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Feminist Cybernetic, Critical Race, Postcolonial, and Crip Propositions for the Theoretical Future of Human-Machine Communication

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Abstract

The authors review theoretical trends in HMC research, as well as recent critical interventions in the *HMC* journal that usefully reshape and expand our research terrain. Conventional research such as positivist and quantified approaches are identified as restraining research questions and delimiting understandings of concepts including subjects, agency, and interactivity. Feminist cybernetic, critical race, postcolonial, and crip theoretical approaches are offered, examining how they fill research gaps in HMC, expanding content areas explored, and addressing diverse intersectional pressures, situated, and time/space dynamics that impact human-machine interaction. The authors suggest these shifts are essential to expanding HMC research to address diverse populations, regional realities around the globe, and to engage in vibrant scholarly debates occurring outside HMC. They contend these shifts will outfit HMC to weigh in on important issues of justice, equity, and access that arise with emerging technologies, climate change, and globalization dynamics.

Keywords: crip, critical digital race studies, feminist cybernetics, human-machine communication, postcolonial feminism

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Introduction

Human-machine communication scholars have long been developing our research in diverse journals of communication and human-machine interaction, focusing on the relationship between technologies and communication. Since 2017, scholars have sought to demark human-machine communication (HMC) as a coherent subfield, notably with interventions in the early volumes of *Human-Machine Communication* and the *SAGE Handbook*; these represent scholarly traditions as well as shifts reflecting contemporary critical turns. As the HMC subfield expands, we propose action items to expand and innovate the theoretical trajectory of HMC scholarship.[1] Specifically, we propose engaging feminist, including cybernetic, critical race approaches, postcolonial, and crip approaches, particularly the work of esteemed communication colleagues (conspicuously absent from HMC research), that can enrich and extend burgeoning HMC research. In engaging greater criticality, including ontological, phenomenological, and constructivist approaches, HMC research can attend more carefully to the contexts that condition machines and humans, and refine analyses regarding how human-machine interactions make possible diverse forms of subjectivity, interaction, power, identity, agency, and communication. Our intervention reflects Iliadis (2023), who contends that potent scholarship that can arise in HMC when combining "humanistic and qualitative tools, theories, methods, and frameworks" with the "long rich histories" of critical and cultural approaches in communication studies (Iliadis, 2023, pp. 117–118). Referencing canonical literature from critical and cultural studies and contemporary HMC scholars, Iliadis (2023) defines criticality as rejecting objective or universalizing views of science and technology, and relativizing subject positions and political orientations, emphasizing culture, relativity, subjectivity, standpoints, and situated interactions (p. 199).

We concur with this definition of critical research, and point readers toward lesser referenced critical approaches, particularly intersectional scholarship. Critical intersectional approaches, particularly feminist, cybernetic, critical race, postcolonial and crip conceptual frameworks, can attune research to the complexities that enable or restrain human-machine communication. Feminist cybernetic scholarship presents opportunities for HMC scholars to critically probe the relationship between gendered and racialized flows of labor and technology. Moreover, crip approaches demonstrate how the generative insights on building, hacking, and creating that emerge in disability cultures offer machines new ways of reading, organizing, and interacting with human-created data that shape unique relationships beyond ableism (see Brilmyer & Lee, 2023; Rauchberg, 2022). Moreover, recognizing the intersectional (dual micro and macro frameworks) digital, globalized, networked dynamics in which our technologies and practices operate will nuance research findings. This will enable HMC scholarship to take a more prominent role in these important scholarly discussions in and beyond communication studies. Our intervention seeks to ensure that the emerging landscape of HMC is outfitted to engage with emerging human-machine issues and realities in a shifting terrain where digital technologies and practices fluctuate regionally and globally in response to crises including industrial change, climate change, political conflicts, and globalization dynamics.

The Theory Behind Conventional HMC Methods

HMC scholars maintain that while communication brings a distinct, valuable approach to the study of human-machine discourse and interaction, HMC has employed a restrained collection of methods and theoretical approaches. As Wilson (2017) argues, HMC researchers choose methods based upon several considerations: "opportunities and access, resource constraints, disciplinary traditions, and ethics as well as the types of data desired, plans for data analysis, and broader assumptions about the research process" (p. 1020). Methods, of course, are binded to theoretical assumptions and dispositions. Predominant methods in HMC have included content analysis, experimental, or ethnographic methods. Critical approaches such as discourse, visual, material, ideological, aesthetic, and cultural analysis, as well as co-design and research creation, have been perceptibly peripheral in HMC research. Such absences close off experimentation and the potential of HMC to demonstrate its full potential. Engaging critical and, crucially, intersectional approaches can produce findings impactful in both communication and neighboring academic spaces (e.g., sociology, anthropology, digital humanities, science and technology studies [STS]) and expand HMC's strength in offering policy recommendations valuable to government, industry, and cultural organizations. Scholars in these spaces have had to contend with similar reckonings. STS, for example, has successfully pressed scholars to bring greater "social thickness and complexity" to the study of technological systems (Jasanoff, 2015, p. 2).

The Case for Future Robust and Expansive Intersectional HMC Research

A robust HMC field is one where scholars engage in reflexivity and trouble our theoretical assumptions; engage with contemporary theory to consider human-machine dynamics more generously; interrogate our digital and networked conditions across diverse global regions, contexts, and practices; and address questions focused on the political, justice, and climate impacts of human-machine interaction. This includes addressing the various ways in which humans and machines interact in ways that create barriers to or foster equity, diversity, access, inclusion, ethics, justice, and sustainability. Taking up these approaches should be key action items for HMC scholars—theoretical hurdles we must jump through if HMC is to ably contend with issues vital to our research terrain, engage with issues currently addressed rigorously in other areas of communication, and to confidently weigh in on key challenges facing our planet in the twenty-first century and propose steps that chart ways forward.

This essay proceeds as follows: First, we review trends in historic HMC research, followed by recent calls for innovation in HMC from various researchers, including the editors of *Human-Machine Communication (HMC)*, recognizing the journal as a primary site of emerging HMC research. We then highlight examples of HMC scholarship that demonstrates innovation, and, in turn, that which illustrates ongoing limitations, particularly in regard to theoretical breadth and intersectionality.[2] As well, we reflect on current efforts to (re)frame the field, focusing on the *HMC* journal, noting the editors' calls for new types of primary research questions, content foci, and analytic lenses. In our review, we focus on noted absences that can be filled by feminist (cybernetic and critical race), postcolonial and crip approaches—potent approaches that offer innovative theoretical inquiry and

paradigmatic[3] orientations, in conversation with critical shifts outside of HMC. Notably, this article is a theoretical extension of our *SAGE Handbook of Human-Machine Communication* chapter (Gardner & Rauchberg, 2023). In this essay, we offer theory (arising from critical methods) that enables inventive analysis and argumentation in HMC.

Limitations of Conventional HMC Research

Scholars have tracked the theoretical commitments of conventional HMC research as focusing on interpersonal interaction (Fortunati & Edwards, 2020) and (post-)positivist research, often employing interpersonal theory, survey-based instruments, and quantitative measures (Spinda, 2017). These theoretical foci normalize methods that capture cues and patterns of (assumedly monolithic) human subjects as they interact with computers, which glosses details of identity and cultural contexts. Such approaches limit the ways in which user/subjects are contextualized and assume that human-human communication interactions guide human-machine communications, neglecting the opportunity to complicate machine interlocutors. Stahl and Edwards (2017) review HMC research as relying on positivist and post-positivist theories, and quantitative research methodologies, such as experimental and survey research, and only minimally engaging with critical or qualitative research methods (e.g., humanistic or critical methods). In emphasizing interpersonal theories, crucial distinctions between humans and computers are blurred; the focus is often on evaluating social scripts utilized by computers upon human users, restraining consideration of the diverse types of human-computer social interaction. These limited approaches often constrain research on mobile technologies and artificial intelligence (AI) to addressing relationships, speech acts, nonverbal cues, and/or measuring the gratification computers might offer to humans. A traditional user-centric focus is overly narrow, often problematically embracing technological determinism or utopianism.

Makady and Liu's (2022) quantitative study reviewed 444 peer-reviewed empirical studies published between 2010 and 2021 across journals with the highest impact factors in the Social Sciences Citation Index (SSCI). The study tracked terms employed in articles noting their coherence and prevalence, aiming to note trends in HMC scholarship that included subject matter, and theoretical and methodological approaches. However, the study did not investigate intersectional approaches, nor track the terms we used in our review of early HMC issues. The authors instead tracked the use of the term "power"—singularly (rather than in relation to other terms) and as content rather that analytic lens—finding it was employed to inquire into the "critical role of AI in Journalism," which recurred in the *Journal of Broadcasting and Electronic Media* (*JBEM*), and *Journalism Studies* (*JS*). Despite such methodological limitations, the findings show HMC research in these journals addressed a limited set of (emerging) devices and gave only marginal attention to others such as wearables. The study also echoes assertions that HMC research on emerging technology research needs to work to further develop theoretical HMC-focused frameworks.

In much HMC research, scholars objectify machines and homogenize users, failing to note how biases (regarding disability, gender, race, ethnicity, and other signifiers) are embedded in both machines and in social structures, and work to condition, and impact experiences (Gardner & Kember, 2021). While some HMC scholars recognize that technology itself has become a communicator (Guzman, 2018), many still overlook important

feminist cybernetic scholarship recognizing practices by which humans and technology inter-inform (Haraway, 1987) or entangle (Barad, 2007) to complicate communication dynamics, which is further discussed below.

The circumvention of feminist and other critical research trends also appears in HMC scholarship in areas of interface design and ubiquitous computing research, which overwhelmingly rely on convenience sampling and experimental research design. Here research often takes a human-computer interaction (HCI) approach, seeking to improve usability via storing, retrieving, and manipulating information from interfaces in seamless manners (Stahl & Edwards, 2017). There is ample opportunity in HMC to engage a critical communication framework that complicates the notion of the universal user, foregrounding how different histories, experiences, and expectations of subject's condition and impact human-machine dynamics. In interface design and ubiquitous computing, such an approach disavows the concept of a homogenous user, addressing micro and macro contexts of use to complicate and situate research. In social computing studies, which tests how computers and interfaces facilitate interactions, this approach would contextualize the "social" in time and space.

HMC research that engages with information-processing theory (how information is processed by humans, driven predominantly by psychology) and agent goal theories (what motivates users toward a goal or activity) also tends to omit attention to user difference. In turn, these missing cultural and identity signifiers could profitably complexify analysis. While such critical lenses remain infrequent in HMC research, some approaches *do* problematize understandings of the social and the human. For example, social interaction theory in HMC attends to: "culture, situation, time, organization, physical setting, and others that are all socially embedded within each individual" (Stahl & Edwards, 2017, pp. 3–5). As well, Computers as Social Actors (CASA) framings probe human communication to understand how and why humans might respond to computers as social actors (see Nass et al., 1994).

That is to say, lessons in innovation are readily available from within the HMC community. Some HMC scholars engage critical and interpretivist paradigmatic approaches that problematize the reductive framing of human subjects, offering theoretical models that complicate notions of interaction and communication. For example, referencing machine-actor dynamics, which garners much attention in HMC, Dehnert & Leach (2021) found that humans interpreted video game scripts via ableist lenses, reading machines, for example, as sub- or superhuman which worked to manifest a sense of control or anxiety. The authors make a plea to HMC researchers to address the social biases (e.g., heteronormativity, whiteness, ableism, etc.) that condition how humans communicate with machines.

Upon reflection, while some exceptional HMC scholarship engages critical frameworks of analysis, much HMC research to date has often neglected to rigorously incorporate historical, social, regional, or cultural contexts relevant to the human-machine experience, or to critically reflect upon how theoretical framings are employed. In the next section, we review calls to action to address such absences in the early journal issues of *Human-Machine Communication,* where editors Fortunati and Edwards rigorously solicit new material aiming to reinvigorate HMC scholarship. We then provide a review of key innovative scholarship published consecutively in *HMC* Volumes I–V. We note this research as important advancements, particularly in ontological and constructivist research, innovations

in CASA, Actor-Network Theory (ANT), and in engaging interdisciplinary approaches. Finally, the essay reviews remaining gaps or weaknesses that, we propose, can be filled by feminist, crip, critical race, and postcolonial approaches.

Calls for HMC Innovation: Early Volumes of *Human-Machine Communication*

We reviewed the first five volumes of *Human-Machine Communication* to capture research that engaged theoretical or methodological approaches from feminist, critical race, post-colonial, critical disability, or crip approaches to HMC subject matter. We scanned these articles manually, searching for keywords including critical, feminist, cyber, colonial, post-colonial, queer, disability, crip, race, and power. We also reviewed the articles' bibliographies and citations seeking authorial references from feminist, critical race, postcolonial, anti-colonial, critical disability, and crip studies scholarship. When such evidence was found, we conducted a critical/cultural close reading of the article to assess how and in what ways the arguments and findings espoused key principles, aims, and objectives common in these approaches. In the following discussion we reference findings of evidence as well as significant deficits of these approaches in HMC.

The *HMC* editors recognize absences of critical research in the field and have stridently solicited research to the journal that engages in complex critical, contextualized, and interdisciplinary scholarship. Their calls invite "big" research questions that offer complexity beyond mere engagement with interdisciplinary methods, and provide alternative ways to analyze complex interactions (Fortunati & Edwards, 2022, p. 11) and to shift attention more rigorously toward the analysis of emerging technologies. Their appeals have advanced with each issue; Volume I (2020) and II (2021) called for critical and innovative research.[4] Volume IV proposed new psychosocial and cultural frameworks able to tarry with key ideas such as hybridity, otherness, relations of work, labor, and gender, which have given rise to important shifts in the social sciences. Finally, Volume V (2022b) invited nuanced research on gender in HMC with attention to historical and political dynamics that shapes it, a clear recognition that we must update HMC research to reflect advancements in gender-machine research elsewhere in communication, sociology, cultural anthropology, digital humanities, STS, and beyond.

Key Critical Interventions and Gaps in Early Volumes of HMC

HMC Volumes I–V include the editors' introductions with inspiring arguments for theoretical advancements in HMC. Our review below is generally organized by Volume number, summarizing the editors' priorities for future HMC research, and highlighting selected innovative interventions that correct HMC's pervasive focus on human-human communication, and engage in more critical, historical, ontological, and constructivist research approaches. These essays additionally include notes regarding ongoing classic HMC approaches that can benefit by incorporating critical frameworks and contexts.

Articles in *HMC* Volume I propose a broad redefinition of HMC scholarship. For instance, HMC can address communication theories and practices with and about digital interlocutors, including the context of machine spaces, human-machine configurations,

and how humans and machines are constructed through discourses and interactions. The editors call for more ontological inquiries to innovate HMC, noting as example research on interactor and inter-agent communication, reflecting humans' emotional investments in relations with digital interlocutors, which productively troubles classic interpersonal theories in HMC (Fortunati & Edwards, 2020, p. 9). *HMC* Volume I also includes articles that engage classic sender/receiver models that problematically assume disembodied signaling, and communication science approaches in dialogue with (often automated) computers and robots, social robots, and conversation versus dissemination. At the same, time key articles in Volume I make great strides, reflecting the editors' ambitions for the field. Banks and De Graaf (2020), for example, propose replacing the outdated transmission model of communication with an agent-agnostic transmission model that recognizes blurred ontological differences between humans and machines. They contend that scholars should focus on how machines themselves communicate, to address the "missing mass [of] . . . emerging, unintuitive, and surprising ways that humans and machines make meaning together" (Banks & De Graaf, p. 20).

In Volume II (2020), "Moving Ahead with Communication," the editors praise the interdisciplinarity approaches of articles in the issue, with notable pieces that pressure paradigmatic HMC boundaries and theoretical habits. Recognizing the central position in HMC occupied by mediated communication, the media equation, and Computers as Social Actors (CASA) (Nass et al., 1994), the editors challenge scholars to develop CASA and Media as Social Actors (MASA) approaches with historical, sociological, semiotic, and hermeneutic approaches (Fortunati & Edwards, 2021, p. 9). We concur, noting that, while HMC is indeed rich in CASA, MASA, and Actor Network Theory (ANT) approaches, much research in this terrain fails to contextualize the social, political, or embodied state of "actors" in networks. Moreover, it does not differentiate between "humans" in the human-machine dyad, and social actors in human-machine networks. A strong contribution is offered in this volume by Gibbs and colleagues' (2021) analysis of structuration theory, which addresses both micro- and macro-communication processes in the negotiation of control between human and machine agents, qualifying human experience with attention to institutional, social, cultural, and personal contexts. Such approaches, they note, shift attention from technology as object to technology as agent, allowing analysis of the roles played by agency and control to better understand HMC in organizational processes (Gibbs et al., 2021, p. 161).

Other important contributions in these *HMC* issues trouble interaction research that focuses on outcomes and glosses over deep understandings of interactivity or how human communication complicates HCI approaches, machines as social actors, and media agents (see Banks & De Graaf, 2020; Fortunati & Edwards, 2020; Guzman & Lewis, 2020; Lombard & Xu, 2021). For example, Gunkel's (2022) subsequent *HMC* Volume IV intervention, in response to Banks et al.'s (2021), demonstrates the usefulness of ontological approaches to consider ethical questions (and how we ask subjects about them) in HMC, rather than relying on applied approaches. The piece interrogates the diverse mental models and social representations people use to create perceptions, opinions, and attitudes in human-machine interactions. Such scholarly exchanges offer productive debate that is essential to keeping HMC research accountable and relevant. Volume IV (2022), engaging in psycho-social and cultural approaches to HMC, offers scholarship engaging narrativity, content analysis, and philosophical and empirical approaches. The editors praise the contributions as proactively

addressing emerging issues, and wading into fresh territory—articles, for example, that explore machines as potential moral subjects or sites of otherness and hybridity (Gunkel, 2022). To illustrate potentials for theoretical inventiveness, the editors propose that scholars might resurrect James's (1991) pragmatic social theory of meliorism. The concept probes our human future—not via an inflexible binary of optimism/pessimism that asks what is—but rather via an "in-between" position that asks what-if (Gunkel, 2022, p. 11). The call for such innovative shifts in HMC is repeated in the volume with Richards and colleagues' (2022), whose review of journal articles about HMC decries outdated research approaches, worrying the current research trajectory (namely laboratory cross-sectional experiments) "will lead to naivete in our understanding of HMC" (Richards et al., 2022, p. 56). As a solution, the authors call for interdisciplinary research that engages in intersectionality, to address "marginalized individuals and communities (e.g., ethnicity, class, gender identity, sexuality, sexual orientation, physical disability), critical/cultural (e.g., prejudice, discrimination), relational and group development" (Richards et al., p. 56).

Successively, in Volume V (2023), Gender and Human-Machine Communication, the editors' introductory essay presents diverse theoretical approaches to gender from philosophy, women's studies, and communication, to introduce gender as a constructed phenomenon. They review research, largely empirical, showing that power, embedded in social, industry (particularly ICTs), language, and other structures and systems, enforces and normalizes particular gendered practices. As examples, the editors cite analyses of gender perceptions (e.g., in human-robot interactions) and representation (how technologies assume a normative male subject in design).

While questions of gender representation and perception are important areas of communication research, important feminist intersectional and cybernetic approaches are not well reflected in this or previous *HMC* issues. An intersectional approach, for example, could add weight to Liu's (2021) feminist mixed-methods study in Volume II, of advertisements marketing a holographic bride substitute in Japan. Blending visual semiotic analysis and an ANT framework, the study finds that ontological assumptions—the passive, subordinated female subject/wife—are attached to the machinic bride, glorifying the ideal. The guarded summary contends that humanized objects reflect social practices of objectification. While the editors reinforce the importance of the finding—that machines are reflective and productive of human gender relations (Fortunati & Edwards, 2021, p. 19)—we propose that a feminist intersectional approach that explores how gender power articulates to age, regional customs, and family values (in Japan) could offer a thicker reading regarding the cultural conditioning and communication with impact of female-identified machines.

An outlier in *HMC* Volume V, authored by Jarvis and Quinlan (2022), productively employs a feminist intersectional lens (addressing gender, race, class, and sexuality) to effectively analyze how Instagram shadow banning (a belief referring to a platform company's opaque algorithmic suppression of user-generated content) impacts infertility hashtags. The authors found that hashtag patterns prioritized by Instagram worked to construct in-vitro fertilization (IVF) experiences as most accessible to White women and administered in wealthy medical spaces, thus reinforcing stratified access to IVF. This unique article integrates emerging research on shadow banning and racialized algorithm studies to create an important research question and effective critical analytic lens—an exemplary lesson for HMC scholars invested in contemporary critical gender analysis.

In *HMC* Volumes I–V, the editors succeed in laying out changes necessary in HMC, some of which are underway, to refresh our scholarship particularly calling for ontological, constructivist, feminist, and intersectional frameworks of analysis. Scholars in these volumes offer important interventions that refresh classic models, including engaging ontological approaches to understand subjects and ethics, and offering heightened constructivist approaches. Along with the editors, many authors in these volumes plead for theoretical invention and experimentation, and greater dialogue with emerging trends in communication and ancillary fields. In the following, we eagerly embrace these recommendations, including the *HMC* editors' interest in a "what if" future (Fortunati & Edwards, 2022) that can be possible with theoretical shifts, particularly injecting key critical conceptual frameworks from communication scholars that are often overlooked in HMC research.

Toward a "What If" Future of Human-Machine Communication: Propositions for Theoretical Shifts in the Field

Here we introduce key challenges posed to HMC by feminist cybernetic, critical race, crip, and postcolonial approaches, and offer distinct propositions for invigorating research in HMC. Each section addresses a specific example of *HMC* research representing an innovation or a gap, and then offers propositions for integrating feminist, including critical race frameworks, postcolonial and crip approaches. The propositional sections discuss how and why these are essential interventions for this subfield, the types of new research questions that invite and how they complicate analyses to open up HMC terrain to new ideas and possibilities. We offer this intervention in the spirit of the editors' ambitions for the field, proposing that engagement with such approaches can kindle scholarship that expands the breadth of HMC subject matter, approaches, and build theory, and speculate new future questions to be asked in HMC.

What Can Critical Feminist, Race, Postcolonial, and Crip Lenses Bring to HMC?

First, we summarize the key commitments that feminism, including critical race approaches, crip and postcolonial research offer that can update and innovate HMC. Our concerns are that much HMC research in the field, and a significant portion published in the HMC journal (despite interventions by the editors), continues to reflect conventional approaches that often engage with reductive, narrow approaches. In sum, these often: support epistemological approaches that reify essentialisms and binaries; assume technological and information systems are neutral or objective; and reify technological determinism, technological utopianism, or techno-futurism (assuming technology produces advanced humans). Such choices flatten power and ontological differentials that distinguish humans and machines, failing to complexify agency, subjectivity, and affect by neglecting to explore critical and time/space dimensions. In this way, such approaches do not consider local and intersectional contexts that impact communication. Crucially, while some HMC research nods to intersectionality, we call for more contextual and situational intersectional approaches. Our concept of intersectionality recognizes the varying dimensions by which identity signifiers

attached to subjects, including race, class, gender, disability, and colonization, interconnect to create compounding systems of discrimination. We identify these gaps and propose new theoretical frameworks in HMC research to disrupt the routinized replication of habituated theories that restrain research questions, analyses, and findings. In this way, we understand our intervention to push back against the disregarding of important innovations in scholarship outside of HMC. Below we offer our assessments of key residual theoretical gaps and analytic weaknesses in HMC scholarship, and examples that demonstrate how the addition of critical feminist, race, postcolonial and crip approaches can enable evocative research that updates HMC scholarship. We do so by placing our recommendations in conversation with prominent diverse scholarly communities to make it more relevant and impactful.

Proposition 1: Engage Feminist Critical Digital Race and Postcolonial Studies in HMC

HMC spaces sparingly engage with feminist critical digital race and postcolonial theoretical frameworks, despite that much of this research comes from within communication and fields that directly feed HMC, including STS, Internet Studies, and digital humanities. These crucial approaches support analysis of how racial, gender, class, and colonial values embedded in social structures and cultural practices are inscribed in technologies, and become replicated or transformed in human-machine interactions. Intersectional scholarship offers essential critical race-informed approaches that unpack how layered forms of bias attached to identity signifiers (race, class, gender, colonialism, ableism) infuse technologies and social systems. Such understandings complicate HMC theories that assume systems and machine and human actors are innocent or homogenous and unpack how social bias impacts how humans and machinic systems interact.

In groundbreaking work, for example, feminist scholars have revealed the internet as a space where social racism moved to online (Nakamura, 2002), manifesting cybertype (racial stereotypes) structures that became part of the online experiences. Like gender, race itself is understood as a technology (Benjamin, 2019; Coleman, 2009) that amplifies racial hierarchies, replicating social divisions. At the same time, race can also be a resistive position; Bailey and Trudy (2018) coined the term misogynoir to illustrate how Black women's agency is systemically mocked, erased, and plagiarized in interactions with machines and platforms; Bailey and Trudy subsequently documented Black women's online responses to disrupt racial stereotypes and confer agency to human actors.

Nakamura and Chow-White's (2012) anthology offers scholars diverse methods to illustrate how race works as code, image, and interaction in non-innocent digital networks (articulated to race and other biases) to distribute privilege. In information studies, Noble (2018) has demonstrated that search engine algorithms imbue generalized racism on the internet to guide searches that reinforce racism, while Buolamwini and Gebru (2018) have shown that facial databases that feed common recognition tools are White-dominant, reflecting history technologies that have worked to surveil Blackness (Browne, 2015), particularly. TallBear (2013) offers a close reading of DNA lab science, showing that material (blood) and semiotic (race or tribe) data are conflated via "markers" that segregate Indigenous peoples in distinct genetic categories, with tragic consequences for land claims and sovereignty. The approach shows how science and social systems mutually inform to denaturalize race

and ethnicity, in this case, indigeneity. Machinic designs, contends Benjamin (2019), act as a "New Jim Code" that encodes inequity in machinic interactions. Similarly, Coleman (2021) writes that artificial intelligence (AI) possesses a pathological insistence on racial categories that automate the sorting of race, place, and objects (Coleman, 2021, p. 6). At that same time, race is also identified as a tool that can stratify and sanctify or support liberation and social injustice.

The Value of Critical Digital Race Scholarship for HMC

As feminist scholars have noted, no social (including machine or platform) space is free of gender, race, and other operations of power and we must beware of assuming in our research that White or male actors are deraced or degendered. That is, intersectional critical digital and platform research frameworks apply expansively to HMC research. They can assist researchers to engage in what STS scholar Suchman (2006), among others, refer to as situated research—that which reflects on the micro and macro practices of power that inform human-machine communication in distinct spaces and times. Similarly, feminist and critical digital race scholarship shows the value of addressing historic social practices of intersectional bias to reveal often invisible, colluding White and masculinist forms of power that necessarily imbue technological tools, structures, and practices. Feminist scholars also offer metatheoretical directives—frameworks to transform colonial practices within the academy. Tallbear's (2013) "promiscuous" standpoint approach, or objectivity in action for example, invites scholars across disciplines to work collaboratively to co-constitute research claims and outcomes; such an approach supports scholars to check biases embedded in lenses and method, and ensure ethical values reflect diverse dispositions. Sandoval (2000) redeploys Haraway's (1987) idea of oppositional consciousness in a method constructed to aid scholars to transform theory into social action, to confront academic colonialism. Critical race, ethnicity, and indigenous approaches correct biased ontological and epistemological approaches, including those within HMC, which have historically neglected and undertheorized the intersectional dynamics of power attendant to gender, race, ethnicity, colonialism, and more.

Here we offer an example of how Gardner, co-author of this paper, engages a critical intersectional approach in her current study, which probes how and why young women (aged 18–20) navigate cyberviolence on social media platforms in regional communities in Canada and South Africa. An uncritical HMC approach might focus on how platforms such as Instagram are programmed with terms to capture cyberviolence, but fail to explore the local terms (language, emojis, etc.) recognized in youth subcultures as gender-based biases or slurs. Conversely, a critical HMC approach would address how users understand the machine's communication nature, which in turn impacts their communication acts (Edwards, 2018) in cyberviolence scenarios. Our study, for example, probes how young women's engagement in chat groups might be impacted by their expectations that platform algorithms might censor or delete violent gender-based cyberviolence. An uncritical study might collect data to quantify percentages of (undifferentiated) young women who use likes or shares in acts that seem to amplify cyberviolence. In contrast, our study queries how, in such cases, subjects may be navigating their identity, reputation and agency and gender

power (via culture, religion, community standards) alongside expectations regarding how platform algorithms function. Alper (2017) cautions HMC scholars to avoid assuming that technologies generally empower any (universal) subject; similarly, we can not assume that perpetrators use universal practices to harass and disempower. At the same time, we query subjects' use of technologies that appear resistive, but may instead indicate other aims. Local communities' interactions with digital technologies may be guided by their expectations of these tools, combined with distinct definitions of gender-based cyberviolence. Our study thus probes how personal belief systems (informed by local family, religious, or cultural values) may inform how young women calculate the power that social media tools render in their local social groups, and how those understandings may impact when and how they respond to cyberviolence on social media platforms. For example, young women may choose to engage confrontationally or passively with cyber perpetrators in order to avoid appearing weak, which might increase their vulnerability, or they may agree to share a sexualized photo to win community approval or enhance social status. This case study illustrates how considering a subject's assumptions about machines, regional understandings of gender power, and cultural epistemologies of gender violence produces richer understandings of how and why actor-subjects engage in communications mediated by machines.

An excellent example of such intersectional research in *HMC*, noted earlier, is Jarvis and Quinlan's (2022) study, which carefully interrogates the ways whiteness shapes gender, class, and sexuality within reproductive health messaging on Instagram. While others such as Dehnert and Leach (2021), in addition to the *HMC* editors, have called for more critical studies, we challenge HMC scholars to engage with and cite the scholarship of feminist and critical digital race scholars whose work is prominent in communication and neighboring fields, to engage in thicker analyses that more carefully link histories (past and present) of bias and prejudice to the technologies and practices we analyze.

Postcolonial Feminist Contributions to Human-Machine Communication

Nearly absent in HMC scholarship are studies using feminist postcolonial media and technology approaches that articulate feminist interests to transnational, colonial, and nationalist relations, with focused attention on regional histories. Exceptional postcolonial feminist communication scholars offer blended micro and macro frameworks able to recognize the colonial values embedded in technology and networks, and actor practices, with attention to how technological flows to and within the global South impact access, uptake, and interaction. These approaches correct research that essentializes subaltern subjects (Kumar & Parameswaran, 2018) and denaturalizes North/Western research that universalizes the concept of networks, to expand understandings of how technologies and subjects arise relationally and in transnational dynamics (Shome & Hegde, 2002).

Shome (2016) seeks to expand conversations across media and postcolonial studies to unsettle the prominence of Eurocentric biases within media studies, particularly the universalization of White, Northern subjects and a history failing to recognize the complexities of colonialism. Shome's analysis shows how colonized peoples, in this case referencing India, have historically preferenced different value systems (e.g., religious over secular) than colonizers in the design and uptake of media and other technologies. The article criticizes Northern scholarship that assumes technological development and use follows a coherent,

linear path over time and space, for example, failing to recognize the ways in which colonized peoples, often covertly, engage values in media/technology in histories that are circuitous and messy. For Shome (2016), convergence is an example of a poorly theorized Northern idea that is insensible in India, particularly among the majority with no technology access. She writes: " . . . convergence . . . obscures issues of (and is often built upon) divergences and disconnections of peoples situated in, or excluded by, contemporary capitalist mediated relations that are imbricated in geopolitics and postcoloniality" (Shome, 2016, p. 250). Shome's appeal is akin to the one we are proposing here—that postcolonial approaches can help HMC scholars to regionalize studies of human practices with technologies, with attention to how diverse social and cultural values condition them and to understand development histories that are distinct from the North. Such analyses will be more fine-tuned and accurate and contribute to theoretically sophisticated understandings of the geopolitical dimensions in which technologies operate and flow.

Many fine examples of feminist postcolonial research in communication studies serve as excellent models for HMC. Employing online ethnography in Second Life research, Gajjala (2010) has shown that digital diasporic cultures condition subjects to manifest "authentic" cultural positions to enable their success in emergent transnational economies (p. 523). Hegde (2011) offers a groundbreaking collection of feminist transnational media and network studies addressing how globalization dynamics impact networked labor, media consumption and regulation, and identity practices (e.g., sexuality and gender). Parameswaran's (2011) ethnographic study shows that cosmetic whitening creams are technologies that both offer Indian women cultural currency—white skin that reflects Eurocentric standards of beauty, while also reifying racial and caste biases in India. These intersectional studies produce rich, often contradictory, findings that productively complicate analysis.

These foundational intersectional, transnational studies in communication are rarely evoked or employed in HMC research. The aforementioned feminist critical race and postcolonial research scholarship has obvious relevance to HMC in exploring relations between media technologies, networks, and issues of human (including audience) consumption, and representation. However, this research also productively pressures HMC scholars to expand our conceptions of gender and race to what feminists, in the Foucauldian (poststructuralist) sense, term technologies—tools and practices. This conceptualization supports the analysis of how times/spaces and other conditions produce and reproduce gender and race in ways that might support or deny access, agency, and so forth. While some HMC scholars recognize technologies as practices, we encourage that application to race and gender, bodies and subjectivity, via intersectional frameworks, to expand attention to how micro and macro power dynamics surround and often produce human-machine relations and communication.

With great appreciation for the *HMC* editors and their broad solicitation attempts, we find little evidence of postcolonial, let alone intersectional feminist postcolonial approaches in the journal to date. The editors, in the introduction to Volume II (2021), note the importance of recognizing colonialism in theoretical work that evaluates the nature of the human being (p. 16); as well, Jarvis and Quinlan (2022) note colonization as an identity signifier that denaturalizes human subjects, and Denhert (2022) crafts human-machine sexualities, as "communicative sexuotechnical-assemblages" noting the historic exclusion of "others" from sexual science as something that has compounded colonization (Denhert, 2022, p. 131).

These brief references aside, postcolonial frameworks have not, to date, been deeply employed in HMC. In correcting this absence, HMC can move its subject matter and approaches toward greater attention to diverse global actors and agents and unique human-machine dynamics, while remaining astute and responsive to emerging—and constantly shifting—technological, sociocultural, political, and environmental global dynamics.

Proposition 2: Critical Disability and Crip Challenges to Human-Machine Communication

Akin to connections in feminist and postcolonial studies, HMC is uniquely positioned to engage with innovative crip and disability justice approaches. Derived from the interstices of critical disability studies, feminist analysis, and queer theory, crip theory rejects curative and deficit conceptualizations of disability (Kafer, 2013). Instead, it presents disability as a whole, political-cultural identity always in flux and contextualized by economic, political, and cultural ideologies (McRuer, 2006). Following Fortunati and Edwards's call (2021) for work that disrupts disabled/nondisabled binaries (p. 20), we note crip, critical disability, and disability justice approaches as essential points of extension to feminist and postcolonial studies of human-machine interaction.

To date, HMC has only sparingly engaged in disability and crip research. Such practices create oversights for the ways digital technologies, such as internet-hosted platforms, are hubs for disability cultures—particularly disability justice making and organizing (Sins Invalid, 2019, p. 25). Often referred to as the "second wave" of disability rights, disability justice is a practice led and guided by the expertise of Black, Brown, Indigenous, queer, and trans disabled people across North America in the early 2000s (Sins Invalid, 2019). Committed to intersectionality (Crenshaw, 1990), disability justice and crip approaches to computing foreground the importance of understanding how disability status is negotiated by its interactions with race, gender, sexuality, class, nationality, and other political categories of identity in digital or computer-mediated spaces. The digital space is crucial for disability justice activism, art practice, archiving, and other human-machine engagements. Disability justice perspectives articulate the need to address access as a frictive, always incomplete goal that users, machines, and other interlocutors must collectively strive for to create many possibilities for human-machine engagement (Hamraie & Fritsch, 2019, p. 4). Crip approaches also interrogate the relationship between imperialism, disability, and technology (Coráñez Bolton, 2023; Jerreat-Poole, 2022). Influenced by feminist, critical race, and postcolonial analyses of technology, crip approaches to HMC equally articulate boundary-pushing research of understanding the role of cultural contexts in platforms, systems, and human-machine interactions through various methodological orientations and approaches. Some of these projects offer challenges to ableist ideas about human-computer relationalities through crip and neuroqueer technoscience (Banner, 2019; Hamraie & Fritsch, 2019; Rauchberg, 2022; Sterne, 2019), collective access-making (Gotkin, 2019; Hamraie & Fritsch, 2019; Jackson et al., 2022), crip HCI and information studies (Brilmyer & Lee, 2023; Shew, 2020; Sum et al., 2022; Williams et al., 2021); and participatory digital arts-based approaches (Britton & Paehr, 2021; Lazard, 2018; Sick in Quarters, 2020).

While existing HMC work lacks in quantity, early work in the *HMC* journal on disability offers critical beginnings to design and usability through analyses of human-machine

relations as they are represented in new media texts. For instance, Dehnert and Leach (2021) call for more critical approaches in their critical constructivist case study, probing how gamers' scripts reveal ableist views of the normal body and ableist stigmas. The pair call upon researchers to challenge our methodological habits, questioning for example, how human interaction scripts might embed harmful principles and instigate harmful relations with machines. Davis and Stanovsek's (2021) discussion of disabled users on the virtual reality platform Second Life address the use of avatars as digital embodied identity, and the concurrent benefits and limitations disabled platform users face. For instance, though the platform provides benefits for disabled people to connect and build community (particularly in a pandemic), some forms of virtual communication, such as typed gestures, are inaccessible to blind/low vision users and those accessing the platform with screen readers (p. 131). Though they do not use the term collective access (see Hamraie & Fritsch, 2019), Davis and Stanovsek's (2021) digital ethnography provides crucial insight on the frictive nature of accessibility, challenging the mainstream assumption that accessibility is universally experienced by all disabled people everywhere. Additionally, Denhert's (2022) new materialist study of sex robots through an HMC lens rallies researchers in the subfield to consider crip and critical disability analyses of human-machine relationalities.

While this existing HMC work addresses the violent encoding of ableism in human-machine relations, previous writing does not identify how crip computational and design practices can mutually inform human-machine relations in complex, expansive ways. We call for an HMC approach that imagines disability as a theoretical and methodological intervention for broadening and deepening our understanding of human-machine relations. For instance, both Fritsch and Hamraie's (2019) articulation of crip technoscience and Rauchberg's (2022) extended provocation of neuroqueer technoscience offer exciting possibilities for HMC researchers. Notably, co-author of this paper, Rauchberg (2022)'s, invocation of neuroqueer technoscience offers salient nodes for empirical researchers to study disability and self-expression in human-machine relations. Her provocations call for integrating disabled expertise and leadership in the development of human-machine relationships (p. 383). Such methodological offerings can support HMC scholarship to think beyond siloed user-machine divides, and begin to think through the nuanced, complex relationships emerging from computer and human engagements.

Prioritizing human communication and social interactionist approaches, we propose that previous work in the field can also be nuanced with critical feminist situated (Haraway, 1987; Suchman, 2006) and crip approaches to technology and user-experience. Williams et al.'s (2023) introduction of counterventions draws from feminist standpoint theory and crip HCI (Williams et al., 2021) to develop practices for addressing ableism in intervention-based computing systems. The authors identify five steps for engaging in feminist and crip counterventions to substantiate more ethical human-computer engagements: reflexively engaging with stakeholders; critically examining the disconnects between a researcher's intervention and a user's access needs; interrogating the intervention's ideological orientations; developing an intervention that engages in self-critique; and privilege stakeholder experience and leadership in the design and intervention process (Williams et al., 2023, p. 7). Williams et al.'s (2023) discussion of counterventions demonstrates how our propositions for feminist and crip approaches to the study of HMC are mutually constitutive—used together, these

critical theoretical framings introduce exciting possibilities for HMC research to consider questions of power and justice.

Finally, the invocation of crip time transcends past nondisabled notions of time, embodiment, and technology, offering theoretical and paradigmatic contributions to HMC scholarship. Crip time (Kafer, 2013) departs from able-bodied and neurotypical conceptualizations of time: bending the clock to meet people where they are (p. 26). Instead, crip time works alongside technology to provide interdependence for disabled users. Crip time disrupts technoableist (Shew, 2020) uses of assistive tech as a curative measure. Doing so reorients them toward an interdependent flow of relationality between machine and disabled users. Crip HCI considers interdependent transformative alternatives for assistive tech, establishing important nodes for HMC. For example, as a way to challenge assimilative practices in machine learning in "ABLE," a participatory gaming project for older adults with dementia, Gardner et al. (2021) propose training their prototype's inertial measurement unit (IMU) sensors to understand multiple types of movements instead of forcing users to assimilate toward a "normative" style. Moreover, crip time as a theoretical framing offers creative, critical methodologies for interrogating the relationship between ableism, colonialism, and human-machine relationalities through digital storytelling (Dion-Fletcher, 2019), video performance (Lazard, 2018), and autoethnography (Forlano, 2017; Rauchberg, 2022). This practice departs from postpositivist and quantitative work, offering multiperspectival, critical, and context-specific possibilities for the future of HMC.

Proposition 3: Feminist Posthuman Approaches Addressing Gender, Embodiment, and Interaction in Human-Machine Studies

Critical cyberfeminism[4] is a rich area of scholarship within and beyond the field of communication that probes the relationship between feminism and cyberspace, the internet, and digital technologies, beginning with new media but advancing to consider platforms, networks, and systems. It is rarely addressed in HMC, excepting occasional references to Haraway's (1987) famous concept of the cyborg where its usages tend to dismiss the term's grounding in critical feminist race approaches. While cyberfeminism may be considered a densely theoretical framework, we work here to expose key considerations that will make the frameworks approachable.

Where some forms of cyberfeminism address the internet as a space that liberates subjects from social constructs (gender, race, disability), and levels access, critical cybernetic feminism exposes these ideas as mythology. Haraway (1987) establishes the cyborg, referencing Third World feminists' strategic work at the margins, that trounce patriarchal power operating through technologies. The cyborg human-machine hybrid rejects humanist binaries that falsely polarize humans and machines, and positions women (and others) as lacking, deficient, natural, weak, and irrational, and machines as unlively and inert. For Haraway, the networked worlds of computers, infected by origin stories (e.g., Christianity and patriarchy) and the informatics of domination (structural and theoretical forces devoted to binaries) offer potentials for potent human-machine fusions, and transgressive freedoms.

From Feminist STS to Patterns of Intra-Action

Cybernetic feminism shares with Feminist STS approaches informed by situated and robust sociocultural analyses that complicate understandings of interactivity and debunk techno-determinist assumptions. In her landmark book, *Situated Actions*, Suchman (2007) shows that users rely on human conversational norms, rather than machinic instructional logic, to understand how to interact with machines (p. 283). This revelation, only sometimes referenced in HMC, should inform how researchers set up studies of humans reading and responding to machinic scripts.

Many cybernetic feminists, particularly Hayles (1999), Barad (2007), and Braidotti (2013) have expanded upon Haraway's cyborg. Their scholarship offers epistemological challenges to how networks are imagined, referencing the distributed system model as one where subjects and actors mutually or intra-inform, in ongoing dynamics that tend to reproduce embedded social and structural bias. These approaches, further discussed below, offer metaphysical challenges to how scholars imagine networks, actors, and interaction and troubles HMC research that assumes systems and networks communications are static, universal, or exist within singular spheres of power. Specifically, Hayles contends that machine and human cognition inter-form networks in a process of distributed cognition (or deep attention). Haraway (2006) disrupts the idea of mutually informed intelligibility in network studies, offering an alternative where humans and machines inter-inform to create meaning and knowledges over time. Barad (2007) counters with the provocative concept of intra-action, derived from quantum physics, contending that humans, machines (and all stuff) co-evolve in disparate, unpredictable ways that reflect the layers of (emerging) context that inform all (animate and inanimate) actors and objects. There is great relevance here to HMC: Barad's (2007) "ethico-onto-epistemological" approach complicates ANT by interrogating the apparatus within material and social realities that evolve in shifting relations. The potency of the concept of intra-action is illustrated in Gardner and Jenkins (2015), who used it to understand how participants read data visualized by consumer biometric devices; they discovered that participants engaged in complex intra-actions with the machinic representations, including converting them into narratives inspired by their embodied experience, and the *virtual* pasts of their own lives.

As well, Braidotti (2013) and Barad (2007) disrupt assumptions that communication (or interaction) dynamics occur in stable time/space realities. Instead, they show that geopolitical relations impact all human-machine interactions. Challenging our understanding of matter as inert, Bennett (2010) complicates it as vibrant, engaging an ecological sensibility, and expanding Latour's (2007) ANT approach with Deleuze and Guattari's (1980) assemblage theory.[6] Her feminist, situated, embodied approach augments ANT theory, enabling analysis of how machines and technologies impact intelligibility, agency, interaction, and innovation. These conceptual frameworks disavow coherent networks and any universal, objective, or innocent subject (commonly assumed in HMC). These approaches can be used to explore, practically, how the layered dynamics of power and/or privilege can impact human-machine interactions and communications, subjectivity, to produce (or otherwise inform) embodiment, agency, or automation, or in metaphysical studies speculating how subjects come into being or becoming. These interventions challenge well-used approaches, such as ANT, and offer innovative frameworks that complicate how we address context

(e.g., adding geopolitical and other time/space dimensions), and finally, inject greater attention to how embodiment impacts agency and interaction, opening HMC into these vibrant theoretical conversations within and beyond communication studies.

Evidence and Potentials of Feminist Posthumanism in HMC

HMC has not rigorously engaged feminist cybernetic theory and continues to engage with critical feminist approaches only sparsely. Still, we are encouraged by the editors' call to theorize beyond "binary" gender and discourse models, to probe discourses of power and privilege, and engage feminist and disability frameworks, which will bring more critical analysis of the normative body to HMC. As well, the post humanist challenge to the antiquated human-machine dyad is well represented in some ANT studies in HMC and researchers have pressured traditional ontological and epistemological assumptions in ANT. Banks and De Graaf's (2020) study of robots, for example, probes the ontological nature of nonhuman actors' understanding of linguistic capability. Guzman (2020) presses ontological questions regarding how social representations of machines impact human experiences with machine's potential communication abilities. Additionally, Sandry's (2015) challenge to ontological habits of ascribing human to human communication patterns to robots engages Hayles (1999), recognizing the messy reality of human communication as both distinct from and entwined with robot communication. The authors reevaluate the human-robot boundary as permeable (Fortunati & Edwards, 2021, p. 15, quot. Sandry, 2015), provoking Hayle's (1999) interest in understanding humans and computers as dynamic partnerships.

We propose more such challenging feminist ANT approaches in HMC, which complicate essentialist and binary gender assumptions and asymmetric framings of gender to technology (Lagesen, 2012). They work to destabilize key analytic concepts in HMC (life, object, agent) and address how material (e.g., biological, physiological) and social relations intra-inform, to trouble how we understand subjectivity, perception, and cognition in human-machine interactions and spaces. Usefully, a feminist post humanist approach can also posit flaws in post-anthropological assumptions. An example is Braidotti's response (2013) to Verbeek's (2008) popularly cited theory of nonhuman agency, whereby technologies actively contribute to how humans conceptualize power and address ethical questions in human-machine relations. Braidotti challenges that Verbeek problematically applies human ethics to technology, shifting moral intentionality from an autonomous transcendental consciousness to technological artifacts, suggesting this devalues complex (and diverse) human positions. This type of intervention exemplifies the potentials for feminist cybernetics to challenge theory habitually referenced and reified in HMC, again providing useful pressure that tests, deepens, and expands the terrain of HMC research.

Conclusion

As human-machine communication (HMC) scholarship seeks to expand its theoretical and paradigmatic approaches, there is an unprecedented opportunity to learn from and engage with feminist, critical race, postcolonial, and crip frameworks, arising from within and beyond communication studies. We propose that HMC researchers should expand the repertoire of both theory and paradigm to complicate normative conceptualizations of

actors, interactivity, interaction, agency, to challenge habituated HMC theory, and engage micro and macro contexts to trace the messy operations of power vis a vis various forces, and diverse temporal and spatial planes. The feminist, critical race, postcolonial, and crip scholarship we have offered assists scholars to locate and trouble conventional ontological and epistemological assumptions; we recommend these approaches to update references to conventional HMC cannon and to oft-cited Western critical and postmodern theories in HMC research.

While decidedly underutilized in HMC, feminist, critical race, postcolonial, and crip approaches offer strategies to interrogate material artifacts, data, technologies, practices, and framings that can innovate research designs, methods, and insert new ethical considerations. This research would expand HMC terrain to include greater and richer considerations of gender, race, disability, and postcolonial manifestations of human-machine dynamics. These dynamic interventions enable scholars to address the material, ontological, and epistemological realities and contexts shaping regional and global human-machine dynamics, thus encouraging HMC research to be more global, situated, nuanced, and relevant. In moving more intentionally into the experiential and situational world of diverse global actors and dynamics, HMC shifts our work into the space of emerging human and communication practices. HMC scholarship reflecting this breadth and depth would outfit scholars with ongoing agility, and to have greater relevance and impact within communication and allied fields, including HCI, digital humanities, STS, and beyond.

Notes

1. We follow Lindlof and Taylor's (2017) definition of theory as " . . . any systematically developed account of communication that seeks to explain what it is and how it works" (p. 50).
2. Our use of the word intersectional recognizes both Crenshaw's (1990) coining of the term and formative scholarship by Third World feminists (Anzaldúa, 1987; Combahee River Collective, 1977; Lorde, 1984) describing how layered social identity factors generate exponential practices and systems of bias.
3. We present paradigm as "fundamental . . . frames of reference that we use to justify our choices in designing and conducting communication research" (Lindlof & Taylor, 2017, p. 6).
4. Notably guest editors of *HMC* Volume III (2021) sought research emerging from the COVID-19 pandemic; the issue took a more practical approach, asking scholars to produce *holistic discourse* analyzing how partnerships with humans make possible, recognize, or shape communicable machines. Because the *HMC* editors did not inject a call for innovation into Volume III, we do not address its content in this article.
5. Cyberfeminism was a term invented by Sadie Plant, as explained by Bassett (1997) to denote a post-human insurrection, where an emergent system of women and computers revolts against patriarchy as a worldview and material reality that seeks to subdue them.
6. Bennett (2010) seeks to understand how all things are connected, complicating traditional notions of relationality via a feminist material analysis of embodiment

(desire, sensations). Her positive ontology approach probes the vibrancy of matter, challenges life/matter boundaries, and understands the political contributions of nonhuman matter, as stretching "received concepts of agency, action, and freedom" (p. viii).

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References

Alper, M. (2017). Giving voice: Mobile communication, disability and inequality. MIT Press.

Anzaldúa, G. (1987). *Borderlands/La Frontera: The New Mestiza.* Aunt Lute Books.

Bailey, M., & Trudy. (2018). On misogynoir: citation, erasure, plagiarism. *Feminist Media Studies, 18*(4), 762–768. https://doi.org/10.1080/14680777.2018.1447395

Banks, J., & De Graaf, M. M. A. (2020). Toward an agent-agnostic transmission model: Systematizing anthropocentric and technocentric paradigms in Communication. *Human-Machine Communication*, *1,* 19–36. https://doi.org/10.30658/hmc.1.2

Banks, J., Koban, K., & Chauveau, P. de V. (2021). Forms and frames: Mind, morality, and trust in robots across prototypical interactions. *Human-Machine Communication, 2,* 81–103. https://doi.org/10.30658/hmc.2.4

Banner, O. (2019). Technopsyence and Afro-Surrealism's cripistemologies. *Catalyst: Feminism, Theory, Technoscience, 5*(1), 1–29. https://doi.org/10.298968/cftt.v5i1.29612

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Bassett, C. (1997). With a little help from (our) new friends? *Mute, 1*(8). https://web.archive.org/web/20121113103214/https://www.metamute.org/editorial/articles/cyberfeminism-spcl-little-help-our-new-friends

Benjamin, R. (2019). *Race after technology: Abolitionist tools for the New Jim Code*. Polity.

Bennett, J. (2010). *Vibrant matter: A political ecology of things*. Duke University Press.

Braidotti, R. (2013). *The posthuman*. Polity.

Brilmyer, G., & Lee, C. (2023). Terms of use: Crip legibility in information systems. *First Monday, 28*(1–2). https://doi.org/10.5210/fm.v28i1.12935

Britton, L., & Paehr, I. (2021). Con(fuse)ing and re(fuse)ing barriers. *APRJA: A Peer-Reviewed Journal about Research Refusal*, *1*(1), 1–14. https://doi.org/10.7146/aprja.v10i1.128188

Browne, S. (2015). *Dark matters: On the surveillance of Blackness*. Duke University Press.

Buolamwini, J., & Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. *Proceedings of Machine Learning Research*, *81*, 77–91. http://proceedings.mlr.press/v81/buolamwini18a.html?mod=article_inline

Coleman, B. (2009). Race as technology. *Camera Obscura, 24*(1), 177–207. https://doi.org/10.1215/02705346-2008-018

Coleman, B. (2021). Technology of the surround. *Catalyst: Feminism, Theory, Technoscience, 7*(2), 1–21. https://doi.org/10.29868/cftt.v7i2.35973

Combahee River Collective. (1977). The Combahee River collective statement. https://web.archive.org/web/20201109143613/https://www.blackpast.org/african-american-history/combahee-river-collective-statement-1977/

Coráñez Bolton, S. (2023). *Crip colony: Mestizaje, US imperialism, and the queer politics of disability in the Philippines*. Duke University Press.

Crenshaw, K. (1990). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review, 43,* 1241–1293.

Davis, D. Z., & Stanovsek, S. (2021). The machine as an extension of the body: When identity, immersion and interactive design serve as both resource and limitation for the disabled. *Human-Machine Communication*, *2*, 121–135. https://doi.org/10.30658/hmc.2.6

Dehnert, M., & Leach, R. B. (2021). Becoming human? Ableism and control in Detroit: Become human and the implications for human-machine communication. *Human-Machine Communication, 2*, 137–152. https://doi.org/10.30658/hmc.2.7

Deleuze, G., & Guattari, F. (1980). *A thousand plateaus*. University of Minnesota Press.

Denhert, M. (2022). Sex with robots and human-machine sexualities: Encounters between human-machine communication and sexuality studies. *Human-Machine Communication*, *4*, 131–151. https://doi.org/10.30658/hmc.47

Dion-Fletcher, V. (2019). Own your cervix. *Canadian Journal of Disability Studies, 8*(1), 160–163. https://doi.org/10.15353/cjds.v8i1.475

Edwards, A. P. (2018). Animals, humans, and machines: Interactive implications of ontological classification. In A. L. Guzman (Ed.), *Human-machine communication: Rethinking communication, technology, and ourselves* (pp. 29–59). Peter Lang. https://doi.org/10.3726/b14399

Forlano, L. (2017). Data rituals in intimate infrastructures: Crip time and the disabled cyborg body as an epistemic site of science. *Catalyst: Feminism, Theory, Technoscience*, *3*(2), 1–28. https://doi.org/10.28968/cftt.v3i2.28843.17

Fortunati, L., & Edwards, A. (2020). Opening space for theoretical, methodological, and empirical issues in human-machine communication. *Human-Machine Communication*, *1*, 7–18. https://doi.org/10.30658/hmc.1.1

Fortunati, L., & Edwards, A. (2021). Moving ahead with human-machine communication. *Human-Machine Communication*, *2,* 7–28. https://doi.org/10.30658/hmc.2.1

Fortunati, L., & Edwards, A. (2022). Framing the psycho-social and cultural aspects of human-machine communication. *Human-Machine Communication, 4*, 7–26. https://doi.org/10.30658/hmc.4.1

Gajjala, R. (2010). Placing South Asian digital diasporas in second life. In T. K. Nakayama & R. T. Halualani (Eds.), *The handbook of critical intercultural communication* (pp. 517–533). Wiley & Sons.

Gardner, P., & Jenkins, B. (2015). Bodily intra–actions with biometric devices. *Body & Society*, *22*(1), 1–28. https://doi.org/10.1177/1357034X15604030

Gardner, P., & Kember, S. (2021). Introduction: Probing the system: Feminist complications of automated technologies, flows, and practices of everyday life. *Catalyst: Feminism, Theory, Technoscience, 7*(2), 1–15. https://doi.org/10.28968/cftt.v7i2.36962

Gardner, P., & Rauchberg, J. (2023). Feminist, postcolonial, and crip approaches to human-machine communication methodology. In A. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 252–260). SAGE.

Gardner, P., Surlin, S., Akinyemi, A., Rauchberg, J., Zheng, R., McArthur, C., Papaioannu, A., & Hao, Y. (2021). Designing a dementia-informed, accessible, co-located gaming platform for diverse older adults with dementia, family, and carers. In Q. Gao & J. Zhou (Eds.), *Human aspects of IT for the aged population: Supporting everyday life activities* (pp. 58–77). Springer, Cham. https://doi.org/10.1007/978-3-030-78111-8_4

Gibbs, J. L., Kirkwood, G. L., Fang, C., & Wilkenfield, J. N. (2021). Negotiating agency and control: Theorizing human-machine communication from a structurational perspective. *Human-Machine Communication, 2*(1), 153–171. https://doi.org/10.30658/hmc.2.8

Gotkin, K. (2019). Crip club vibes: Technologies for new nightlife. *Catalyst: Feminism, Theory, Technoscience*, *5*(1), 1–7. https://doi.org/10.28968/cftt.v5i1.30477

Gunkel, D. J. (2022). The symptom of ethics: Rethinking ethics in the face of the machine. *Human-Machine Communication*, *4*, 67–83. https://doi.org/10.30658/hmc.4.4

Guzman, A. L. (2018). What is human-machine communication, anyway? In A. L. Guzman (Ed.), *Human-machine communication: Rethinking communication, technology, and ourselves* (pp. 1–29). Peter Lang.

Guzman, A. L. (2020). Ontological boundaries between humans and computers and the implications for human-machine communication. *Human-Machine Communication*, *1*, 37–54. https://doi.org/10.30658/hmc.1.3

Guzman, A. L., & Lewis, S. C. (2020). Artificial intelligence and communication: A human-machine communication research agenda. *New Media & Society*, *22*(1), 70–86. https://doi.org/10.1177/1461444819858691

Hamraie, A., & Fritsch, K. (2019). Crip technoscience manifesto. *Catalyst: Feminism, Theory, Technoscience*, *5*(1), 1–31. https://doi.org/10.28968/cftt.v5i1.29607

Haraway, D. J. (1987). A manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s. *Australian Cultural Studies*, *2*(4), 1–42. https://doi.org/10.1080/08164649.1987.9961538

Haraway, D. J . (2006). *When species meet*. University of Minnesota Press.
Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics.* University of Chicago Press.
Hegde, R. S. (2011). *Circuits of visibility: Gender and transnational media cultures*. NYU Press.
Iliadis, A. (2023). Critical and cultural approaches to human-machine communication. In A. Guzman, R. McEwan, & S. Jones (Eds.), *The SAGE handbook of human–machine communication.* SAGE.
Jackson, L., Haagaard, A., & Williams, R. M. (2022, April 19). Disability dongle. *Platypus: The CASTAC blog.* https://blog.castac.org/2022/04/disability-dongle/
James, W. (1991). *Pragmatism.* Prometheus Books.
Jarvis, C. M., & Quinlan, M. M. (2022). IVF so White, so medical: Digital normativity and algorithm bias in infertility on Instagram. *Human-Machine Communication, 5*, 133–149. https://doi.org/10.30658/hmc.5.6
Jasanoff, S. (2015). One. Future imperfect: Science, technology, and the imaginations of modernity. In S. Jasanoff & S. Kim (Ed.), *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power* (pp. 1–33). University of Chicago Press. https://doi.org/10.7208/9780226276663-001
Jerreat-Poole, A. (2022). Virtual reality, disability, and futurity: Cripping technologies in Half Life: Alyx. *Journal of Literary and Cultural Disability Studies*, *16*(1), 59–75. https://muse.jhu.edu/article/847103/summary
Kafer, A. (2013). *Feminist, queer, crip*. Indiana University Press.
Kumar, S., & Parameswaran, R. (2018). Charting an itinerary for postcolonial communication and media studies. *Journal of Communication*, *68*(2), 347–358. https://doi.org/0.1093/joc/jqx025
Lagesen, V. A. (2012). Reassembling gender: Actor-network theory (ANT) and the making of the technology in gender. *Social Studies of Science, 42*(3), 442–448.
Latour, B. (2007). *Reassembling the social: An introduction to actor-network-theory.* Oxford University Press.
Lazard, C. (2018). Crip time [Video file]. https://vimeo.com/clazard
Lindlof, T. R., & Taylor, B. C. (2017). *Qualitative communication research methods* (4th ed.). SAGE.
Liu, J. (2021). Social robots as the bride? Understanding construction of gender in a Japanese social robot product. *Human-Machine Communication*, *2*, 105–120. https://doi.org/10.30658/hmc.2.5
Lombard, M., & Xu, K. (2021). Social responses to media technologies in the 21st century: The media are social actors paradigm. *Human-Machine Communication*, *2*, 29–55. https://doi.org/10.30658/hmc.2.2
Lorde, A. (1984). *Sister outsider: Essays and speeches.* Crossing Press.
Makady, H., & Liu, F. (2022). The status of human-machine communication research: A decade of publication trends across top-ranking journals. In M. Kurosu (Ed.), *Human-computer interaction: Theoretical approaches and design methods*. HCII 2022. Lecture notes in computer science (pp. 83–103). Springer. https://doi.org/10.1007/978-3-031-05311

McRuer, R. (2006). *Crip theory: Cultural signs of queerness and disability*. NYU Press.
Nakamura, L. (2002). *Cybertypes: Race, ethnicity, and identity on the internet.* Routledge.
Nakamura, L., & Chow-White, P. (2012). *Race after the internet*. Routledge.
Nass, C., Steuer, J., & Tauber, E. R. (1994). Computers are social actors. *CHI '94: The 1994 ACM Conference on Human Factors in Computing Systems*, 72–78. https://doi.org/10.1145/191666.191703
Noble, S. U. (2018). *Algorithms of oppression: How algorithms reinforce racism*. NYU Press.
Parameswaran, R. (2011). E-Race-ing color: Gender and transnational visual beauty economies in India. In R. S. Hegde (Ed.), *Circuits of visibility: Gender and transnational media cultures* (pp. 68–88). NYU Press.
Rauchberg, J. S. (2022). Imagining a neuroqueer technoscience. *Studies in Social Justice, 16*(2), 370–388. https://doi.org/10.262522/ssj.v16i2.3415
Richards, R. J., Spence, P. R., & Edwards, C. C. (2022). Human-machine communication scholarship trends: An examination of research from 2011 to 2021 in communication journals. *Human-Machine Communication, 4,* 45–65. https://doi.org/10.30658/hmc.4.3
Sandoval, C. (2000). *Methodology of the oppressed*. University of Minnesota Press.
Sandry, E. (2015). *Robots and communication*. Palgrave-MacMillan.
Shew, A. (2020). Ableism, technoableism, and future AI. *IEEE Technology and Society Magazine*, *31*(2), 40–85. https://doi.org/10.1109/MTS.2020.2967492
Shome, R. (2016). When postcolonial studies meets media studies. *Critical Studies in Media Communication*, *33*(3), 245–263. https://doi.org/10.1080/15295036.2016.1183801
Shome, R., & Hegde, R. S. (2002). Postcolonial approaches to communication: Charting the terrain, engaging the intersections. *Communication theory*, *12*(3), 249–270. https://doi.org/10.1111/j.1468- 2885.2002.tb00269.x.21
Sick In Quarters. (2020, December 31). SiQ for 8Ball Community TV [Video file]. https://www.youtube.com/watch?v=3nRjDyXmK2c
Sins Invalid. (2019). *Skin, tooth, and bone: The basis of movement is our people—A disability justice primer* (2nd ed.). Sins Invalid.
Spinda, J. W. (2017). Communication and technology. In M. Allen (Ed.), *The SAGE encyclopedia of communication research methods* (pp. 174–177). SAGE.
Stahl, B., & Edwards, C. (2017). Human-computer interaction. In M. Allen (Ed.), *The SAGE encyclopedia of communication research methods* (pp. 671–674). SAGE.
Sterne, J. (2019). Ballad of the dork-o-phone: Towards a crip vocal technoscience. *International Journal of Interdisciplinary Voice Studies, 4*(2), 179–189. https://doi.org/10.1386/ijvs_00004_1
Suchman, L. (2006). *Human-machine reconfigurations: Plans and situated actions*. Cambridge University Press.
Sum, C. M., Alharbi, R., Spektor, F., Bennett, C. L., Harrington, C. N., Spiel, K., & Williams, R. M. (2022). Dreaming disability justice in HCI. *CHI EA '22: Extended Abstracts of the 2022 Conference on Human Factors in Computing Systems*, 1–5. https://doi.org/10.1145/3491101.3503731
TallBear, K. (2013). *Native American DNA: Tribal belonging and the false promise of genetic science*. University of Minnesota Press.

Verbeek, P. (2008). Cyborg intentionality: Rethinking the phenomenology of human-technology relations. *Phenomenology and the Cognitive Sciences*, *7*, 387–395. https://doi.org/10.1007/s11097-008- 9099-x

Williams, R. M., Boyd, L. E., & Gilbert, J. E. (2023). Counterventions: A reparative reflection on interventionist HCI. *CHI '23: Proceedings of the 2023 Conference on Human Factors in Computing Systems*, 1–11. https://doi.org/10.1145/3544548.3581480

Williams, R. M., Ringland, K., Gibson, A., Mandala, M., Maibaum, A., & Guerreiro, T. (2021). Articulations toward a crip HCI. *Interactions*, *28*(3), 28–37. https://doi.org/10.1145/3458453

Wilson, S. R. (2017). Selection of methodology. In M. Allen (Ed.), *The SAGE encyclopedia of communication research methods* (pp. 1020–1023). SAGE.

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COMMUNICATION