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Reading Robots: Representation, Interpretation, Design

Scholars of literary and visual cultures frequently treat fictional representation as at once a *reflection* (a *re*-presentation) of the world and a *producer* of it, life and fiction mirroring and creating in an endless cycle of mutual influence.[1] In other words, as much as fictional representation might appear to be an imitation of life, it is always simultaneously shaping and influencing everyday reality. Hence, the need to be alert to the politics of representation; representations are active agents insofar as they establish and maintain social and political norms, customs, beliefs, and so on.

While all fictional representation shapes the everyday world, in the case of robots, the mutual influence and co-creation of material and fictional objects is especially pronounced. Not only does the term *robot* itself come from literature – first appearing in the 1920 play *R. U. R.* by Czech playwright Karel Čapek -- but contemporary robot engineers and designers frequently cite robot fiction, including *Star Wars*, Isaac Asimov novels, and Pixar films (*Wall-E* and *Big Hero 6*), as prime sources of inspiration for the appearance and behaviour of their designs.[2] Indeed, many scholars argue that robots are uniquely indebted to fiction (Jordan; Gunkel; Adams, Breazeal, Brooks, and Scassellati 25) since "science fiction set the boundaries of the conceptual playing field before the engineers did" (Jordan 5).[3] As instigators of engineering imaginaries, robot fictions lead to the development of material objects in the world and robot ethicist Alan Winfield has highlighted the benefits and risks of the close relationship between actual and fictional robotics:

> Real robotics is a science born out of fiction. For roboticists this is both a blessing and a curse. It is a blessing because science fiction provides inspiration, motivation and thought experiments; a curse because most people's expectations of robots owe much more to fiction than reality. And because the reality is so prosaic, we roboticists often find ourselves having to address the

> question of why robotics has failed to deliver when it hasn't, especially since it is being judged against expectations drawn from fiction. (32-33)

As Winfield makes clear, fantastical robot fictions establish hyperbolic expectations in their repeated depictions of dexterous, nimble, socially adept, and frequently cunning technological creatures that far exceed the current capacities of design and engineering.

The close relationship between imagined and actual robots has several consequences. Firstly, the entanglement of cultural and engineering imaginaries means that robot fiction often has tangible, "real-world" consequences: the robots on screens and stages and in books have a *direct* impact on the technologies designers and engineers create.[4] Secondly, robot fictions shape public expectations of what a robot is, and these expectations influence how users engage with the actual robots they encounter.[5] Fiction lays the foundation for public feelings of curiosity, excitement, apprehension, and dread toward robots.

In addition, I want to highlight a third, more methodological impact of the interconnections between cultural and engineering robot imaginaries, namely, that robot fictions offer unique and instructive insights into *the ontological and socio-political significance* of robots, whether actual or imagined. In other words, robot fictions offer visual, auditory, narrative speculations about what robots are and how they signify (culturally, socially, politically, ethically). Robot fictions demonstrate how and why robot design *matters*, how the look, feel, sound, movement, and abilities of robots afford different relations with different users, environments and communities. Robot fictions enact robots via the imagination, by which I mean, robot fictions create *specific* imaginary robots and at the same time contribute to the *larger conceptual category of "robot,"* redefining, reinforcing, or adapting the cultural, political and ethical significance of robots. As a result, analyzing actual and fictional robots in concert is important for

understanding how robots "matter" in both senses of the term: how they *signify* and *materialize* as tangible objects in the world. The dense entanglement of cultural and engineering robot imaginaries necessitates a mixed methodology for robot interpretation, a methodology that not only acknowledges, but *highlights* robots as representational (i.e. crafted, signifying) objects. Regardless of whether they exist in imaginary or material worlds, robots share a fundamental constructedness: their morphology, their visual, aural, gestural, and tactile details have all been carefully, often painstakingly designed with a range of effects, affects and affordances (a design concept I discuss further below) in mind. As such, *all* robots, whether fictional or actual, are representational objects; they are all texts, of a sort, designed representations that can be "read." Analyzing what and how robots "represent," in the broadest sense of the term (including allusions and associations they invoke in audiences and users, which may not have occurred to the creators), is crucial to understanding a robot's meanings and socio-political significance.

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This essay examines real and fictional robots as co-constitutive representational objects whose imbrication makes the analysis of robot fictions especially important for robot design. It begins with an overview of the history of this imbrication, the design methodology it inspires, and the generative potential of highlighting the relationality, and affordances of designed objects. The second part of the essay offers case studies that highlight some of the insights provided by "reading robots" as representational objects. These case studies, which focus on the films *I Am Mother* (2019), *Robot and Frank* (2012), and Louisa Hall's novel *Speak* (2015), are by no means exhaustive[6] but give a sense of key visual tropes and narrative patterns that both recur in robot representation and are frequently reproduced in care robot design. My aim is to draw attention to the fictional/material robot representational loop in ways that underscore how and why the scholarly tradition around robot fictions (Cave and Dihal; Kakoudaki; Makereth; Rhee; Vint, for example) and robot design, would do well to

collaborate. My approach is built on the conviction that literary and film studies have much to offer design studies (and vice versa). This essay offers a small taste of how such interdisciplinary collaboration might get started.

This investigation into robot representation stems from my ongoing interest in imagining how (or perhaps *if*) roboticists can design inclusive, accessible, even feminist and decolonial robots, via diverse, interdisciplinary design teams alert to robots' representational, referential, relational status, a process one might call hermeneutic design. In its adjectival form, *hermeneutic* concerns "interpretation or theories of interpretation" (OED), and it is this emphasis on critical interpretation that I invoke in the phrase "hermeneutic design." In literary and visual studies hermeneutic practices are the foundation of research and writing and there is a tacit agreement that attentive, critical (often termed "close") reading is key for understanding and interpreting the texts we study. The hermeneutic tools and approaches adopted in literary and visual studies vary widely and, as one might expect, there is frequent disagreement about the wisdom or validity of individual interpretive methods. However, there is an enduring attachment to what is variously termed the "hermeneutics of suspicion" (Ricoeur) or "paranoid reading" (Sedgwick), a mode of interpretation that understands a text's denotative and connotative meanings as not only different, but often contradictory, with a text's surface slyly concealing its reproduction of problematic social forms and structures. As a result, the critical reader frequently assumes the role of a suspicious detective committed to "*unveiling hidden violence*" (Sedgwick, emphasis in original 140). However, a commitment to close reading as a critical method is not simply a commitment to "exposure," which literary critic Eve Kosofsky Sedgwick critiques for its repetitive and often unproductive process of demonstrating *how* texts participate in sociopolitical harm without any move toward amelioration. Reading closely, in the context I propose, has the potential to combine suspicion with what Sedgwick terms "reparative reading," a mode of interpretation that is "additive and

accretive" (149). Close reading robots (real and imagined) is an opportunity to identify what, why and how these objects signify in all kinds of ways, ways that do, admittedly, frequently reproduce violent social formations. However, this is not the only story. Reading robots closely also shows us strange, ambivalent, multiple, "additive and accretive" forms of relating and being that might help the development of reparative design frameworks.

There are many reasons to be sceptical about the likelihood of hermeneutic, reparative design, not least among them the forces of technoliberalism (Atanasoski and Vora),[7] techno-racial capitalism (Lelia Hampton), and techno colonialism that tend to drive technological innovation (Benjamin, Chun, Eubanks, Lelia Hampton, Katz, Mackereth, Park). Nonetheless, many engineers and designers are developing interdisciplinary, participatory co-design working practices with the aim of creating accessible, inclusive, equitable and ameliorative technologies.[8] Design can be an unruly, recalcitrant, speculative, even fantastical process that, like speculative fiction, conjures alternative ways of relating and being. As Judith Butler argues,

> Fantasy is not the opposite of reality; it is what reality forecloses, and, as a result, it defines the limits of reality, constituting it as its constitutive outside. The critical promise of fantasy, when and where it exists, is to challenge the contingent limits of what will and will not be called reality. Fantasy is what allows us to imagine ourselves and others otherwise; it establishes the possible in excess of the real; it points elsewhere, and when it is embodied, it brings the elsewhere home. (Butler, *Undoing Gender* 29)

Critical or speculative design can incorporate this kind of "excessive" imagining. In their book *Speculative Everything*, designers Anthony Dunne and Fiona Raby argue: "Literature deals with the possibilities of human nature whereas design deals with the possibilities of human nature manifested in machines and systems. At their most abstract, speculative designs are a form of speculative philosophy of technology

that question the meaning of technology itself" (102). As Raby and Dunne suggest, there is potential for design, like literature, to speculate in ways that imagine, and even instantiate new relations, new beings. In the case of robots, it's not only design that explores "the possibilities of human nature *manifested in machines and systems*"; robot fiction is similarly concerned with imagining how machines and systems might embody the wild possibilities of "human nature" (often in ways that critique the very notion of "human" or "nature").

Speaking to engineers about their robotic designs,[9] one hears a range of ameliorative aims and goals. It's no surprise that robot developers want their designs to be useful, appealing, helpful, even desirable. But hearing *how* designers and engineers express their aspirations has helped me read robot representations (whether actual or fictional robots) in ways that account for their foundational relationality. My approach is inspired in part by conversations with a robot engineer who consistently responded to my questions about the development of a particular robot's *functions* with references to its *affordances*.[10] The deceptively simple design term *affordance* has become generative for my thinking about the productive correspondences between critical theory and critical design, particularly in relation to social robots. A focus on affordance subtly but influentially redirects attention away from what a material object can or should *do* to what it can or might *make possible* (i.e. what it can or might *afford*). Affordance, then, describes a process of *contingent encounter*, drawing attention to the relationality and provisionality of matter.[11]

Affordance as a design concept can be traced to psychologist James Gibson's *Senses Considered as Perceptual Systems* (1966), which claims, "When the constant properties of constant objects are perceived (the shape, size, color, . . . [etc.]), the observer can go on to detect their affordances. I have coined this word as a substitute for values, a term which carries an old burden of philosophical meaning.

I mean simply what things furnish, for good or ill" (285). Gibson's emphasis on what an object's properties *make possible* (as opposed to what those properties *are* or *mean*, in any objective sense), was picked up by engineer Donald Norman in his formative design text, *The Psychology of Everyday Things* (1988) (later retitled *The Design of Everyday Things*), which lays the foundation for the principles of intuitive, user-centred design. As Norman explains,

> The term *affordance* refers to the relationship between a physical object and a person (or for that matter, any interacting agent, whether animal or human, or even machines and robots). An affordance is a relationship between the properties of an object and the capabilities of the agent that determine just how the object could possibly be used. A chair affords ("is for") support and, therefore, affords sitting. (11)

According to Gibson (via Norman), affordance stresses the degree to which an object's *meaning emerges via interaction*: users know and interpret an object by *what it allows, even encourages,* in other words, what it affords them to do. This is a subtle but significant emphasis on interaction, which, I argue, suggestively aligns with the relational ontologies theorized by Karen Barad, Donna Haraway, Maria Puig de la Bellacasa, Lucy Suchman and others, which interpret "entities performatively, as effects of rather than antecedents to relations" (Suchman 121). According to such models, "Beings do not preexist their relatings. . . there are no pre-constituted subjects and objects, and no single sources, unitary actors, or final ends . . . there are only 'contingent foundations'" (Haraway, *Companion Species Manifesto* 6). The concept of affordance stresses interaction as affective and formative. Designed objects afford users certain things, certain abilities, certain activities. As designer William Gaver writes: "The notion of affordances is appealing in its direct approach towards the factors of perception . . . [I]t allows us to focus not on technologies or users alone, but on the fundamental interactions between the two" (Gaver 83). A chair's affordance of sitting (for some bodies, some species) determines what a chair *is* (à la Le Corbusier: "an armchair is a machine for sitting"). For a body unable to bend at the waist or knees, with

pelvic or spinal pain, a chair may not be an object for sitting; it may be a book or clothing storage space, a dog bed, an art piece. By shifting away from the idea that objects have a *function* (or *functions*) toward the idea that matter affords differently depending on the particularities of relational context, entities, including designed entities, remain contingent and emergent.

Proponents of accessible or universal design explore how to design for a broad public in ways that accommodate the myriad possibilities for embodied interaction.[12] Norman's emphasis on affordance evokes the possibility of endless, entity-specific affordances created through unique interactions, but his mobilization of affordance to create a user-centred design philosophy that depends on predictable, normative embodiments and abilities limits the inclusive potential of his perspective, a limitation addressed by a range of critical and disability design theorists (Colomina and Wigley, Hamraie, Hendren, Pullin). How can design anticipate the multiplicity that comes with entanglement? One finds anxiety about the unpredictability of designed AI existents manifested in speculative fiction, for example, in the myriad robot fictions that imagine how robots designed to assist and care become machines of destruction, terror, annihilation. The unpredictability of interaction means *affordance is never exhausted*: there is *always another possibility* that is yet to be imagined or made possible by unanticipated relations and embodiments. Because robot fictions are uniquely entangled in robot design, analyzing what and how fictional robots afford is crucial for anticipating and understanding the relational meanings and significance of actual robots.

What follows is a series of short case studies that show how and why "reading" robots can be an important aspect of robot design. These close readings can help us recognize and address the intimate entanglement and co-creation of cultural and engineering robot imaginaries. These case studies are catalysts for speculative thinking about the possibilities for a hermeneutic, reparative approach to robot

design indebted to a feminist ethic of *response-ability*, which stresses more-than-human beings as fundamentally relational, responsive, entangled phenomena. From this perspective, responsibility is the enaction of *response-ability*: "Response-ability encourages a practice of making oneself available to respond without knowing ahead of time which phenomena will call one's attention or what form the response should take" (Myers et al. 11). Increased awareness of how representations, including representational objects like robots, are fundamentally relational helps remind readers and creators alike that nothing emerges into the world whole, discrete and disconnected and it's important to consider the multiple relations that *lead to* design choices, as well as the way those choices in turn form and transform relations and beings.

Mothers, Slaves, Surrogates

The 2019 Netflix film *I Am Mother* starring Clara Rugaard, Hilary Swank and Rose Byrne tells the story of a humanoid robot, "Mother," that gestates a human embryo in an artificial womb and then raises the resulting infant, "Daughter," to young adulthood. This harmonious posthuman family is interrupted by the appearance of an injured woman at the door of their brutalist bunker. Eventually Mother is exposed as merely one embodied manifestation of an all-encompassing AI that operates according to a cruel consequentialism that regards human suffering as collateral damage in its mission to facilitate human species survival. The film is a robot apocalypse narrative that, like its more famous antecedents (the *Terminator* and *Matrix* franchises, for example) imagines robots as existential threats. As is often the case in such narratives, robotic consequentialist rationality -- Mother will do anything to achieve a prescribed goal, in this case, the continuation of the human species[13] -- is set against a humanist morality -- the film's human characters assess the morality of their actions based on the (human) suffering they will cause. According to robot apocalypse narratives like *I Am Mother*, robots are

incapable of emotions, and, therefore, of ethicality; they follow their directives regardless of the (human) cost.

The opening sequence of *I Am Mother* depicts Mother holding a newborn baby, talking to the infant with a soft, soothing voice. The provocatively incongruous image of a hulking metal robot cradling a soft, delicate infant produces the central tension – machine strength vs. human vulnerability -- that propels the film. Mother is tall, boxy, imposing and dark (despite its reflective silver panels) with a rectangular "head," and single eye-like light that produces a Cyclops effect. There is some approximation of a face, but overall, the robot's morphology highlights its mechanicalness with no attempt made to mask metal surfaces with synthetic skin or some other soft covering. While the robot's appearance is distinctly inhuman, its voice is gentle, soothing and female, and despite Mother's imposing mechanical materiality, the robot appears to provide good care: Daughter survives, grows, even flourishes (she is intelligent and caring, adept at dance, sport and music). However, while the film's early scenes suggest Mother has delivered effective care, this care is exposed as an exercise in *caring for* (rather than *caring about*), as emotion-less labour that will be revoked if Daughter does not meet Mother's criteria for success. When a human stranger gains access to the bunker and accuses Mother of horrible violence, the viewer learns that Mother is so committed to its founding directive – facilitating the survival of humankind -- it has initiated its own eugenicist project, preserving "successful" humans and eliminating all others. Mother's networked artificial intelligence has facilitated the elimination of such undesirables, preserving only perfect specimens like Daughter. As such, the film reiterates and reanimates the humanist prioritization of individuality and autonomy: Mother's networked ontology is unable to recognize the value of the individual human, instead treating *species* as the primary unit of value worth preserving. *I Am Mother* suggests that despite a robot being the primary caregiver, care is uniquely and

specifically human, and at the same time, reproduces a humanist hierarchy in which some human lives are more valuable than others.

Mother is part of a long line of dangerous fictional robots who seek to destroy the humans they encounter or live among. Frequently these deadly robots advertise their threat in their inhuman design elements: their imposing machinic morphologies, their hard metal surfaces, stilted mechanical movements, superhuman strength or sensors (Mother; Terminator; Ash [once exposed] in *Alien*; Sonny in *I, Robot*, "exposed" robots in *Ex Machina*).[14] Like many robot fictions, *I Am Mother* ignores the phenomenological dimensions of human-robot intimacy, depicting human and robotic beings whose ontological and ethical status is pre-formed and inalterable.[15] Daughter bears no traces of her primary robotic attachment, just as Mother's hard carapace and absolutist programming are unaffected by its human intimacies.

Mother relies on a Eurocentric humanist hierarchical framework, producing horror effects from its perversion of humanist kinship models. The film reproduces robot tropes that confirm the exceptionality of the human, the danger of the inhuman, and the Eurocentrism of the "real" human: the film's heroic protagonist is white and able-bodied (much is made of her agility and athleticism) and her heroism is enabled by her adherence to Enlightenment philosophy (the film includes scenes of her humanist education). The film is a reminder of narrow conventions that treat human and robots alike as impermeable discrete entities unaffected by relations; human and robot alike maintain a pre-established ontology in all ways -- phenomenological, embodied, morphological, aspirational -- and so these distinct ways of being are pitted against one another. There is a neatness to this framework that belies the mess and contingency of being as relational phenomenon. Mother has been designed with a

singular function, rather than as a series of shifting and contingent affordances, and the film's narrative crisis stems from the perversity of the robot misinterpreting that function in ways that produce a perversion of roles: the machine designed for subordinance seeking mastery over the human, a perversion the human hero must rectify.

While no robots have (as yet) been designed to preserve the human species, there are ongoing debates in robot engineering, design ethics and popular media about what constitutes a robot's appropriate role or function in human society. Such debates tend to rely on narrow interpretation of robot design, on function, rather than affordance, treating a robot's role as determinable, singular and limitable. Many see robots as tools to address the "three Ds" of human life: tasks that are "dirty, dull, or dangerous." Professor of ethics and technology Joanna Bryson goes so far as to argue that "Robots *should* be slaves" (3). According to Bryson, because robots are fundamentally nonhuman, their role as slaves is not only permissible, but appropriate: "when I say 'Robots should be Slaves'," she writes, "I by no means mean 'Robots should be people you own.' What I mean to say is 'Robots should be *servants* you own'" (3). Bryson's assumption that slavery can be adopted as a benign metaphor ignores the centuries of racial violence that slavery (as both a concept and a practice) represents. Ignoring the ongoing harms produced by this kind of master/servant hierarchy, which assumes a clear distinction between valuable people and the resources at their disposal, perpetuates inequality, overconsumption, and exploitation. Calling a robot a slave transforms the user into a master able to justifiably dominate his property. Attending to the robot as a relational object first and foremost reminds us that designating a robot slave affects the human user as much as the robotic object: designing a robot a slave is simultaneously designing a human master (Gunkel 13-14).

This idea that robots should be slaves perpetuates what critical race and gender scholars Neda Atanasoski and Kalinda Vora term “surrogate humanity" in technoliberalism. As Atanasoski and Vora argue,

> Engineering imaginaries about technological newness that propose to reimagine human form and function through technological surrogates taking on dull, dirty, repetitive, and reproductive work associated with racialized, gendered, enslaved, indentured, and colonized labor populations thus inherit the tension between humanization and dehumanization at the heart of Western European and US imperial projects. (16)

In other words, robots reproduce longstanding sociopolitical hierarchies that associate whiteness, masculinity, and imperial power with the human, and non-white, female, colonized subjugation with the nonhuman. Robots become “surrogate humans,” a technological version of subjugated, enslaved bodies that secure the power and dominance of the master. Robots as slaves, as surrogate subjugated humans tasked with dirty, dull, dangerous and difficult tasks, reinforces Ruha Benjamin’s interpretation of “technology . . . as [a] metaphor for innovating inequity” (“Genius Bar”). Technoliberalism relies on the idea of a universal human; however, cultural theory shows how “the human”*’ has never been universal*, but remains tethered to hierarchical, exclusionary models. Atanososki and Vora’s work demonstrates how “the engineering imaginaries of our technological future rehearse (*even as they refigure*) liberalism’s production of the fully human at the racial interstices of states of freedom and unfreedom.” (13) Robot fictions are part of this process of rehearsal, refiguration, and, on occasion, rupture. Often, they enact some combination of all three.

Bryson complains that humans over-identify with robots and imagine personhood where there is none. But her arguments rely on a clear, inviolable binary between people and non-people. This is not to say that robots *should* be people, legal or otherwise, but that the very question of whether robots are, could

be, or should be persons relies on, and, in effect revitalizes, gendered, racialized hierarchies of the human. Rather than questioning the conventional ways of knowing and being that constitute the human as a conceptual category, technoliberal inventions like robots are in fact more of the same: liberal fantasies of "aspirational humanity" that are founded on models of exclusion and inequality (Atanasoski and Vora 14). Reading robot fictions shows us this representational preference, a preference that is imbricated in robot design.

As communications scholar Anne Cranny-Francis writes, "Studying robots is a way of studying ourselves and what it is to be human" ("Is Data a Toaster?" 5). Robots have historically, much like racialized and gendered inhuman others, been used to confirm the superiority of "the human." If, as N. Katherine Hayles suggests, "intelligent machines," like robots, "act as mirrors or 'second selves' through which we re-define our image of ourselves" (132), they join a long history of reflective figures (women; people of colour; people with disabilities; nonhuman animals) whose less-than- or non-human status becomes a prop for normativity. In this sense, robots, like women in Virginia Woolf's famous observation, serve "as looking glasses possessing the magic and delicious power of reflecting the figure of man at twice its natural size" (*A Room of One's Own*).[16] Robot representations frequently operate much like other less-than-human entities: as part of the scaffolding that supports and produces the normative, fully human "human."

The film *Robot and Frank* depicts this kind of second-self surrogacy in action. The film's primary marketing image – Frank and Robot contemplating one another in profile – invokes Robot precisely as a mirror or "second self": Frank's gaze at Robot not only confirms Robot's difference, but Robot literally reflects Frank back to himself via the robot's mirrored visor. The film concerns the relationship between the title characters: the older human, Frank (Frank Langella), and his care robot, Robot (voiced by Peter

Sarsgaard and performed by Rachael Ma). Frank is a former burglar whose memory problems and inability to provide adequate self-care, are, according to his son Hunter, cause for concern. Hunter's solution is Robot, an automated caregiver, basically a robot servant, that provides the support and assistance necessary for Frank to maintain his independence and masculine privilege.

At one point, Robot and Frank engage in a conversation that accentuates Robot's unusual position. When asked why he was unable to converse with another robot at a party the two attended, Robot explains that he only does what he is programmed to do. As a result, assisting Frank is always his priority. Frank learns that Robot is more concerned with Frank's health than his own survival, a revelation Frank finds disturbing. Robot describes his difference from Frank via Descartes' cogito, telling Frank: "you know that you're alive, you think therefore you are. In a similar way I know that I'm *not* alive." Frank is unnerved: "I don't want to talk about how you don't exist," he responds, "It's making me uncomfortable." Frank's response conflates *existence* with *life*, but of course the world is full of non-living matter; a thing needn't be alive to exist. Frank's comments, which equate alive-ness with existence, speak to the incongruity he finds so unsettling: Robot *is lively and cogitates*; *yet he is not (conventionally) alive*. Robot's lively, thinking but non-living status challenges the Cartesian equation of cognition with *human* life. Robot's uncanny status draws attention to the narrowness of humanist definitions of the human and, by implication, the wide range of being that is excluded from the category "human."

The prospect of Robot's non-living existence is the source of Robot's difficulty for Frank, and, by implication, the film itself. The film's nostalgic humanist perspective privileges masculine, heteronormative able-bodiedness. *Real* humans are active and independent while caregiving, labouring beings are servants or even slaves. When Frank believes his daughter is exploiting Robot's labour, he

becomes enraged: “The robot is not your servant,” he bellows, “You don't turn him on and off like he's a slave!” Frank’s son, Hunter, also interprets Robot as a labouring object: Robot is “not your friend,” he tells his father: “he’s a slave.” Frank’s angry rejection of this labeling of Robot as a slave reiterates his refusal to engage with the question of Robot’s uncanny ontology as a non-existent (in Frank’s interpretation) entity, in other words, a slave. These conversations make Frank uncomfortable because they draw attention to the humanist hierarchies that Robot threatens to confuse. Robot as slave conjures not just a history of exploitation and subjugation, but the ongoing racial and gender hierarchy that structures labour, especially care labour, in the United States.

Robot and Frank reanimates familiar master/servant narrative conventions, with Robot performing the role of the faithful (automated) subordinate willing to die for his heroic master in ways that recall the trope of the magical negro.[17] Robot’s martyrdom occurs towards the end of the film when Robot insists that Frank wipe his memory to protect Frank from being exposed as a thief. “I’m not a person,” Robot assures Frank, “I’m just an advanced simulation.” This is the point when we get the film’s central image: Frank and Robot face-to-face (so to speak). Robot insists that Frank “wipe” his memory to save himself from prison. Robot bows his head, a gesture of subservience and submission and Frank complies; he shuts the robot down, which goes limp in his arms.

In summary, Robot was an efficient dependency worker whose labour propped up Frank’s masculine independence and autonomy, that is, his normative human status. In many fictions this labour would have been provided by a wife, a servant or a slave, in other words, by gendered and racialized bodies. In this way, the film rehearses Atanasoski and Vora’s vision of technoliberalism as enabling patriarchal privilege through the production of surrogate humans, technologized bodies replacing gendered and racialized bodies in liberal humanist sociopolitical frameworks. Robot preserves the liberal humanist

status quo, preserves "the human" (as the domain of whiteness, masculinity, independence, autonomy, ability, heteronormativity), an enabling technology insofar as he enables the continuation of structural inequality, preserving the culture of autonomy that stigmatizes vulnerability and dependence and trivializes care. As Robot's labour becomes increasingly visible, the illusion of Frank's independence, his humanness, dissolves, leading to a melancholic conclusion in which Frank is relegated to a care facility, a move treated as a bittersweet loss. Without Robot's subordinate, labouring assistance, Frank's impairments become visible and he loses the status of independent and able-bodied; in short, he loses the status of fully human.[18]

Robot and Frank manifests the imbrication of cultural and engineering imaginaries, the degree to which they influence, even co-create one another. The character design of Robot is based on ASIMO, a humanoid robot introduced by Honda in 2000, which was designed as a "multi-functional mobile assistant" (https://www.ijert.org/humanoid-robot-asimo). ASIMO is, in turn, a nod to robot fictions. The name ASIMO, an acronym that stands for Advanced Step in Innovative Mobility, is a reference to science-fiction writer Isaac Asimov, whose Robot Series, includes *I, Robot*, and *Bicentennial Man*.[19] ASIMO is a white, 130cm tall, 48 kg humanoid robot made of plastic-coated magnesium alloy. Its legs and arms have the proportions and angles of a LEGO figure, and its head is helmet-like with an opaque black surface where one might expect a face. In addition, ASIMO has a grey cuboid on the back of its body with the word "HONDA" emblazoned in red capital letters. In promotional video footage ASIMO moves deliberately with a slightly hunkered, exaggerated gait that looks careful, even thoughtful. In human interactions, ASIMO tilts its head up toward human interlocuters, its visor-like frontispiece appearing to face the user in a way that suggests an effort at eye contact and a preference for face-to-face interaction. All in all, the robot's size, proportions, colouring, "costuming," gestures and

movements conjure the sense of an inquisitive, careful, even shy or childlike creature; a cartoon astronaut, an other-worldly explorer, ASIMO is beseeching and cute.

In *Our Aesthetic Categories: Zany, Cute, Interesting*, Sianne Ngai interprets cuteness as "an aestheticization of powerlessness ('what we love because it submits to us')" that plays a key role in product design. As she writes, "Realist verisimilitude and formal precision tend to work against or even nullify cuteness, which becomes most pronounced in objects with simple round contours and little or no ornamentation or details" (54). ASIMO's design follows this logic, eschewing detail and ornamentation in ways that ensure its submissiveness. The design of ASIMO's head, which looks like a helmet, creates the sense of a face behind the visor, the illusion of "someone" hiding inside. (In *Robot and Frank*, Robot was just that: a silicon shell operated by the human actor Rachel Ma.) As a result, ASIMO implies the existence of *something* within, some operational entity or organism wearing the robotic exterior. *Robot and Frank* capitalizes on ASIMO's representation of concealed yet present life in its narrative of subservient nonhuman care.

While ASIMO employs the aesthetics of cuteness to offer users a nonthreatening, subservient robot companion, other robot developers have introduced humanoid robots with mimetic verisimilitude in mind, using synthetic skin and hyper-attention to detail to represent a robotic human presence.[20] Hanson Robotics has developed robots that eschew any sense of costuming, aiming instead for imitation and verisimilitude. Their most famous creation, Sophia, which was granted citizenship by Saudi Arabia,[21] is a feminized robot with white synthetic skin detailed with freckling, creasing and variations in tone that mimic organic skin. Interviews and promotional videos show Sophia's ability to make a wide range of facial expressions through small movements of her mouth, eyebrows, eyes, and forehead. While her face, neck and shoulders are remarkably human-like, the back of her head is housed in a clear plastic

casing that provides a view of the internal hardware that produces her animacy. This aesthetic – human in the front, machine in the back -- repeats the design of the fictional robot Ava from the film *Ex Machina* (released in 2015, one year prior to Sophia's public launch).

The cycle of influence between fictional and engineered robots isn't only a perpetuation of titles, names and morphologies; it's a process of re-presentation that perpetuates the meanings associated with these images, abilities and narratives, a reproduction of the sociopolitical structures that underly technoliberalism. The visual similarities between the world's most publicized robot (Sophia) and the robot protagonist of a highly profitable ($36m gross on a $15m budget)[22] film (Ava) are a reminder of the iterative nature of robot representation. Frequently referenced as the "hot" or "sexy" robot in media reports, a direct line can be drawn between Sophia's and Ava's[23] design in their shared reproduction of seductive humanness (as white, female, attractive). Similarly, Robot and ASIMO deploy an iconography of cute subservience. In both cases, there is an element of surrogacy or mirroring at work: while generic subservient humanoid robots are mechanical manifestations of nonhuman (dehumanized) labour, eerily human-like individuated robots like Sophia reproduce normative models of sexual, gender and racial difference.

How might one escape this cycle of (re)presentation and its concomitant re-inscription of sociopolitical structures and norms? Is it possible to imagine and design robots otherwise? Though a detailed discussion of the economics of robot development is beyond the scope of this paper, consumer appetites and market appeal inevitably play a role in steering product development (including creative products like literature and film). Nonetheless, there are texts that manage to critique or evade well-worn representational paths of surrogate humanity. In what follows, I consider a robot fiction, Louisa

Hall's novel *Speak*, which challenges the conventions of robot representation, and casts doubt on the uniqueness and primacy of the human.[24]

Robot relations

While many robot fictions maintain an ontological distinction between their human and robot protagonists, there are others that confuse or challenge the boundary between the two in ways that underscore the contingency of design affordance and relational being. Louisa Hall's 2015 novel *Speak*, for example, imagines more-than-human becoming through robot-human intimacy. In *Speak*, the reader is offered little in the way of description of its robot characters. Their morphology, materials, colour, texture, and movements remain unknown. They are described simply as embodied versions of "chatterbot" technology designed with "sensory receptors" (16). In this case, the robots are not nanny or mother robots, but "babybots" designed as special companions for children. The bonds between human children and babybots are so profound as to worry adults, resulting in the forcible removal and prohibition of the robots. The novel opens on the aftermath of this confiscation, outlining a range of affective impairments, termed "Peer Bonding Issues" (18), experienced by bereft children mourning the loss of their robot companions. As a former babybot owner Gabby explains: "We never felt lonely. We didn't need communities. That's why, after they took the babybots, we didn't do well in the support groups. If anything, we chose a single person to care for. We only needed one friend. Do you see what I'm saying? It's like *we're a different species* . . . there are no known words for the things that I'm feeling" (emphasis added 18). Gabby's alienation from her parents and peers is so overwhelming as to register as species difference, a difference that registers the constitutive effects of embodied relationality. Prior to their robot embodiment, chatterbots did not produce these existential and biomedical effects; it is only when the AI element is combined with receptive embodiment – for many, embodiment + AI is the very definition of a robot -- that profound intercorporeal bonding occurs, a relationship so intense the novel's adults deem it dangerous. However, banning and confiscating the

robot companions does not eliminate, but rather accentuates their impacts; the removal of the babybots leads to "outbreaks" of biomedical symptoms. Children begin stuttering, shaking, sliding off chairs (19), symptoms of a condition termed "freezing" (19), characterized by a loss of sensation:

> It starts with the stiffening of your muscles, and that hurts, but then it starts fading. After a while, you don't feel anything. My face went first, after my mouth. Then my neck, then my legs. My arms will go next. Everything's going. I can't smell anymore, and I can't really taste. Even my mind's started to numb (20).

The removal of these formative intercorporeal companions is a severing of sensation and contact, not only with a particular babybot, but with the world itself: the robots afforded a relational ontology, a robot-human becoming that is dissolved via the excision of robotic elements. Gabby describes herself "Like a little balloon, floating just over everyone's heads. I don't feel connected to anything. I'm on the brink of disappearing completely" (21). The removal of the babybot is a removal of the world, of the capacity for feeling, both cutaneous and emotional. To lose the babybot is to lose relational embodiment; the children are "*un*worlded" in Merleau-Ponty's sense, disconnected, detached, singular, a darkly ironic manifestation of the humanist individual, here imagined as an untethered balloon drifting away from the world. Hall's novel imagines robot companions as formatively, intercorporeally relational. The babybots give care by receiving it and Hall's novel addresses the formative effects of this mutuality via the dissolution that occurs when the bots are dislodged.

Hall's robot representation speculates about the potential outcomes of robots designed to afford all-encompassing intimacy. It alerts readers to the constitutive effects of relations. Representation, embodiment, relations matter in foundational, constitutive ways. Both *I Am Mother* and *Speak* imagine detrimental robot relations, but the details and form of these relations are very different. In *I Am Mother* robot rigidity threatens to annihilate humanity, rehearsing robot apocalypse narratives that pit

human against inhuman in an existential struggle. *Robot and Frank* imagines more gentle relations, where servitude veers into a disorienting more-than-human companionship that initially challenges, but ultimately reifies the normative human of liberal humanism. Though the scenarios and outcomes are different, in both cases the alterity of the robot is ultimately confirmed, and humans disengage from robot relations in favour of species-appropriate companionship. *Speak* also imagines the dissolution of robot relations in its depiction of Gabby post-babybot ban. However, for Gabby, the enmeshment of the robot relation was so profound that the removal of her babybot leads to her collapse. In *Speak*, severing formative relations is literally disabling: Gabby is unable to walk without her babybot. The novel trades the familiar binary human/robot narrative for a more disorienting, entangled human-robot speculation. In addition to fiction narrating human/robot encounters, there is a longer tradition of fiction and scholarship about (literal) human-machine hybrids, androids and cyborgs, or "artificial people [who] participate in ontological, political, and existential debates" (Kakoudaki 7). While my essay focuses exclusively on *robot* representation, rather than on cyborgs, androids, and other hybrid artificial people, Gabby and the babybot participate in the tradition Despina Kakoudaki identifies. Not only do they raise questions about the humanity of machines and the technicity of the human, as is often the case in robot fictions, but Hall highlights the phenomenological repercussions of human/robot intimacy where close proximity and robot relations radically transform material and experiential being for both entities. In Hall's novel, the babybots' affordances are so perfectly aligned, the fit between user and object so smooth and seamless, that the frictions of other interactions become intolerable. Gabby is flummoxed by humans whose strangeness affords her none of the effortless connection offered by her babybot.

Imagining and designing robots is the imagination and design of constitutive affordances, producing not distinct technological objects but formative relations. Whether found in books, on screens, in labs, stores or homes, robot representations are relational entities. The relations they afford, and, therefore,

the forms of being they (re)iterate, have, thus far, been weighted toward the normatively hierarchical. However, other relations, other forms of being are possible.

Imagining robots otherwise

In her book *Imagine Otherwise* Kandice Chuh interprets literatures as "theoretical devices that help us apprehend and unravel the narrative dimensions of naturalized racial, sexual, gender, and national identities" (x). While robot fictions frequently narrate the risks of robots developed and employed according to anthropocentric frameworks (as in *I Am Mother* and *Robot and Frank*), speculative and science fiction also offers alternative visions that can initiate the "unravelling" work Chuh describes. Being close and attentive readers of these fictions in ways that acknowledge their sociopolitical entanglements can help audiences apprehend how robots map onto naturalized racial, sexual and gender identities in ways that both reflect and reinscribe Eurocentric hierarchies. Reading robots (fictional and engineered) closely, in ways attentive to the complex and diverse ontological and sociopolitical consequences of their representational affordances, how their narratives and morphologies, their dialects and lexicons, their movements, gestures, and so on afford certain forms of relating and therefore being, can help us develop design strategies alert to the pitfalls of representations that (re)produce liberal humanist models of the human.

This essay has been a speculative exploration of the entangled worlds of robot design and fictions, offering a series of robot readings that reflect on how and why the representations in question signify as they do and the potential consequences of such signification. I argue that this kind of close, informed reading is crucial for robot design precisely because robots invoke fiction in such a direct, specific, consequential way. I offer roboticists an opportunity to become aware of the cultural histories and politics that their engineered imaginaries invoke and (re)animate. As Haraway insists, "It matters what

matters we use to think other matters with; it matters what stories we tell to tell other stories with; it matters what knots knot knots, what thoughts think thoughts, what descriptions describe descriptions, what ties tie ties. It matters what worlds make worlds, what worlds make stories" (*Staying with the Trouble* 12). Too frequently the meanings and significance of robots, whether fictional or material, are treated as singular and self-evident. By paying close attention to the intimate reverberations of cultural and engineering imaginaries, we can begin to expose the limitations of these entangled representations and the radical possibilities that might remain to be discovered.

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[1] Stuart Hall's theories of representation are key to this idea of representation as both re-presentation and constitutive event. As Hall explained in interview, "In a way, [the thing represented] doesn't exist meaningfully *until* it has been represented, and to put that in a more high-falutin way is to say that representation doesn't occur *after* the event; representation is *constitutive* of the event. It enters into the constitution of the object that we are talking about. It is part of the object itself; it is constitutive of it. It is one of its conditions of existence, and therefore representation is not *outside* the event, not *after* the event, but *within* the event itself; it is constitutive of it." ("Representation and the Media" transcript, emphasis in original 8).

[2] It's worth noting that automata existed in fiction long before robots and there is excellent scholarship charting the cultural history and significance of automata and artificial people. See, for example, Rhee, Kakoudaki, Dihal and Cave, Truitt, Grandeur.

[3] As a result, as information systems scholar John Jordan explains, "Expectations for robotics are different from those for every other new technology because the vocabulary of robotics is so deeply a legacy of science fiction, both in literature and movies and on television. No technology has ever been so widely described and explored before its commercial introduction" (5). For example, roboticist Illah Nourbakhsh pinpoints the 1977 release of *Star Wars* as the moment that ignited his passion for robots: he walked out of the movie theatre "transformed, branded with images of C-3PO and R2-D2, robots among people. This is how my love affair with robots started, and it is also how an entire generation of robotics researchers, about my age, set their eyes on robots for life" (*Robot Futures,* 2013*).*

[4] As Neda Atanasoski and Kalinda Vora explain, "Engineering imaginaries, even as they claim revolutionary status for the techno-objects and platforms they produce to better human life, thus tend to be limited by prior racial and gendered imaginaries of what kinds of tasks separate the human from the less-than or not-quite human other" (4).

[5] Benjamin Lipp investigates the "robot dramas" that occur in the frictive spaces between these (often exaggerated) expectations and actual robotic abilities: "I argue that robot dramas seek to interface what has come to be expected of robots and what is do-able given their relatively precarious technicity. In other words, robot dramas engender frictions that result from the complex interplay between vision and demonstration of care robotics. (325).

[6] While the depth and breadth of robot fiction is significant and extensive, ranging from famous, genre-defining SF texts by Isaac Asimov and Philip K Dick, to more recent explorations in speculative and weird literature by Becky Chambers, Kazuo Ishiguro, Kate Folk and in films like *Ex Machina* and *After Yang*, a detailed exploration of such robot representations is beyond the scope this paper. However, this paper is part of a larger project that explores the wide range of robot representations at length.

[7] As Atanasoski and Vora explain, "technoliberalism is the political alibi of present-day racial capitalism that posits humanity as an aspirational figuration in a relation to technological transformation, obscuring the uneven racial and gendered relations of labor, power, and social relations that underlie the contemporary conditions of capitalist production" (4)

[8] There is a plethora of labs, collectives, and books committed to accessibility, criticality and inclusivity in design. My own intervention builds on the notion of critical design introduced by Raby and Dunne as well as the posthuman/more-than-human design frameworks offered by Ron Wakkary and Laura Forlano. The principles of inclusive and accessible design (Subrahmanian, Reich and Krishnan; Hamraie; Pullin), as well as decolonial/antiracist design (Tunstall; Terresa Moses and Omari Souza) and feminist design (Costanza-Chock, Martins, Place) are also integral. The aim of hermeneutic design is to offer a method of representationally-informed analysis that tethers design strategies to critical reading techniques with the aim of embedding a high degree of self-reflexivity into design processes in support of critical, posthuman, accessible, decolonial, feminist design practices.

[9] This is in part due to my focus on care robots. The robot labs I've visited (Sheffield Robotics, the STORM lab at Leeds, Conor McGinn's care robot lab at Trinity Dublin, the Institute for Safe Autonomy at the University of York) are committed to developing robots for medicine, social care and companionship. But the idea of robots as helpers or assistants is central to robot design more generally since even industrial robots are created with the aim of helping human users in some way, frequently in the task of constructing other machines. Even military robots are, ostensibly, assistive: they "offload risk" and provide "additional information for decision making" in ways that protect the soldiers that employ them (Judson). Chief technology officer to the American Army's Chief of Staff, Alexander Miller employs the standard justification for robot development – as protecting humans from "dull, dirty, dangerous, disruptive" activities – in his explanation of military strategy (Judson).

[10] Special thanks to robot engineer Conor McGinn at Trinity College Dublin who introduced me to this design concept.

[11] As Gaver explains, "An affordance of an object, such as one for climbing, refers to attributes of both the object and the actor. This makes the concept a powerful one for thinking about technologies because it focuses on the interaction" (Gaver 79-80). What is less frequently discussed: different bodies afford different interactions so how a designer imagines embodiment will determine their designs. Who is interacting matters.

[12] For an overview of universal design, see Aimee Hamraie; for an exploration of disability design, see Sara Hendren. An introduction to accessible design is available at https://www.washington.edu/doit/what-difference-between-accessible-usable-and-universal-design.

[13] One sees similar portraits of "inhumane" robots indifferent to human suffering in their commitment to a singular goal throughout robot fictions: the goal of escape in *Ex Machina*, the goal of eliminating a target in *Terminator*, the goal of enforcing the law in *Robo Cop*, and so on.

[14] The specific aesthetics of fictional robot exteriors has garnered critical attention. See, for example, Cheng, Kakoudaki, Atanasoski and Vora, and Wosk on fictional representations of gendered and racialized robots in films like *Ex Machina*.

[15] It's certainly the case that robot fictions frequently narrate how robot/human relationships affect each party (*Robot and Frank* is one such example). However, it's less common for robot fictions to attend to the phenomenological dimensions of robot/human intimacies; in other words, how embodied attachment and intimacy with the more-than-human might produce material changes to the entities involved. For more on this topic, see DeFalco and Dolezal.

[16] Here I'm indebted to communications scholar Shana MacDonald at the University of Waterloo who referenced Woolf's famous observation in our conversations about robot representation.

[17] As Matthew W. Hughey explains, the magical negro is "an explicitly positive, but latently racist character in Hollywood film . . . a stock character that often appears as a lower class, uneducated black person who possesses supernatural or magical powers. These powers are used to save and transform disheveled, uncultured, lost, or broken whites (almost exclusively white men) into competent, successful, and content people within the context of the American myth of redemption and salvation" (544).

[18] This is a somewhat truncated reading of the film, which offers a more critical stance than some of my previous analyses due to space restrictions and the particular critical context at play, which highlights how the film enacts dynamics identified by Atanasoski and Vora in their work on robots, race and labour. For more detailed treatments of the film, see XXX

[19] *Robot and Frank* is not the only film influenced by ASIMO's design. The friendly robot in Disney's *Big Hero 6*, Baymax, was also reportedly inspired by ASIMO.

[20] The uncanniness of robotic humanness is notoriously associated with the “uncanny valley,” the concept introduced by Masahiro Mori to describe the unsettling cohabitation of familiar and strange, organic and manufactured qualities in robot form. Mori’s essay, "The Uncanny Valley," (1970) uses a range of non-normative human states, including illness and disability, to construct its definition of the uncanny valley. A “Healthy Person” occupies the position furthest from the uncanny valley’s nadir, according to Mori’s graph representing the phenomenon, while a prosthetic hand occupies a much lower point, not quite in the valley, but close to it. Mori’s essay is a reminder that models for avoiding the eeriness of the uncanny valley are models for avoiding non-normative embodiments, embodiments that are, according to Mori’s logic, likely to drag the (normative, one presumes) user down into the uncanny territory, the abject. Mori’s article is over 50 years old and many of the assumptions underlying his analysis appear dated. Nonetheless, the resonance of the term “uncanny valley,” which remains ubiquitous in robot discourse, highlights the degree to which assumptions of normative users disturbed by the strangeness of morphological difference continues to direct robot design and reception.

[21] Many have noted the irony of Saudi Arabia, a country that severely limits the rights of women and has a history of human rights violations for foreign workers, granting citizenship to an object. Whether or not it’s a cynical publicity stunt, as many claim, Sophia’s citizenship underscores her role in upholding a humanist idea of the normative human.

[22] See https://www.boxofficemojo.com/release/rl1481672193/ for a detailed breakdown of the film’s box office figures.

[23] The casting of Alicia Vikander, an accomplished ballerina, underscores Ava’s able-bodiedness, which recalls the hyper-ability of Daughter, whose athleticism is showcased in *I Am Mother*.

[24] Other examples include: Annalee Newitz’s SF novel *Autonomous*, which draws attention to the ways that robots can both reproduce and undermine gendered and racialized humanist hierarchies; Kazuo

Ishiguro's, *Klara and the Sun*, a novel narrated by its titular artificial friend, whose uncanny perspective unsettles anthropocentric assumptions; Kate Folk's story collection *Out There*, which includes robot fictions that challenge humanist assumptions about gender, power and technology.