Intelligence Research as Art" asks questions that

build upon a dream-audit for technobodies:

> Why do we accept as foreordained that computers and monitors must manifest themselves in metal, wood, or plastic? Who decreed that they need to look like electronic devices? Perhaps they should look like stuffed animals. Perhaps they should not be restricted to one physical locus but rather spread out so that whole spaces become active. Who said that typing or moving a mouse is the best way for us to communicate with a computer? Similarly, who said that displaying text on a screen or a piece of paper is the best way for the computer to respond to people?[138]

Unveiling technological projects as socially constructed materializations of power

brings us to a place where we can better critique the ways in which these technologies

precipitate disproportionate harm for marginalized bodies. We need to understand the

way that power and differential access is reproduced and reified within technology. This

is a move from understanding technologies as cultural products to viewing them also as

sociocultural producers. Unveiling the constructed nature elucidates how hegemonic

structures that we move in and through mindlessly are not inevitable, and with this un-

derstanding comes the space to imagine alternatives. Gordon eloquently puts this idea

as so: "We need to know where we live in order to imagine living elsewhere. We need to

imagine living elsewhere before we can live there."[139]

Speculative fiction and Afrofuturism are genres that are significant for their abili-

ties to forge space and work with time. The speculative is a method that can imagine

different configurations, an exercise in world-building. In "Racial Fictions, Biological

Facts", Ruha Benjamin writes "novel fictions that reimagine and rework all that is taken

---

[138] Stephen Wilson, "Artificial Intelligence Research as Art," 403.

[139] Avery Gordon, *Ghostly Matters,* 5.

Flesh Without Blood: (Re)locating Embodiment in Technology

for granted about the current structure of the social world— alternatives to capitalism,

racism, and patriarchy— are urgently needed. Fictions in this sense are not falsehoods

but refashioning through which analysts experiment with different scenarios, trajecto-

ries, and reversals, elaborating new values and testing different possibilities for creating

a more just and equitable society. Such fictions are not meant to convince others of

what is, but to expand our own vision of what is possible."[140] And so Benjamin experi-

ments with speculative fiction as a method to challenge the nexus of knowledge and

power and to draw out the complicated but liberatory effect of dreaming up alternatives

to structures. In "Ferguson is the Future,"[141] Benjamin imagines a world where events of

Ferguson are celebrated because they catalyzed the abolition of the police-state. Vic-

tims of police brutality like Eric Garner and Aiyana Mo'Nay Stanley-Jones have been

resurrected through biotechnological innovations that allow for reparation of stolen life

through stem cell technology. Following in the steps of science fiction writer Octavia But-

ler, the works of activists and writers showcased in the anthology *Octavia's Brood* build

worlds and imagine different realities. In *Black Angel,* Walidah Imarisha shares the story

of A., a fallen-angel turned protector of people marginalized in New York City. While

walking the dark streets, A. oversees ICE deporting families into trucks under the cover

of night. Imarisha narrates that "her wing sliced through two agents in front of her as she

ran toward the trucks. Angels of vengeance have steel for wings, and her remaining

wing had become razor sharp."[142] In this story, Imarisha shares another speculative fic-

---

[140] Ruha Benjamin, "Racial Fictions," 2.

[141] Ruha Benjamin, "Racial Fictions."

[142] Walidah Imarisha, "Black Angel," 51.

tion, or reimagining of worlds with A, Black angel, as a cyborg with a prosthetic metal wing who defends her community.   Sondra Perry is an African-American inter-disciplinary artist whose work explores identity and technology. Her 2018 Serpentine exhibition *Typhoon coming on* blends a variety of high and low-tech technologies with other mediums and forms to construct an interactive experience that involves participants in the reimagining of narratives relating to the trans-Atlantic slave trade and consumer capitalism. The exhibition guide quotes the artist, who describes her focus: "I'm interested in thinking about how blackness shifts, morphs and embodies technology to combat oppression and surveillance throughout the diaspora. Blackness is agile."[143] These reimaginings of blackness are all alternative ways of imbricating technologies with bodies that prioritize values of restorative justice through a reclamation of power to render embodiment. There is a vast juncture between the way embodiment blends within technologies in these alternatives forms and the ways in which artificial intelligence reproduces the practices of surveillance on black and brown bodies.

Another practice in utopian longings for technology is a collaborative paper titled "Patching Gender: Non-binary Utopias in HCI." This piece constructs a series of scenarios, referred to as 'gender bugs' which reflect the often-exclusionary terrain of technological design in human-computer interaction. It then may follow up one of these scenarios with a utopian fix. For example, Bug #4 is titled "Liar, liar, gender on fire" and reads as following:

> Gray finds out that the European Union is funding facial recognition technology that will function as lie detectors on EU borders. As Gray has to cross a border in and out of the EU every day, she is worried about the implications of gender

---

143 Sondra Perry, *Typhoon coming on*, 6 March-20 May 2018 Exhibition Guide.

> recognition in this software, and how that may complicate the chances of chang-
> ing her legal gender marker to non-binary in the future. Gray criticises this devel-
> opment not only because automated gender recognition and lie detection are un-
> attainable, but also because the product can be used to target the most vulnera-
> ble populations.[144]

For this scenario, there is no utopian fix to a system that takes an essentialist approach

to 'reading' or 'classifying' gender. This will always be a harm for non-binary people.

These utopian alternatives highlight a disparity between the ways in which ubiq-

uitous practices of artificial intelligence reify oppression of bodies_ and _ the radical

utopian imaginary for bodies in interaction with technologies. Personally, I would rather

hold space for technologies that open, rather than close the world.

---

[144] Keyes, Barlas, Spiel "Patching Gender: Non-binary Utopias in HCI," 4.

6. Conclusion

"If we are going to have artificially intelligent programs and robots, I would have sculptors and visual artists shaping their appearance, musicians composing their voices, choreographers forming their motion, poets crafting their language, and novelists and dramatists creating their character and interactions. To ignore these traditions is to discard centuries of experience and wisdom relevant to the research questions at hand."[145]

Whether or not we can have artificial intelligence that is radical and liberatory is something I am very suspicious of. I am not sure we would recognize it if it carried these potentials. AI is increasingly used to monitor, survey, and police normativity and deviance. However, there are alternatives. Imagine that instead of viewing AI as an abstract and impressive feat that has been achieved, we move to understand it as just one formulation of technology that is involved in body-making processes. Albeit, a formulation where abstraction and miniaturization are specific features. Rather than taking an approach of moral nihilism, AI can be understood as arising out of a sociocultural context wherein the technoscape is defined by the same systems and structures of power, namely colonization, white supremacy, patriarchy and capitalism. AI is an extremely expensive technology funded for its capacity to privilege the power structures of the system through which is arises. Accordingly, it is not surprising that AI is used to locate protestors, assist ICE; automate policing; manipulate people through subtle marketing techniques among other social implications. We should also not be surprised that AI renders complex personhood via its disproportionate rendering of whiteness and masculinity as accurate over blackness and femininity. While AI is a massive financed project built through an

---

[145] Stephen Wilson, "Artificial Intelligence Research as Art," 407.

architecture of data, this does not mean that it is any more technical nor any less social than other assemblages of bodies and machines. As long as AI is in the hands of those in power, it will be employed to further reify and facilitate that power.

AI, unlike the cyborgian bodies imagined and created by Mori or the virtual-marketing tool/robot/avatar @lilmiquela, is abstracted and convoluted so much that it shrinks away from its own involvement and accountability in body-making. In fact, it is presented and framed in such immaterial ways that it feels invisible. Digesting bodies into its black-box reflects the strategic context of the ways that AI is used to image bodies. AI as a broad assemblage of technologies pertains to the topic of embodiment in that it construes which bodies count as bodies. Like other hybrids that challenge boundaries related to the body, AI—as it is operationalized through facial recognition, automatic gender recognition and machine learning datasets trained on human bodies—renders selves and bodies through sociotechnical practices that determine who is seen and if they are seen, why.

Bibliography

Abu-Lughod, Lila (1996). Writing Against Culture. In Richard G. Fox (ed.), *Recapturing Anthropology: Working in the Present*. School of American Research Press. pp. 137-162.

Adam, Alison. "Gender/Body/Machine." Ratio, 15: 354-375. doi1111/1467-9329.00197 . 2002.

Adam, Alison. "Constructions of gender in the history of artificial intelligence," in *IEEE Annals of the History of Computing*, vol. 18, no. 3, pp. 47-53, Fall 1996, doi: 10.1109/MAHC.1996.511944.

Adam, Alison. *Artificial Knowing: Gender and the Thinking Machine.* Routledge: OX, 1998.

Alaimo, Stacy, and Heckman, Susan. "Introduction: emerging models of materiality in feminist theory." in *Material Feminisms,* edited by Stacy Alaimo and Susan Heckman. Indiana University Press, 2008.

Australian Government. "Fitzpatrick skin phototype." Arpansa. https://www.arpansa.gov-.au/sites/default/files/legacy/pubs/RadiationProtection/FitzpatrickSkinType.pdf.

Balsamo, Anne Marie. *Technologies of the Gendered Body: Reading Cyborg Women.* Duke University Press, USA. 1995.

Balsamo, Anne Marie, "Forms of Technological Embodiment: Reading the Body in Contemporary Culture." in *Cyberspace, Cyberbodies, Cyberpunk: Cultures of Technological Embodiment*, edited by Mike Featherstone and Roger Burrows. Sage Publication, 1995.

Barad, Karen. "Posthuman Performativity: toward an understanding of how matter comes to matter." in *Material Feminisms,* edited by Stacy Alaimo and Susan Heckman. Indiana University Press, 2008.

Benjamin, Ruha. "Racial Fictions, Biological Facts: Expanding the Sociological Imagination through Speculative Methods." Catalyst: Feminism, Theory, Technoscience, 2(2), 1-28. 2016.

Boshier, Rosa. "This Is Fucky: Simulated Influencers Are Turning Identity into a Form of Currency." *Bitch Media.* January 28, 2020.

Flesh Without Blood: (Re)locating Embodiment in Technology

Buolamwini, Joy and Gebru, Timnit. "Gender Shades: Intersectional Accuracy Dispari-
ties in Commercial Gender Classification." Proceedings of Machine Learning Re-
search 81:1–15, 2018 Conference on Fairness, Accountability, and Transparency

Butler, Judith. *Gender Trouble: Feminism and the Subversion of Identity*. New York:
Routledge, 1999. http://homepages.neiu.edu/~bpbisbey/HumoryHomosexualidad/But-
ler%20(1990)%20Gender%20Trouble.pdf

Brim, Matt and Ghaziani, Amin. "Introduction: Queer Methods." 2016.

Crawford, Kate and Vladan Joler, "Anatomy of an AI System: The Amazon Echo As An
Anatomical Map of Human Labor, Data and Planetary Resources," *AI Now Institute and
Share Lab*, (September 7, 2018) https://anatomyof.ai

Crawford, Kate and Paglen, Travor. "Excavating AI: The Politics of Images in Machine
Learning Training Sets."https://www.excavating.ai/. 2019.

Deleuze, Gilles, and Guatarri, Felix. *A Thousand Plateaus.* A & C Black, September 1,
2004.

Derrida, Jacques. *Positions.* Translated and Annotated by Alan Bass. The University of
Chicago Press: Chicago, 1981.

Fausto-Sterling, Anne. "The Five Sexes, Revisited," pages 17 - 21 in *Gender Through
the Prism of Difference,* Fifth Edition, edited by Maxine Baca Zinn et al. Oxford Universi-
ty Press, 2016.

Featherstone, Mike, and Burrows, Rogers, "Cultures of Technological Embodiment," in
Cyberspace, Cyberbodies, Cyberpunk: Cultures of Technological Embodiment, edited
by Mike Featherstone and Roger Burrows. Sage Publication, 1995.

Foucault, Michel. *The History of Sexuality.* Volume 1: An Introduction, Translated from
the French by Robert Hurley. Vintage Books, A Division of Random House, Inc. New
York. 1990.

Franchi, Stefano, and Güzeldere, Güven, "Machinations of the Mind," in *Mechanical
Bodies, Computational Minds*, edited by Franchi and Güzeldere. The MIT Press, Cam-
bridge, 2005.

Gordon, Avery. "Some Thoughts on Haunting and Futurity." Borderlands, 10:21 VOL-
UME 10 NUMBER 2. The University of California, Santa Barbara, 2011.

Gordon, Avery F., and Janice Radway. *Ghostly Matters: Haunting and the Sociological Imagination*. University of Minnesota Press, 1997. Accessed June 14, 2020. www.jstor.org/stable/10.5749/j.ctttt4hp.

Haraway, Donna. "A Cyborg Manifesto." Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in Simians, Cyborgs and Women: The Reinvention of Nature (New York; Routledge, 1991), pp.149-181. http://people.oregonstate.edu/~vanlondp/wgss320/articles/haraway-cyborg-manifesto.pdf

Haraway, Donna. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective."*Feminist Studies* 14 (3):575-599 (1988).

Harding, Sandra. *Whose Science? Whose Knowledge? Thinking from Women's Lives.* Ithaca, NY: Cornell University Press. 1991.

Holmes, Jessica. "MARIKO MORI with Jessica Holmes." Interview by Jessica Holmes. The Brooklyn Rail Magazine*.* April 2018. *https://brooklynrail.org/2018/04/art/MARIKO-MORI-with-Jessica-Holmes*

Humphries, Rolfe, "The Story of Pygmalion from Ovid's *Metamorphoses."* The Victorian Web. Last modified 3 December 2004. http://www.victorianweb.org/painting/classical/humphries1.html

Hysterical sublime. Oxford Reference. Retrieved from https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095954927.

"IMAGENET ROULETTE: VIRAL PHENOMENON EXPOSES A DANGEROUS AI FLAW." *Game Industry News.* SEPTEMBER 26, 2019.

Imarisha, Walidah. "Black Angel." In *Octavia's Brood: Science Fiction Stories from Social Justice Movements, edited by*Imarisha, Walidah, Adrienne M. Brown, and Sheree R. Thomas. AK Press: Oakland. 2015.

Keyes, Os. "The Misgendering Machines: Trans/HCI Implications of Automatic Gender Recognition." *Proc. ACM Hum.-Comput. Interact.* 2, CSCW, Article 88 (November 2018), 22 pages. 2018.

Keyes, Os. "Our Face Recognition Nightmare Began Decades Ago. Now It's Expanding." *Vice.* Sep 4 2019.

Law, John. "On Power and Its Tactics: A View from the Sociology of Science." The Sociological Review 34, no. 1 (February 1986): 1–38. doi:10.1111/j.1467-954X.1986.tb02693.x.

Latour, Bruno. (1990). Technology is Society Made Durable. *The Sociological Review*, *38*(1_suppl), 103–131. https://doi.org/10.1111/j.1467-954X.1990.tb03350.x

Latour, Bruno. *Pandora's hope: essays on the reality of science studies*. Cambridge, Massachusetts: Harvard University Press. 1999. Page 304.

Le Guin, Ursula K. "The Carrier Bag Theory of Fiction." 1989.

Levitas, Ruth. *Utopia as Method*. Palgrave Macmillan: UK, 2013. ALGRAVE MACMILLAN

Mayor, Adrienne, "Introduction: Made Not Born," in *Gods and Robots: Myths, Machines, and Ancient Dreams of Technology.* Princeton University Press. (2018). https://www.jstor.org/stable/j.ctvc779xn.5 .

Martin, Emily. "The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles," Signs: Journal of Women in Culture and Society 16, no. 3 (Spring, 1991): 485-501. https://doi.org/10.1086/494680

McLuhan, Marshall. *Understanding Media: The Extensions of Man.* McGraw- Hill, 2003.

Miller, John. "Cyborg Dreams." Essay for exhibition CYBORG DREAMS, 83 Pitt Street New York, New York 10002. March 4-20, 2017.

Miquela (@lilmiquela), Instagram Biography. As of June 2020. https://www.instagram.com/lilmiquela/?hl=en

Miquela (@lilmiquela), Instagram Post from from April 19, 2018. https://www.instagram.com/p/BhwuJcmlWh8/?utm_source=ig_embed.

Mori, Masahiro. "The Uncanny Valley." Translated by Karl F. MacDorman and Norri Kageki. *IEEE Spectrum*. 12 Jun 2012

Nichols Goodeve, Thyrza. "Mariko Mori's Cyborg Surrealism," Parkett 54, 1998–1999.

O'Brien, Jodi. "Introduction, Where is Gender?"in *Gender, Sexuality and Intimacy: A Contexts Reader*, edited by Jodi O'Brien and Arlene Stein. Sage Publications, 2017.

Flesh Without Blood: (Re)locating Embodiment in Technology

Ortner, Sherry B. 1974. Is female to male as nature is to culture? In M. Z. Rosaldo and L. Lamphere (eds), Woman, culture, and society. Stanford, CA: Stanford University Press, pp. 68-87.

Perry, Sondra. *Typhoon coming on*, Serpentine Sackler Gallery. 6 March-20 May 2018 Exhibition Guide.

Petrarca, Emilia. "Lil Miquela's Body Con Job." *Medium.* May 14, 2018.

Ploeg, Irma van der. "The body as data in the age of information," in *Routledge Handbook of Surveillance Studies,* ed. By Kirstie Ball, Kevin Haggerty, David Lyon. Routledge: London and New York. 2012. 176-183.

Sauers, Jenna. "LIFE AFTER FICTION: THE FUTURE OF LIL MIQUELA." *Cultured Magazine.* April 23, 2019.

Schreiber, Rachel. "Cyborgs, avatars, Laa-Laa and Po: The work of Mariko Mori." After-image (March/April 1999): 10-12.

Shieber, Jonathan. "More investors are betting on virtual influencers like Lil Miquela." *Telecrunch.* January 14, 2019

Spiel, Katta; Barlas, Pinar; Keyes, Os. "Patching Gender: Non-binary Utopias in HCI." 2019. DOI: https://doi.org/10.1145/3290607.3310425

Stamper, Kory. "From 'F-Bomb' to 'Photobomb,' How the Dictionary Keeps Up with English." Interview by Terry Gross. *Fresh Air*, NPR, April 19, 2017. Audio, 35:25. http://www.npr.org/2017/04/19/524618639/from-f-bomb-to-photobomb-how-the-dictionary-keeps-up-with-english.

Stone, Sandy. "THE EMPIRE STRIKES BACK: A POSTTRANSSEXUAL MANIFESTO." Original copyright (c) 1987.

Stone, Allucquère Rosanne. *The War of Desire and Technology at the Close of the Mechanical Age.* MIT Press, 1996.

Tomas, David, "Feedback and Cybernetics," in *Cyberspace, Cyberbodies, Cyberpunk: Cultures of Technological Embodiment*, edited by Mike Featherstone and Roger Burrows. Sage Publication, 1995.

Tomas, David, "From the Cyborg to Posthuman Space: On the Total Eclipse of an Idea." Parachute no112 O/N/D 2003. WN: 0327406069007.

Tsing, Anna. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins.* Princeton University Press: Princeton & Oxford. 2015.

Wajcman, Judy. *Technofeminism.* Cambridge: Polity Press, 2004.

Wajcman, Judy. "Feminist Theories of Technology." Cambridge Journal of Economics 2010, 34, 143–152 doi:10.1093/cje/ben057.

Ward, Jane. "Dyke Methods: A Meditation on Queer Methods and the Gay Men Who Hate It." 2016.

West, S.M., Whittaker, M. and Crawford, K. (2019). Discriminating Systems: Gender, Race and Power in AI. AI Now Institute. Retrieved from https://ainowinstitute.org/ discriminatingsystems.html.

Wilson, Benjamin & Hoffman, Judy & Morgenstern, Jamie.   "Predictive Inequity in Object Detection."Cornell University. 21 Feb 2019. https://arxiv.org/pdf/1902.11097.pdf

Wilson, Stephen. "Artificial Intelligence Research as Art." in *Mechanical Bodies, Computational Minds*, edited by Franchi and Güzeldere. The MIT Press, Cambridge, 2005.