Computer Supported Cooperative Work (CSCW)
https://doi.org/10.1007/s10606-025-09518-0

RESEARCH

Reframing Diversity in Computing on the Basis of Genders

Jennifer A. Rode*[1], Phoebe O. Toups Dugas[2] & Andruid Kerne[3]
*[1]*Knowledge Lab, University College London, London, UK (E-mail: jen@acm.org);* [2]*Department of Human-Centred Computing, Faculty of Information Technology, Monash University, Melbourne, VIC, Australia (E-mail: phoebe.toupsdugas@monash.edu);* [3]*Department of Computer Science, University of Illinois Chicago, Chicago, IL, USA (E-mail: andruid@ecologylab.net)*

Accepted: 4 April 2025

Abstract. In this paper, we revisit the issues surrounding the lack of gender diversity in computing and build a theory on the roles and effects of genders in computing. Our intention is to transform human experiences with computing technologies to more equitably reflect and represent diversity. To support gender diversity in design, we work to create an integrated trans-feminist theory. In doing so we draw from diverse fields, including English, psychology, philosophy, cultural theory, law, medicine, and feminist, queer, disability, indigenous, post-colonial, Black, and Chicana studies. We show how and why marginalized people need to develop our own languages and voices as a step in empowering our identities. We assemble quantitative data showing the paucity of people with historically marginalized genders in computer science education and in our best papers. We use the participation gap in computing, combined with the mental health impact, to argue that computing, as a field, needs to critically examine our cis/heteronormative tendencies, which perpetuate a vicious cycle of erasure, and instead frame scholarship in terms of gender identities and presentations.

Keywords: Gender, LGBTQIA, Queer, Theory, Argument, Broadening participation, Diversity

1 Introduction

Historically, scholars raised the 'woman problem in science' (Harding 1986). This is well-intentioned, but problematic. We re-frame to refer to the problem of computing being dominated by white, cis,[1] heterosexual men. Our goal is to

[1] *Cisgender* and *cis* are terms that began use in the 1990 s to describe a person whose individual's gender identity (This term comes from (Harding 1986) and includes both gender presentation and identity which we discuss later.) corresponds to their sex assigned at birth. The prefix *trans-* is Latin, meaning 'the other side of', as opposed to *cis-*, meaning 'on this side of'. For those interested, more information can be found at: (Stryker 2017; Scheuerman et al. 2020; PBS Independent Lens 2023) and references throughout this work.

Published online: 11 June 2025

support a transformation of human experiences of computing technologies in order to more equitably reflect and represent diversity in how, specifically, *historically marginalized gender identities and presentations* experience gender identity. Our position is that by historically marginalized gender identities and presentations, we mean those that are not cis-masculine, e.g., trans people, non-binary people, agender people, genderqueer people, and women. We identify structural exclusions of historically marginalized gender identities and gender presentations in Computer Supported Cooperative Work (CSCW) and beyond.

We do so through an intersectional context, focusing on gender identity and presentation alongside race, disability and others, which Collins (1990) refers to as the 'matrix of domination'. In doing so we draw on both on foundational (Crenshaw 2017; Collins 1990) and more modern HCI (Erete et al. 2018) intersectionality theory. In this paper, we revisit diversity issues with an intersectional lens to build new theory on the roles and effects of genders in computing, with a goal of creating equity.

In CSCW, and in science, technology, engineering and mathematics (STEM), more broadly, much well-intentioned work has addressed the need for gender equity, diversity, and inclusion (United States' National Science Foundation n.d.; Computing Research Association's Committee on Widening Participation in Computing Research 2025; UK Research and Innovation 2025; European Commission n.d.). These efforts have been substantially based on Liberal Feminism, an older school of thought, which has argued that men and women would attain the same achievements if both[2] were given the same opportunities (Tong and Botts 2018).

Liberal Feminism predates much queer theory, is heteronormative, and excludes trans identities (Stryker 2017). Further, this approach fails to acknowledge that people *perform* gender and that institutions and technologies, *themselves*, can be gendered, disadvantaging those who are historically marginalized. We amalgamate queer and feminist theory to show how and why this has not worked out so far; bringing them together enables us to work toward equity.

1.1 Gender theory in CSCW

We are not the first to theorize about gender in CSCW. We build on diverse prior work in our field that addresses non-cis-masculine identities (Ahmed et al. 2016; Nova et al. 2021; Kannabiran et al. 2011; DeVito et al. 2020; Haimson 2017; Light 2011; Scheuerman et al. 2021; Spiel et al. 2019a; 2019b). We also build on Feminist Theory by Bardzell (2010) and Rode (2011b); and, in turn, earlier

[2] We emphasize that, in addressing historically marginalized gender identities and gender presentations, we do *not* consider binary gender to be the norm. In this case, we are referring to how prior work represents identity.

CSCW scholars, including Wagner (1994), Robertson (2000), and Bratteteig (2002), who laid out imperatives of gender for truly participatory design.

In the present CSCW literature, we see scholarship on queer studies and more traditional gender studies. However, we observe that these communities are hardly talking to each other. For instance, in the 69 page article, 'Gender-Inclusive CSCW Research and Design: A Conceptual Review,' addressing trans and non-binary identities is relegated to future work. At the same time, Taylor et al. (2024) provide a comprehensive literature review addressing LGBTQIA +identities, but does not connect it with other marginalized identities such as cis women. Yet, we believe that queer and feminist CSCW communities have common causes for social good regarding diversifying computing. Just as the coal miners and the LGBTQIA +community came together in England during the mining strikes (Warchus (Director) 2014; Kelliher 2014), and the Black and Jewish communities historically came together in the American Civil rights community (Religious Action Center of Reform Judaism n.d.), we call on people in computing from historically marginalized gender identities and presentations to come together to encourage gender diversity in computing beyond its overwhelmingly cis-masculine base.

We propose a strategic alliance among people with historically marginalized gender identities and presentations. We are aware—both from literature and our own positionalities—that there is tremendous sensitivity in the non-binary community about efforts to bridge these marginalized communities (Crossley 2019; Just Between Us 2019). Yet, while we recognize these communities are diverse and have different needs (in face of the current prevailing sentiment against diversity), we feel it is critical to move past our differences to pursue strategic ally-ship in the face of the patriarchy. We acknowledge gender identity and presentation are complex and personal (Butler 1997), and that people present themselves using a range of femininities, masculinities, and gender divergences. Our intention is to bring together people with gender identities and presentations that are historically marginalized in computing, not to erase differences. We recognize that sometimes these groups have divergent needs.

1.2 Contribution

In this paper we strive to make two contributions. First, we provide a critique of how Liberal Feminism is inadequate for computing. Second, we argue for the need of a new form of feminism that allows for all gender identities and presentations across their multi-dimensional landscape. We then move to use this integrated trans-feminist theory as the starting point of a call for computing to move beyond the cis-masculine norm, so that it includes all people with

gender identities and presentations that have been historically marginalized. We make two parallel arguments:

1. that computing has been significantly hostile to historically marginalized gender identities and gender presentations[3]; and
2. that computing needs to open up to the ever-expanding range of gender identities and presentations.

Butler, in their most recent book, discusses the 'phantasm of gender', which they frame in terms of society's fear of discussing gender (Butler 2024). As we have been working the last four years to get this paper to publication, we have seen our work get caught up in cultural debates over gender, offending both feminists and trans people. We sincerely aim to offend neither—our positionalities include both. We ask our readers to read empathetically as we negotiate this tightrope.

1.3 Foundations & evolution

We will cite old feminist theory and studies of women in science and tech that are sometimes gender-essentialist. We think that even problematic works can have value, even if they only address the rights of cis women. Instead, we will extend such works' relevance to a world that is not heteronormative and use its arguments to advance the rights of gender-divergent people.[4] Conversely, we take queer theory and interpret and show its relevance to cis women. We are working to build an integrated trans-feminist theory, a theoretical coalition against patriarchy in computing.

Our contribution is based in expanding prior arguments to integrate queer theory with feminism to trouble[5] implicit and explicit treatments of gender in CSCW. As numerous scholars have observed, much computer science (CS) literature on gender fails to consider how gender is not a simple binary and needs to include people of historically marginalized gender identities and presentations (e.g., Light (2011); MacArthur et al. (2021); Rode (2011b); Spiel et al. (2019a, b); Haimson (2025); Bardzell et al. (2012); Burnett et al. (2016); Taylor et al. (2024)).

We review and integrate gender-theoretical foundations, featuring Judith Butler, Laurent Berlant and Michael Warner, and Sandra Harding. Butler contributes understandings of how gender is socially constructed through performance, and not just based on sexual organs (Butler 2006), even while their theory around

[3] We acknowledge this hostility is more common in the more technical areas of CSCW and less so in the design and user studies communities, but also that it reflects larger attitudes throughout computing.

[4] We use the term 'gender-divergent people' throughout this paper when we are talking specifically about literature on third gender identities and presentations (Dawson 2022).

[5] 'Trouble' is a word used when scholarship engages queer theory to explore issues from a non-binary and non-cisgender perspective. We believe its origins lay in the Civil Rights movement and advocacy of 'good trouble' as a productive social force for change (Porter 2020).

trans identity is problematic (Section 4). Berlant and Warner (1998) develop the concept of [cis/]*heteronormativity* (Section 3), the omnipresent underlying cultural, social, and political fog that invisibly privileges cisgender heterosexuality over LGBTQIA +identities (Berlant and Warner 1998). Harding offers foundations in the operational concepts of gender symbolism, individual gender, and structural gender (Harding 1986).

In order to combat gender trouble[6]—how certain gender identities and presentations have been marginalized—in computing, we integrate diverse perspectives on identity and apply them to help understand CSCW and STEM. A range of other scholars—e.g., Anzaldùa (1992), Hooks (1989), Rich (2013), Gilligan (1993), Thomson (1997), West and Fenstermaker (1995), Booker (2019), Daly (2016)—have articulated the importance of language in how people with traditionally marginalized genders develop identity that overcomes marginalization and gains empowerment (Section 7.1.1). We invoke Anzaldùa's (1992) emphasis on the need to blend one's own linguistic sources and personal languages to overcome prevailing impositions of silence and oppression. A contribution of this paper is thus to curate diverse gendered vocabularies that people use to name themselves and their activities. We will extend Anzaldùa to argue that this expansive vocabulary, which may seem like unnecessary jargon to outsiders, is necessary to overcome cis/heteronormativity, to empower gender-diverse CSCW research and practice through its unique power for (self-)representation.

Our reframing of gender in CS counters predominant, Liberal Feminist (Tong and Botts 2018), gender diversity arguments in computing, which focus on simply increasing the number of women (Section 5). We expand the scope by making a more structural argument addressing historically marginalized gender identities and presentations. Addressing women is necessary, but not sufficient. The people who are not cis, not men, not heterosexual, not able-bodied, and/or not white, who are being underrepresented by computing, feature intersectional differences, differences in gender presentation, and differences in experience. These differences fundamentally affect the structure and terms of how we need to approach diversity in computing.

1.4 Structure

In the next section, we present our own positionalities. Next, we build and integrate gender theoretical foundations. Then, we contrast gender and sex, critiquing prevailing binary gender systems. We use the theory to unpack instances in CSCW and, more broadly, STEM. We use gender (in)authenticity to critique 'technology as masculine culture' (Wajcman 1991), and expand this to discuss what it means for people with

[6] In this instance we are not referring to Lewis's use, but Judith Butler with their book Gender Trouble (Butler 2006).

gender identities that are traditionally marginalized in computing. We call this 'technology as cis/heteronormative masculine culture'. Next, we discuss what a re-framing of diversity in this fashion would mean for CSCW, highlighting the importance of claiming voice, framing in terms of relationships not hierarchy, as well as considering authenticity and embodied identities. We discuss a few case studies from the CSCW literature. Finally, using this argument, we develop implications for practice, addressing methodological issues of who research study participants are and how research questions are defined, before engaging in a speculative brainstorm. In this, we address Stumpf et al.'s (2020) call for HCI research that 'transcend[s] conventional thinking about gender as binary and fixed… [to] lead to a richer understanding of users and how to better design for everyone'. We develop conclusions about how reframing diversity in CSCW in terms of genders has the potential to transform computing to be more inclusive and equitable, and so to better serve society as a whole.

2 Positionality

Decades ago, Clifford (1986) articulated the need for positionality statements in ethnographies because, as works of writing, they are as much about their authors as about their subjects. He cites a man who was a Cree hunter (a North American Indigenous people),

> 'Who (the story goes) came to Montreal to testify in court concerning the fate of his hunting lands in the new James Bay hydroelectric scheme. He would describe his way of life. But when administered the oath he hesitated: "I'm not sure I can tell the truth.... I can only tell what I know."'

This principle extends to diverse research in that we only know our own perspectives, our positionality. This notion of partial truths, of particular perspectives resonates with our work here.

Recently, Liang (2021) has critiqued some positionality statements in CSCW as 'reflexivity theater'. They emphasize the need for such statements to address privilege, ethics, power, and values in the context of the research at hand. In this spirit, we include positionality statements, as our lived experiences in regard to our gender identities inherently shape the theory we generate here. We are currently based in the United Kingdom, Australia, and the United States of America. In developing our positions we will focus our argument on the positions that we know firsthand. While we want our work to be relevant a global audience, we do not wish to overclaim. We use these countries to ground our examples. However, as cultural construction of gender varies widely we wanted to avoid over-generalizing, and urge care in applying this argument to the Global South out of respect for cultural and religious differences (PBS Independent Lens 2023).

2.1 Authors' positions

2.1.1 First author

The first author is an unmarried non-binary, but more femininely presenting, disabled, white, Jewish person. Growing up in the U.S. American South, with interests in technology, I was considered a geek and insufficiently feminine. While I was not girly enough for Southern culture, both in undergrad and in Silicon Valley I was taken aside by well-meaning mentors and told I needed to stop curling my hair, wearing makeup, heels and skirts, if I wanted to be taken seriously as a computer scientist. Later in life, as I became increasingly disabled, it became apparent that having children would be medically unwise. This later became impossible due to cancer. As single disabled women are rarely allowed to adopt, motherhood became out of the question. This—when combined with the gender dysphoria[7] from my cancer surgery—left me deeply questioning my womanhood, as a childless person, who was repeatedly told she was not presenting as adequately feminine. As I age, I have become increasingly tired of having my gender policed, and as an anthropologist, I know it is a cultural construct. I am fond of saying I should be able to dress like Malibu Barbie, and it should have no bearing on whether I am taken seriously as a computer scientist. I am a professor and a leader of disability advocacy in CSCW. I would like to move back to the US to be near my parents in Florida, but cannot legally do so as a person who identifies as non-binary and teaches critical race theory.

2.1.2 Second author

The second author is a white, trans woman who is married with children. I am neurodivergent—ADHD and Autistic. I live in Australia, but hail from a southern U.S.-American background. My work, for two decades, has been situated in human–computer interaction, disaster response, and games. Much of my life, until recent years, has been rooted in privilege—I only came out, as trans and neurodivergent, in recent years. My identity as a trans woman was hard to discover—the systematic erasure of trans people in the world means that I literally had no idea of who I was until very late in life. I find myself drawn to the 'girly' side of femininity, finding value expressing myself as I truly am after decades not doing so. Cis/heteronormativity is such that I had no idea of who I was, a dangerous, but common, experience. I only knew that what I needed was denied me due to my perceived masculinities. I was lucky to have a number of experienced friends and colleagues who have helped me transition socially and within the research community. Given the restrictions on transgender people in the USA, I expect I will not be able to safely visit or return to my place of birth.

[7] Gender dysphoria is a sense of wrongness in the world resulting from experiences of gender that can range from the mildly uncomfortable to completely incapacitating (Stryker 2017; Badgley et al. 2025).

2.1.3 Third author

The third author is a widowed single-parent, who presents as male, yet plays a social role associated with the feminine. I began identifying as a mom when I read articles during the pandemic about how moms were 'losing it' (Senior 2016). I was totally overwhelmed and was feeling the impact of the pandemic on my self-efficacy. I understood the circumstances of inadequate resources coupled with spiraling needs as my own. I have realized that I, too, spend thousands of hours per year performing housework, an experience that Davis (1983) argues could be ameliorated in advanced capitalist societies. Yet, forty years after her writing, and contrary to her prognostication, house-work still pervades the feminine experience. I love to cook, to home make, and to nurture. I pass as cis until I tell people that I identify as a mom, which is not always well-received.

I have worked for the representation of diverse people in human-centered computing, and more broadly, in STEM, as a program director for the U.S. National Science Foundation and as a professor. I do this out of a sense of social justice and also because diverse participation in societal structures makes us more intelligent and capable. I have for years been designing and facilitating a workshop on Teamwork: Gender + Race, to support all students engaged in team projects, in my courses, in response to my sense of their experiences and needs. Work like this is now threatened by the U.S. government.

2.2 Collective framing & limits

Our positionalities are essential to the formation and continuing evolution of our perspectives on gender equity issues. Our genders assigned at birth run counter to our lived experiences, and are indexical in framing our perspectives. We are all experienced CSCW researchers. We bring a variety of perspectives to this work.

As with all interpretive work, other researchers, working from their own perspectives, may derive alternative descriptions and prescriptions for the world. We acknowledge that our perspectives are those of white people whose life experiences are founded in the United States of America. We call on others to expand our work with additional perspectives to represent a broader range of positionalities.

3 Cis/heteronormativity

We develop understandings of how and why CS has privileged cis-masculine gender identities. Our contribution formulates a polyvocal concept of gender and applies it to diversity arguments in computing. In doing this, we leverage Berlant and Warner's[8] incisive explication of heteronormativity:

[8] Lauren Berlant was a professor of English and noted queer cultural theorist. Michael Warner is a professor of English and American studies, and a social theorist and literary critic.

> 'By *heteronormativity* we mean the institutions, structures of understanding, and practical orientations that make heterosexuality seem not only coherent—that is, organized as a sexuality—but also privileged. Its coherence is always provisional, and its privilege can take several (sometimes contradictory) forms: unmarked, as the basic idiom of the personal and the social; or marked as a natural state; or projected as an ideal or moral accomplishment. It consists less of norms that could be summarized as a body of doctrine than of a sense of rightness produced in contradictory manifestations—often unconscious, immanent to practice or to institutions... Heteronormativity is a fundamental motor of social organization... a founding condition of unequal and exploitative relations throughout even straight society. Any social theory that miscomprehends this participates in their reproduction.' (Berlant and Warner 1998).

Many scholars have noted how heteronormativity is simultaneously cisnormativity (Robinson 2022; Köllen and Rumens 2022; Worthen 2016; Schilt and Westbrook 2009), which assumes, at its foundation, that gender assigned at birth is the default. These two intertwined norms erase trans identities. Social and political systems prize, prioritize, and assume cis identities and heterosexual relationships. Since heteronormativity implies cisnormativity and, we aim to highlight trans identities, we use *cis/heteronormativity*. When we reference particular scholarship that relies explicitly on one norm or the other, we match the scholarship's usage.

Cis/heteronormativity is pervasive in its cultural forms. It invokes a calculus of ways in which heterosexual approaches to social relationships, mating, children, and families are socially, culturally, invisibly expected (Jaffe 2018). Its normality is tacit and unmarked, like so many significant practices, setting default assumptions that gender and sex are the same and immutable, and that woman-man pairings are expected.

We observe that interactive artifacts are among the panoply of cultural forms whose characteristics are prone to being masked by unmarked cis/heteronormative fog. These render a web of assumptions which we will show implicitly underlie design processes, artifacts, services, and experiences.

4 Sex and gender

The tacit assumption of exactly two discrete gender, called a *binary gender* system (Tong and Botts 2018), underlies the predominant gender participation debate in computing; e.g., in 'broadening participation'. Binary gender equates gender identity purely to sex, while incorrectly assuming that sex, itself, is unambiguous. This has been used by the patriarchy to subordinate historically

marginalized gender identities and gender presentations, rendering us invisible. Binary gender is a cis/heteronormative gender system.

As Butler (2006) observes, 'Sex and gender are radically distinct… Gender is an identity… instituted in an exterior space through a stylized repetition of performative acts.' We draw from Butler a conceptual basis for how gender is not fixed (with our reservations noted later), but a fluid social construct. We also draw on Harding's (1986) tri-part notions of gender in Section 4.2.

4.1 Sex

In computing, 'sex' and 'gender' are often used carelessly and interchangeably; yet, they are not equivalent (Scheuerman et al. 2020; Taylor et al. 2024). Such treatment of gender is an example of cis/heteronormativity through underlying, oppressive, and incorrect assumptions that 'human identity itself is fundamentally organized by gender identifications that are hardwired into infants' (Berlant and Warner 1998). Sex (and, in cis/heteronormative systems, gender) are often assigned to a person on the basis of primary sex characteristics (genitalia) and secondary characteristics (e.g., traits linked to a body's exposure to sex hormones: hair patterns, breast size, voice pitch) (Badgley et al. 2025). Notably, up around 2% of the global population (some 160 million people) are physically intersex—possessing characteristics that are assigned both 'male' and 'female' (Blackless et al. 2000). At the same time, intersex is not a 'legal' gender in many countries (Amnesty International 2018; Third International Intersex Forum 2013). Intersex babies are regularly subject to non-consensual surgery to conform to the heteronormative two-gender system (Fausto-Sterling 2000). Sex assignment is a reductionist practice that in and of itself oversimplifies bodily make-ups (Turner 1999).

4.2 Gender

The arrangement or existence of gender is a social and colonialist construction, not a cultural universal (PBS Independent Lens 2023). Historically, many Western countries have had two legal individual genders (a binary gender system). It is critical to understand the number of genders varies substantially, elsewhere in the world across time (PBS Independent Lens 2023; Werft and Sánchez 2016). Cultures exist with two, three, four, five, and no concept of gender documented. In some East Asian and Indigenous North and South American cultures, third genders have been historically recognized. Increasingly, third genders are gaining legal recognition (Fung 2021). The Sulawesi in Indonesia recognize five genders (National Geographic 2008). According to Oyěwùmí (1997), the Yoruba people of Nigeria had no concept of gender prior to colonialist intervention.

Philosopher Sandra Harding, in her groundbreaking work theorizing about gender and science (Harding 1986), introduced nuanced terminology to differentiate among aspects of how gender works in practice:

1. **Gender Symbolism**, the gender we associate with objects, and the meanings that thus become embedded in the objects;
2. **Individual Gender**, gender values held by a unique, member of society. These include both their gender identity and gender performance, thus in the spirit of Harding throughout this paper if we discuss gender identity we are talking about identity and performance together; and
3. **Structural Gender**, the systems of gender norms in particular societies.

Where Harding's work is focused on cis identities, in the remainder of the paper we will extend this theory to incorporate trans identities (Badgley et al. 2025). Note that individual gender, while unique to a given person, is not free of social pressures, but rather is constructed in response to them, via processes that Butler and West (Section 7.3) articulate. A key takeaway here is that structural genders can differ globally, across cultures (PBS Independent Lens 2023), as well as across fields and aspects of day-to-day life.

Structural genders can also be at odds with individual senses of gender(s). Cis/heteronormativity is an instance of structural gender, a pervasive system of norms. It is critical to understand that as gender is culturally constructed, it is continually changing and re-inscribed. Further, Harding's three forms of gender (gender symbolism, individual gender, and structural gender) change in response to one another and the historical pressures of the moment.

4.2.1 Gender identity

A person's *gender identity* refers to their internal sense of who they are in regard to gender (Harding 1986; Stryker 2017; PBS Independent Lens 2023). This understanding of and attitude toward gender is internal and shapes how a person perceives themselves, an internal cognitive state (much like Rode and Sheenan Poole (2018)'s presentation of agency). Inasmuch as the world around us shapes who we are, many people are only exposed to binary notions of gender and, as children, are expected to conform to the gender most closely aligned to their sex assigned at birth. Of course, gender identities are ever-expanding and, beyond woman and man, include agender, non-binary, genderqueer, and so on. For many people, the notion that a gender identity should even inform how they live their lives is alien—there is no need to even *have* a gender identity.

4.2.2 Gender presentation

Gender presentations refer to culturally dependent social constructs of behavior that become associated with a sexual category (Stryker 2017; PBS Independent Lens 2023). Often, a person will choose to perform (Butler 1997, 2006) their gender in line with cultural expectations (e.g., gender-specific behaviors, forms of dress, patterns of speech). It is worth noting that, for many genders (or lack thereof), there are no cultural expectations, which leads to its own form of oppression (e.g., a social expectation that a person conform to a gender with which they do not identify).

Philosopher and gender theorist Judith Butler understood how gender is not just based on biological sex. Rather, gender is socially constructed, that is, based on social practices, which may follow or flout conventions. Gender is contextualized by how people accept and challenge cultural norms associated with sex and lived experience (Butler 1997, 2006). Butler, in their later work, clarifies that gender is performative not performance (Butler 2004). While Butler has been criticized by scholars, such as Halberstam (2018), for inadequately addressing trans people in building theory, given their 'foundationalist notions of the gendered body' we use the notion of performativity with the explicit intent of doing so in a trans-inclusive fashion.

To this end, it is important to recognize that while sex and gender can be distinct this is not always the case for trans individuals. Thus, it is important to caution that neither sex nor gender is of greater import (Haulotte 2023). Some trans people, even those transitioning, may identify heavily with their sex. For instance, Miller (2021) cautions against the 'essentialist beliefs that genital sex categorization and gender are inextricably linked'. While we clarify the differences between both sex and gender, we are careful to establish their independence.

Our larger point is that gender is not fixed in society. While we acknowledge critiques of Butler based on trans issues, we recognize useful, valid aspects of their theory. Throughout this article, we take this approach, of inclusion of what is useful from the past, rather than excluding scholars based on a single problematic aspect of their work.

4.3 Harms of Cis/Heteronormative binary gender

The binary gender construct is harmful, impacting people of all genders. The prior work that we address here is rooted in cis/heteronormative reporting. Before going further, we note that these studies are generally addressing subjects' sex assigned at birth, which may or may not align with those people's gender identities or gender presentations. Further, such research does not address any other forms of gender identity or gender presentation.

For an example of a harm caused even by the cis/normative binary gender construct, we see a global wage gap of 23% between women and men (Diaz et al. 2017). This is coupled with 'second-shift' work (Hochschild and Machung 2012) where women (presumably sex assigned at birth) still carry the majority of responsibilities for childcare and housework. Second-shift work is another name

for care work, which Fisher and Tronto (1990) observe involves supporting connected people in living as well as possible (Section 7.1.2).

Societal expectations of binary individual gender can injure cis men, as well, i.e., by implying that this caring work is incompatible with cis-masculine identity (Houchschild 2003; Hochschild 2003). This creates a tension for those with cis-masculine identities, who want to be active carers and at the same time get deeply involved in caring for children.

They are faced with a host of issues, from lack of access to 'mother's groups', to the dearth of changing tables in men's toilets. There is also pressure to not pursue women-dominated professions, such as nursing, early years teaching, or childcare.

Finally, and more obviously, people who do not fit within a gender binary (e.g., non-binary, intersex) are also harmed. Pressures to present androgenously or to 'pass' as a man or a woman are common and are a result of cis/heteronormativity.

4.4 The danger of gender essentialism

Building on Harding and echoing Butler, Faulkner (2001) and Kvande (1999) have argued that computing culture follows cis-masculine norms; that it is socially constructed in ways that prohibit femininely identified persons to fully participate without downplaying their femininities. *Gender essentialism* is a conceptual term, 'the view that men and women are fundamentally and perhaps irrevocably different because of their natures' (Tong and Botts 2018), and so gender identity must follow one's biological sexuality.

Gender essentialism refers to oppressive conflations of structural gender and gender symbolism, which impose on senses of individual gender. Thus, we bear the brunt of gender essentialism in CSCW, in that the voices that argue for women's inclusion (Faulkner 2001; Kvande 1999; Tong and Botts 2018) have previously stopped short of calling for places for feminine individual gender identities in computing in ways that subvert dominate cis-masculine norms. Liberal Feminism embeds gender essentialism, in that it does not question structural gender, the gender symbolism of objects like computers, or the relationship between sex and gender in ways that include historically marginalized gender identities and gender presentations.

Based on these theoretical foundations, we argue that structurally, *broadening participation*[9] does not just mean that we need more 'women' in STEM and

[9] U.S. National Science Foundation policy regarding research funding is that, 'A diverse and capable workforce is vital to maintaining the nation's standard of excellence in STEM: science, technology, engineering and mathematics… broadening participation is included in NSF's merit review criteria…' (United States' National Science Foundation n.d.; UK Research and Innovation 2025). This means that reviewers of research funding proposals are instructed to evaluate if and how a proposal works to advance 'Accessibility and inclusivity by increasing the involvement of communities underrepresented in STEM.' The UK EPSRC (Engineering and Physical Sciences Research Council) uses similar policy in making funding decisions, under the aegis of Equality, Diversity, and Inclusion in Europe (UK Research and Innovation 2025).

computing. Broadening participation requires encouraging a range of intersectional gender identities. In particular, broadening participation requires recognizing and supporting equity for and inclusion of historically marginalized gender identities and gender presentations.[10]

5 Instances from STEM to CSCW: reframing on the basis of genders

We reframe corrosive instances of gender in STEM research and practice, with a focus on CSCW. Liberal Feminism argues that if men and women were given equal opportunities, equity would be possible (Tong and Botts 2018). There are multiple key problems here. First, as we said before, Liberal Feminism is gender-essentialist and harms some historically marginalized gender identities and presentations. Further, it implies women are a homogeneous category, without acknowledging differences in intersectionality and in gender presentation. Applying Liberal Feminism to computing implies that if we redress all of the material wrongs that systemically disadvantage women, we would achieve gender equity. In other words, Liberal Feminism suggests that if we get them mentors, exposure to technology, equipment, free time not spent on housework, and programming tuition, girls will succeed on par with boys in computing.

While all of these are necessary, evidence shows that the components of this liberal prescription are insufficient; cultural and structural factors play a key role in how gender gets operationalized in computing education (Margolis and Fisher 2002). Further, we would like to go beyond binary gender and ensure computing is open to kids of all genders, not just 'girls' and 'boys'. For example, Margolis and Fisher's (2002) analysis of computer science as a 'clubhouse' is an instance of how structural gender becomes embedded into computing, to the disadvantage of women. In this paper, we extend this argument to gender-divergent people. As argued by numerous scholars (Light 2011; MacArthur et al. 2021; Rode 2011b; Spiel et al. 2019a, b), much CS literature on gender fails to consider gender-divergent people (Bardzell et al. 2012; Burnett et al. 2016).

Liberal Feminism has failed to solve the 'the woman problem' in science (Harding 1986), STEM, and CSCW. Gaps between women and men's participation in computing have grown, not shrunk, since 1984 (Camp 1997; Misa 1999). Why? Because Liberal Feminism is a reductionist, cis/heteronormative approach that assumes the immediate, material elements are the only part of the equation that needs rebalancing. This perpetuates structural sexism (Homan 2019) that fails to address how underlying social structures and values disadvantage gender-divergent people.

[10] Intersectional aspects of broadening participation—i.e., involving race, ethnicity, and disability—are of course also significant. We touch upon them in Section 7.3.

Structural sexism in STEM is a product of structural gender and cis/heteronormativity. As Mander (1991), observes, '[No] technology is neutral or value free. Every technology has inherent and identifiable social, political, and environmental consequences.' Perhaps more familiar to CSCW audiences, Winner shows how artifacts have politics and how these politics have consequences (Winner 1980). For example, Robert Moses made the parkway overpasses leading to Jones Beach so low that buses from New York City cannot traverse them. A century later, there is still no mass transit connecting NYC residents to that beach. There has been debate about whether this is implicit or explicit bias (Kessler 2021), but, in any case, this construct serves to reify the marginalization of the urban poor. We will show how technologies, policies, and practices incorporate gendered values in their designs and how this gendering hurts people who are underrepresented in computing.

Winner's argument was expanded on by Berg and Lie (1995): similarly, artifacts can have gender. This manifests Harding's gender symbolism. Many technologies embody the predominately cis-masculine values of their creators (Wajcman 2010; Harding 1986). This cis-masculine gender symbolism unbalances the equation before we even get to social interactions. Obvious examples lie in artificial intelligence (AI) systems, where bias in datasets and algorithms result in recognizers that functionally discriminate (Sun et al. 2019; Nadeem et al. 2020; Buolamwini and Gebru 2018; Raji and Buolamwini 2019). Thus, failure to acknowledge that technology itself can be gendered in a way that disadvantages people who are from historically marginalized gender identities and presentations is a significant limitation of Liberal Feminism.

Rode (2011b) previously exposed a pattern in HCI, as a field, of explicitly failing to engage gender in technology research and design. An example is the research epistemology underlying Cassell's (2002) prior work, which took form as, 'We didn't see that it was our place to design a game for girls or a game for boys.' Rode articulated how this pattern instantiates Liberal Feminism's failure to address structural gender:

> 'The inherent focus on the individual in Liberal Feminism makes it difficult to see the ways in which underlying social structures and values disadvantage women... such as those surrounding development of and access to technology.' (Rode 2011b, p.394).

While this argument focused on just women, we wish to extend the key point here to all historically marginalized gender presentations and identities: we need to understand structural sexism, heteronormativity, and gender symbolism as they relate to technology. Research in CSCW cannot ignore genders, but must intentionally create technology for a range of gender identities and presentations.

Likewise, this approach, of not paying attention to gender in design processes, perpetuates cis/heteronormativity.

By extension, we assert, to counteract the bias in technology delineated by technology as cis/heteronormative masculine culture, we need to coalesce and consider a range of feminine and gender-divergent perspectives. We need to attend to how we symbolically gender our technologies. In the next subsections, we describe four instances that demonstrate failures and successes of addressing structural gender.

5.1 Lack of diverse representation in CSCW research – the case of 'Best Papers'

While many best papers in ECSCW, largely thanks to inclusive ethnographic framings, generally consider all genders that are part of the culture, elsewhere we see considerable gender bias in selecting research samples. For instance, consider the awards of best papers in CHI, the ACM Conference on Human Factors in Computing Systems. We recognize that CHI is just one aspect of the CSCW community; we select it as an indicator.[11] Some 15 years after Barkhuus and Rode (2007) first identified shortcomings in how CHI papers address gender,[12]we continue to experience structural problems in recognizing gender diversity. We have reviewed CHI Best Papers 2023 and 2024. We see aspects of this trend continued, though in papers where women and men participants are reported,[13] we generally see parity, save for where we would not expect it studying astronauts, tech workers, or social care professionals. Yet, gender is still underreported, especially trans participants. In CHI 2024 there were 40 best paper awards, 32 of which used human participants[14] of these 22/32 reported number of men, 25/32 reported the number of women participants, and only 7/32 studies reported the number of gender diverse participants. In CHI 2023 there were 35 best paper awards, 27 of which used human participants, and of these 21/27 reported the

[11] While many CSCW communities and subcommunities exist, prominent ranking systems recognize CHI as a high-quality venue that attracts many researchers. Google Scholar recognizes CHI as the highest impact publishing venue for human–computer interaction (https://scholar.google.com/citations?view_op=top_venues&vq=eng_humancomputerinteraction). CHI is one of the three CSCW and HCI-oriented categories for CS Rankings, for which 'The conferences listed were developed in consultation with faculty across a range of institutions, including via community surveys.' (https://csrankings.org). The Computing Research and Education Association of Australasia considers CHI an A* conference—a 'flagship conference, a leading venue in a discipline area' (https://www.core.edu.au/).

[12] Barkhuus and Rode (2007) called for papers in CHI (and by extension CSCW) to include gender in their study descriptions. At that time the majority of CHI Best Papers were either not reporting participant gender, or doing research on subject pools that were over 2/3 male.

[13] For women we combined reported numbers for women and female, for men we combined man and male, and for gender diverse, we combined trans, non-binary, undefined, diverse, or other, but not include prefer not to say or undisclosed.

[14] We excluded papers that studied cats, papers that present technology without user studies, literature reviews, autoethnographies, and artists studying their own tools.

number of men and women, 1/27 reported a combined number of 'female and non-binary' participants, and 6/27 studies reported the number of gender diverse participants. We would like to emphasize that only reporting women and men, and just reporting women, are heteronormative acts that erase trans people. With the exception of Wilcox et al. (2023)'s study of trans health care, which focused exclusively on trans participants, all other studies had only a handful of trans participants. This suggests that trans people in particular are understudied relative to their demographic numbers. It is troubling that we still do not have full gender reporting in highly lauded papers, resulting in an underrepresentation of gender minorities. Through practices of not addressing gender diversity in the representation of research participants, all this work carries forward implicit cis/heteronormative, binary structural gender assumptions.

5.2 Lack of diverse gender diversity for CS PhDs

Unsurprisingly, the data shows that historically marginalized gender identities and presentations are underrepresented in computing. Data shows that the presence of women as graduating computer science majors declined in the U.S. from 37% in 1983–84 (Thompson 2019) to 18% in 2021–22 (Zweben and Bizot 2021). British statistics show consistently low participation, ranging from 17% in 2014–15 to 18% in 2018–2019 (HESA 2020). The U.S. CRA Taulbee survey shows that of 1,614 CS and engineering PhDs in the U.S. and Canada last year, only ~23% were awarded to women, and two were awarded to people it labels 'non-binary/other' (Zweben and Bizot 2021). The British survey did not even have a category to collect data for gender-divergent people (HESA 2020). The evidence below (Section 6.3) shows how few CS and engineering PhDs are being awarded to people with historically marginalized gender identities.

Margolis and Fisher (2002) argue that the decline in women American CS PhDs stems from a culture in which girls were (implicitly and not necessarily intentionally) excluded from participating in the personal computer revolution primarily by fathers, who brought computers home from work and favored their sons in playing with them, and school clubs, which developed (cis) male culture. Girls felt excluded from the conversation in practice. Their voices were not represented. We extend this argument to gender-divergent people (Wajcman 1991).

5.3 Binary gender recognition systems

Keyes (2018) and Hamidi et al. (2018) have researched the adverse impact of binary gender recognition by AI on the trans community. Here designers' cis/heteronormative (and, perhaps, implicit) values lead them to disregard trans identities in their software. This is shown to injure members of these communities, as their identities are, literally erased while systems misgender them. In these ways,

cis/heteronormative software and interaction designs give both users and computer scientists social clues as to whether they are welcome within computing.

5.4 The significant screwdriver

A final example addresses gender in technology design. Bardzell et al.'s (2012) investigation of the 'Significant Screwdriver' develops a critical design prototype that transgresses gender norms around domestic labor by giving home tools feminine characteristics. As such it provides a strong example of a technology that is explicitly symbolically gendered as feminine in the design process. Gendering the screwdriver as feminine helps erase stereotypical gender binaries around domestic work. It reflects the values we raise, manifesting potential for how structural gender and gender symbolism in computing can be represented as more inclusive. Just as the significant screwdriver focused on designing technology to support women, we mention it to highlight how intentional examples of gender-sensitive design can support the needs of other users from historically marginalized genders identities and presentations.

5.5 Summary

Combined, the gender diversity issues with CHI Best Paper Awards and CS PhDs show biases in who creates technologies. Further, Keyes (2018) and Bardzell et al. (2012) show us how intersectional values can be embedded into technology design. Thus, in this paper, we push back against cis/heteronormative treatments of CSCW in computing as oppressive. We need to take into account the diversity of attitudes towards gender, across the world and in subcultures, in order to avoid reinforcing sexism and gender essentialism, and to meet fundamental human rights social justice obligations to people with historically marginalized gender identities and presentations. Incorporating diverse people improves the spaces of experiences and forms of computing with emergent benefits for all human beings.

6 Gender (In)authenticity: technology as Cis/heteronormative masculine culture

These instances demonstrate how cis/heteronormative practices are problematic and how we need to reframe CSCW on the basis of genders. We look to feminist scholars, within Science and Technology Studies (STS), who first identified 'technology as masculine culture' (Wajcman 1991).

Let us start with technology. Wajcman broadens definitions, 'To include not only artifacts, but also the cultures and practices associated with technologies' (Wajcman 2010, p.143). This is consistent with Newel and Simon's (1976)

historic 1975 Turing Award lecture, 'Computer science is the study of the phenomena *around* computers'.

6.1 Historical patterns of gender and work

We cannot think of gender categories in relation to work as stagnant; they flux. We need to understand historical patterns around domestic work. Cowan (1983) describes how domestic technologies have evolved over the last few hundred years. While the physical labor associated with housework has decreased, the hours spent per week remain constant. For example, the standards of cleanliness have increased. Further, she argues, attitudes about middle and upper-class women working outside the home changed after World War II. Before that, women's labor outside the home was conversely considered unacceptable for (cis/heteronormative) upper/middle-class feminine individual identities (Cowan 1983). Of course, working-class women have long done work outside the home, in addition to housework, highlighting the importance of an intersectional perspective.

This historic example of women's involvement in labor inside and outside the home shows how structural gender is deeply enmeshed in practices around class (Cowan 1983). Davis (1983) presents evidence connecting this devalued housework with both race and class. Tronto (1998) also relates housework, performed as part of an ethic of care, to gender, race, and class (Section 7.1.2). We saw this pattern proliferating in the more recent transition to online education during the COVID- 19 pandemic, which adversely impacted working mothers as caregivers (Senior 2016; Walter 2021). While this historical data does not engage with gender-divergent identities or presentations, we use it to make the point that the technologies themselves, work and family practices, and associated gender categories are subject to social construction, and that this construction reinforces heteronormativity.

6.2 Effects in computer science

The social construction of gender and its manifestation in technologies are particularly relevant. Wajcman (2010) uses her concept of 'technology as masculine culture' to argue that technology is often socially constructed and symbolically gendered in male-dominated ways. She argues that technology development is mediated by its creators' values regarding gender, finding examples of masculinely gendered technologies, '…everything from the microwave oven (Cockburn and Ormrod 1993), the telephone (Martin 1991), and the contraceptive pill (Oudshoorn 2003) to robotics and software agents (Suchman 2008).' Wajcman does not engage with cis or trans politics directly, but applying her argument to computing, predominantly cis, hetero, men, and white, computer scientists implicitly and explicitly enmesh their values into their circuits and code. Thus, we raise technology as cis/heteronormative masculine culture as a binary gender norm

that adversely impacts all historically marginalized gender identities and presentations. In these situations, computer scientists embed cis/heteronormative masculine gender values into the design.

Wajcman (2010) cites Malaysia as an example culture, where women are well-represented among CS studies. While there are examples of individual countries, and regions, such as the Middle East or Scandinavia, where the gendering of the computing field is less masculinized (Schlombs 2022), in many parts of the world this remains a challenge. This is what motivates the rhetoric around 'women in computing' and by extension broader gender diversity efforts geared towards all historically marginalized gender identities and presentations. As we have seen, we cannot close the gap only through Liberal Feminism's focus on material aspects, but rather have to expand out to address the social construction of technology by using a structural gender framing, and how technology itself is symbolically gendered to make participation for some people of historically marginalized gender identities and presentations difficult.

Why do we say only some? Because, even in the West, some people with historically marginalized gender identities and presentations already feel at home within computing culture. People experience the cis-masculine norms of computing in different ways, and some find it comfortable. For instance, the pressures on a woman in computing with a feminine sense of self, versus a woman with a more masculine sense of self are different. While this experience is not relevant to all historically marginalized gender presentations and identities, we make this point here as Rode's positionality underlines this statement's importance. Rode as a young woman felt very oppressed by being told to present more masculinely, and many of her female-presenting students still emphasize this is a problem.

There are related issues, which Booker (2019) addresses as forcing trans people to present in line with gender binaries which are similarly oppressive. Kvande (1999) talks about acting like 'one of the boys' as a coping strategy for women in computing. She ethnographically depicts the challenges of presenting one as more feminine in computing. She calls this the *dilemma of difference,* in that women 'have to negotiate whether the meaning of gender should be sameness or difference from men' (Kvande 1999, p.306). This is yet another example of how heteronormativity can take contradictory forms (Berlant and Warner 1998).

Gender-divergent people often face the need to *pass* in order to be at least safe, possibly accepted, and taken seriously (Stryker 2017). *Passing* means that an individual is indistinguishable from cis members of the gender they identify as. The pressure to pass is cis/heteronormative and trans-hostile—it creates a need for individuals to expend additional effort to attempt to fit cis/heteronormative expectations. This is harmful to non-binary transgender people, as passing requires a substantial amount of work to reach; non-binary transgender people are likewise harmed, as their gender identity is essentially erased in favor of the binary. Booker expressly writes against the 'need' for trans people to pass, that we should be accepted for our own identities (Booker 2019).

Related, Micha Cárdenas' concept of shift reflects how trans individuals modulate visibility in choosing when and how to present—passing or otherwise—themselves in the world (Cárdenas 2015, 2022; Liang and DeAnda 2022). Places of safety and comfort reduce the need to pass; while being in public often raises the pressure. Shift is a necessary tool for trans people to act against the pressure to pass, while maintaining safety. An example of shift is Carrasco and Kerne's (2018) notion of *selective visibility*, in which gender-divergent people choose to present themselves in different ways to different people in their social networks, in some cases out, while in others passing.

Given both the dilemma of difference for cis women, and pressures for gender-divergent people to pass, the challenge, then, not one of biology as it is frequently framed but one of supporting historically marginalized gender identities and presentations. This relates to why feminist STS scholars talk about gender (in)authenticity (Faulkner 2001). This has been framed as women's struggles to feel comfortable presenting their true feminine selves within computing culture, and a tension perceived between being as a feminine woman and as technical (masculine) engineer. We would extend this theory to say gender-divergent people can also be faced with gender (in)authenticity. Core to this theory is the word presenting, referring back to how feminist and queer theorists recognize gender as performative (Section 4.). In each moment, we choose to present ourselves, to shift (Cárdenas 2022; Liang and DeAnda 2022; Cárdenas 2015, 2022), on a multidimensional spectrum of femininity, masculinity, and many other diverse gender identities, yet a subset of these modes of presentation will be inauthentic for any individual. By extending this theory to all historically marginalized gender identities and presentations, we highlight they all have to react to a norm that insists only cis/heteronormative masculinity is compatible with technical ability.

The problem for computing is supporting people's struggles to present a range of non-cis-hetero-masculine identities that are taken seriously as technical. We extend the dilemma of difference to include the possibility of presenting oneself as more or less queer on a range of dimensionalities. Thus, for computer scientists with non-cis-masculine individual gender identities, every encounter needs to be read through the lens of presenting one's identity in the context of masculine gender symbolism and in response to structural gender that assumes the cis-masculine to be a position of privilege. It is a lot of work to authentically present as a historically marginalized gender.

6.3 Binary gender systems impact non-binary people

The impacts of binary gender and the need to take it into account become especially stark when we consider gender-divergent people explicitly. Medical research shows stigma has adverse health effects for LGBTQIA + youth (Hatzenbueher and Pachankis 2016) with suicide ideation, suicide attempts and self-harm

at rates 2–3 times their cisgender peers (Reisner et al. 2015). The U.S. organization GLAAD reports significant numbers of 18–34 year olds report their gender as something other than cisgender, including 3% gender fluid, 2% trans, 1% bi, 1% genderqueer, and 3% agender (Harris Poll 2017). While we have been unable to find comparable European statistics, this is a significant shift in U.S. society, which it may be indicative of powerful demographic that may impact Europe, and run counter to the omnipresence of heteronormative, binary gender systems.

Fields outside of computing, such as medicine, psychology and public health, have embraced engaging with non-binary gender in structuring research analysis (Hyde et al. 2018; Gogovor et al. 2021; Meerwijk and Seveliu 2017; Thorne et al. 2019). Yet presently, non-cis/heteronormative genders remain largely invisible in computing. As mentioned earlier (Section 5.2), the Zweben and Bizot (2021) Taulbee Survey shows marginalized genders in computing. We have seen comparable EU statistics in terms of binary gender in single-country studies (Bjørn et al. 2022) and in cross-EU databases (Informatics Europe n.d.). To date however, we have not been able to obtain data on gender-divergent PhD completions in Europe as the cross-EU data does not trace it. Further, Valeria Borsotti's (2024) dissertation in a section called 'Collective action: Complaint about gender-binarism in the HR management system' highlights the problematic nature of trans and non-binary data being omitted.

The actual deaths of LGTBQIA + youth, lack of representation, and concerted effort to restrict the gender-divergent community constitute a practice of necropolitics. *Necropolitics* holds that those who are represented in society effectively drive decisions of who is valued enough to live (Mbembé 2003) in failing to recognize the needs of trans and genderqueer people often has fatal consequences (Hatzenbueher and Pachankis 2016). Without representation in CSCW, the prevailing necropolitics devalues gender-divergent people: we exist and no one can speak for us. By acting against these necropolitics, through reframing gender representation, the community can foster care and help to ensure that we are valued, and represented in CSCW research.

7 A reframing of diversity

We draw on feminist and queer theories, research results, and creative work to build inclusive, polyvocal integrated trans-feminist theory of what it means to live having a historically marginalized gender identity and/or presentation. Our goal is to support gender diversity in CSCW, HCI, CS, computing, and broadly, STEM. We synthesize voices across gender perspectives to coalesce diverse visions of gender in computing. We draw on examples of research on historically marginalized genders in computing in practice to connect theory with practice. We build intersectional connections through gender and queer theory.

7.1 Visions of gender in computing

We recognize that computing, as part of the privileged, provisional, and implicit program of cis/heteronormativity, marginalizes voices and so renders diverse genders invisible and unwelcome. To build new integrated trans-feminist theory and practice, we bring together key ideas from feminist and queer theory scholars and artists—in diverse fields, including Chicana studies, Black studies, disability studies, queer theory, English, poetry, psychology, philosophy, and theology—who have articulated the importance of voice, of being heard, in transformative change toward reclaiming the legitimacy of participation and power. Each of these passages convey different aspects of gender with polyvocality that is often minimized in cis-masculine discourse, which we choose to vocalize, here, for CSCW and computing.

7.1.1 Claiming voice

Gloria Anzaldúa was a scholar in Chicana cultural theory, feminist theory, and queer theory. She sparked a chorus reclaiming feminine, queer, and Chicana identity forms by raising her voice, despite social pressures, in the essay, 'How to Tame a Wild Tongue':

> 'I will no longer be made to feel ashamed of existing. I will have my voice... I will have my serpent's tongue – my woman's voice, my sexual voice, my poet's voice. I will overcome the tradition of silence' (Anzaldúa 1992).

Anzaldúa uses a conversation with her dentist about how her tongue interferes with treatment as a metaphor of how throughout her own lifetime, her Chicano voice has been marginalized by Anglo authorities who claimed that making her speak like them was for her own benefit. We likewise territorialize a space for language expressing diverse identities that include aspects that are feminine and gender-diverse. In this research, we begin raising voices of diverse genders to motivate identification and transformation of how computing research and practice can be transformed to include and empower. Anzaldúa's work thus motivates the need for computing researchers and practitioners to sensitively understand and use the vocabulary that people invoke to describe themselves, lest our voices be marginalized. This language is not jargon, but rather a basis for voicing authentic identities.

Recently deceased activist and scholar of English, ethnic studies, and Afro-American studies, Bell Hooks, built with Anzaldúa's concept of finding and claiming voice as a key to feminist identities. Hooks worked to include and empower herself and others like her through discourse and action that transgresses domination.

> 'The idea of finding one's voice or having a voice assumes a primacy in talk, discourse, writing, and action... Coming to voice is an act of resistance.

> Speaking becomes both a way to engage in active self-transformation and a rite of passage where one moves from being object to being subject... We live in a world in crisis—a world governed by politics of domination... Clearly, differentiation between strong and weak, powerful and powerless, has been a central defining aspect of gender globally, carrying with it the assumption that men should have greater authority than women, and should rule over them' (Hooks 1989).

In this vein, we identify this reframing as a step of resistance against cis-masculine dominated framings of computing. We recognize Anzaldúa and Hooks' assertion of their voices as intersectional, as based in race times gender. We connect the assertion of marginalized voices as valuable with the struggle against necropolitics. Speaking one's own primary process is a form of resistance against erasure. It is an affirmation of life.

7.1.2 Relationships, not hierarchy

Award-winning lesbian feminist poet, Adrienne Rich, penned an important anthology, *The Dream of a Common Language*. Rich dreamed of the language of this empowering voice in action. As a poet, she shows the power of imagery in representing transformative potentials that we yearn for, despite oppressive circumstances.

> 'The rules break like a thermometer, quicksilver spills across the chartered systems... Whatever we do together is pure invention. The maps they gave us were out of date... The hallucinations turn to simple villages. The music on the radio comes clear' (Rich 2013).

We recognize and encourage divergent investigations that likewise break unnecessary linear rules and draw new maps to invent proverbial new social, cultural, and media forms of invention.

Different voices Carol Gilligan is a psychologist and ethicist who did pioneering research about gender roles in social processes. Her work, *In a different voice: Psychological theory and women's development,* presents a combination of qualitative and quantitative data about how women tend to think differently than men (Gilligan 1993). The emphasis becomes on how non-cis masculine perspectives more often incorporate relational thinking, in which participants prioritize the needs of others, rather than exclusionary thinking, in which they just advocate for themselves. An example data analysis characterizes this different voice in practice, contrasting the perspectives of a woman study participant, Karen, with Jeffrey, a man.

> 'While Jeffrey sets up a hierarchical ordering to resolve a conflict between desire and duty, Karen describes a network of relationships...

> focuses on who is left out... contrasting images of hierarchy and network in thinking about moral conflict and choice.' (Gilligan 1993)

Our reframed perspective on life, work, and computing is based in the non-cis masculine gendered empathetic networks of connection that Gilligan uncovered, rather than cisgender masculine hierarchies of priority. Gilligan's own empirical work about differences across genders, is consonant with her articulation of the need to include diverse populations in research studies in order to derive valid, generalizable findings (Section 4). Likewise we recognize the methodological need for representation on the basis of genders in empirical studies.

Ethics of care Scholars have developed an ethics of care from this work, which sits among fundamental ethical frameworks, including deontology (Kant 2012), virtue ethics (Aristotle. 350 BCE 2014), and Ubuntu ethics (Ewuoso and Hall 2019). Part of Gilligan's original work was to articulate, 'This ethic, which reflects a cumulative knowledge of human relationships, evolves around a central insight, that self and other are interdependent' (Ibid, p.74). Her feminist ethics of care are based in the relational networks of responsibility.

Fisher and Tronto (1990) further articulated that care is 'comprehensive,... public and private, integrated..., and... often entails and perpetuates the oppression of women'. They observe that caring is social and 'permeates our lives'. They define caring as, '... a species activity that includes everything that we do to maintain, continue, and repair our "world" so that we can live in it as well as possible' (p.40). They define 4 phases that processes of care involve: caring about (becoming aware of and paying attention to a need), caring for (assuming responsibility and marshaling resources, caregiving (performing caring tasks), and care receiving (responding to caregiving) (Fisher and Tronto 1990; Tronto 1993, 1998). Tronto develops the importance of non-hierarchical perspectives in ethics of care but does not specifically engage with non-binary gender (Tronto 1993). A goal of the present research is to promote the values of different voices and ethics of care for the representation of historically marginalized genders in HCI, computing, STEM, and beyond.

Rhizomes To provide semiotics, which underlie our integrated trans-feminist relational ethics, philosophers and semioticians Gilles Deleuze and Félix Guattari developed a theory of non-hierarchical network thinking, which they call *rhizomatic* (Deleuze and Guattari 1987). The notion of rhizome is based on horizontal root structures, along which new plants grow, which although appear independent are actually interconnected. Mangroves, ginger, and bamboo are examples. Rhizomes contrasts with the roots of deciduous and coniferous trees, which are separate, distinct, and hierarchical. Inclusion, interconnectivity, and open-endedness are rhizomatic. We call for a rhizomatic approach to gender diversity.

We conjure an active space of co-creating alternatives to cisgender, heteronormative, and man-dominated framings, while based on awareness that being a subject means using one's voice to define one's own positionality and relationships, to represent and so include oneself in discourse. This rhizomatic space is intended to serve as a haven for nurturing diverse positional gender voices of relationship, representation, and inclusion. There can be tensions and even conflicts among positions in the space, which we identify as a big tent of allyship.

7.1.3 Authenticity

Reframing the basis of genders requires embraces the corporeality of non-cis-masculine bodies as well as voices. Rosemarie G. Thomson, an English professor, in her foundational disability studies text, 'Extraordinary Bodies: Figuring Physical Disability in American Literature and Culture,' articulates how to value a what she calls 'extraordinary bodies' with disabilities. She highlights the incompatibility between disability and conventional attractiveness (Thomson 1997),

> 'Moreover, such culturally generated and perpetuated standards as "beauty", "independence", "fitness", "competence", and "normalcy" exclude and disable many human bodies while validating and affirming others.... Consequently, the meanings attributed to extraordinary bodies reside not in inherent physical flaws, but in social relationships in which one group is legitimated by possessing valued physical characteristics and maintains its ascendancy and its self-identity by systematically imposing the rule of cultural or corporeal inferiority on others' (p.7).

Thus, the disabled body is robbed of the possibility of being read as attractive relative to binary gender norms. Given that we are calling for an intersectional perspective, it is important to emphasize that disabled bodies can be as attractive as any.

Contemporary trans scholar Jennifer Booker (2019), in her auto-ethnography of her transition, engages with the privileges of passing as a cisgender woman, and her choice not to do so.

> 'The media are full of prominent transgender women (e.g., Caitlyn Jenner, Laverne Cox, and Janet Mock) whom I consider hyper-feminine – they wear heavy make-up and wigs constantly, their appearance is almost as exaggerated as drag queens. Transgender women aren't all that way. For me, my transition to be recognized as a women is a brazen act of authentic living in part because I don't live an exaggerated flavor of feminine just for the sake of fitting in better. "Passing" as a woman isn't needed or a relevant concept for me, because I AM a woman. **This is who I am. I refuse to hide**.'

Booker affirms a space for trans-femininity without the need to pass as a woman. We include this passage to draw attention who gender identity and presentation may differ. Gender identity does not require the physical trappings of structural gender, but rather self-identification, in itself. As Booker says, 'I AM a woman,' regardless of her sartorial and presentational choices. One's definition of individual gender identity is independent of cis/heteronormative structural gender.

7.1.4 Embodied identities

In reframing on the basis of genders, we link to embodiment and the corporeal, even though we reject mapping sex to gender. Like Dourish (2001) and Höök (2018), we call for using CSCW theory to explore experiences based in the body. Computing must be a safe space for diverse bodies' articulations of experience and identity. We recognize that CSCW, in practice, often involves, as Berlant and Warner (1998) recognizes, 'the production of non-heteronormative bodily contexts.' Part of this is to understand how making sexualities of individual gender private and invisible, rather than public and explicit, is a component of the heteronormative yoke.

Again, our inclusive approach recognizes that gender identity and presentation can be independent of sex. At the same time, as per Young's (2002) *Lived Body experience*, we recognize that aspects of gender identity and presentation are based in the body. Young builds concepts, which we identify as embodied, such as 'pregnant embodiment', 'menstrual meditations', and 'breasted experiences'. She reinterprets the pioneering work of feminist film theorist, Laura Mulvey (2013), on the ever-present male gaze.

While accepting diverse bodies and their physical sex characteristics, our viewpoints are defined rhizomatically, relationally to networks of diverse understandings and experiences of feminine bodies. For example, Young's theory builds on prior work by bringing the physicality of gendered bodies into focus, including height, weight, and frailty in the discussion; it extends with race, class and disability. She writes, 'The lived body is a unified idea of a physical body acting and experiencing in a specific socio-cultural situation, it is body-in-situation' (Young 2002, p.16). Our gender diverse approach has the potential to be useful for HCI when wrestling with issues of embodiment (Dourish 2001) and somaesthetics (Höök 2018).

How people navigate in large information spaces is an example of embodied identity. In this vein, we propose extending research by Patrick et al. (2000) and Czerwinski et al. (2002) about gender and virtual reality navigation. This prior work found that binary gender is significant factor in determining people's display needs in virtual reality spaces. Specifically, women's navigation performance relative to men is improved with larger displays—though it is unclear the mechanism behind this, e.g., how and when genetic traits, sex hormones, and/or

socialization may impact a user's ability to make the best use of such displays. We encourage future research to investigate the effects of non-binary gender on navigation performance. Further, the study of simulation sickness and gender can be extended to newer interfaces such as mobile telepresence, the Apple Vision Pro, and the Ray-Ban Meta glasses.

7.2 In practice

Our visions and prescriptions for re-framing are rooted in data about gender in practice. Prior work has previously been defined to describe how people perform a range of gender positionalities. Those works acknowledge a multiplicity of gender identities and presentations. We contribute a space of common language, of dreams and realities, an idealized rallying point and banner for empowering and relating a wide range of gender identities; where they are empirical, our approach is prescriptive. Let us take this argument in three parts. First, we discuss inclusion of trans, genderqueer, and intersex individuals. Second, we discuss the relevance for making a place in computing for distinctly feminine femininity. While we are making an argument about all historically marginalized gender presentations and identities, we will discuss feminist and queer theory separately as they do not overlap well. Then, we will integrate these perspectives, making our argument for all historically marginalized gender identities and presentations.

7.2.1 Gender-divergent people

A reframing works to remove barriers for people with gender-divergent identities in computing. Hoskin (2017) critiques how cis-masculinity is often presented as social norm, and that 'failed masculinity descends into femininity'. Individuals from across the dimensionalities of gender, she writes, risk 'slippage' from a masculine norm. Hoskin constructs femmephobia as a theory of subversive femininities. This can be extended beyond cis/heteronormativity. Gender-divergent identities are subject to homo-, trans-, and femme-phobia, in that they too deviate from cis-masculine norms. While these identities range in how they approach masculinity (some transmasculinities may embrace the masculine, whereas others do not), they are all subject to cis/heteronormative, patriarchal hegemony.

Haimson et al. (2020) develop participatory CSCW research, involving trans people, which exemplifies a reframed approach. They conducted a series of speculative design sessions in which 71% of participants identified as non-binary. They asked participants to 'develop technologies using a community-centered framework… to benefit and center transgender and non-binary people…' Participants envisioned new technologies in four categories: 'technologies for changing bodies, technologies for changing appearances/gender expressions, technologies for safety, and technologies for finding resources.' The envisioned new technologies include 'a body-changing laboratory, a buddy-finding

application, technologies to improve safety, and augmented mirrors and glasses that shift how a person views their own physical appearance.' The process of this research is appropriately representative. The findings provide a valuable springboard for innovative technology development and a push back against prevailing necropolitics.

Liang et al. (2023) investigate how human–computer interactions can trigger gender dysphoria experiences. The work shows how cis/heteronormativity and a lack of diversity in design teams leads to trans harm through the design of games. This project analyzed popular game designs from the perspective of four trans researchers for the ways in which they propagate dangerous stereotypes of trans people and render game players complicit in anti-trans violence. As a move against necropolitics, they call for greater attention from designers and developers for how trans people are marginalized and harmed through design.

Technology development must recognize the diverse range of gender identities that are performed in practice. Mappings of traits to concepts like masculine and feminine are themselves culturally constructed. In Strathern's (1980) ethnography among the Hagen people, concepts like *Mbo* (domestic) and *RΦmi* (wild) are considered both masculine and feminine. This practice transcends gender essentialism to create exemplary models of individual and structural gender. It suggests that framings of gender themselves are culturally dependent, and that one culture's gender(s) might map differently than the next.

7.2.2 The feminine: diversified

Next, let us consider the feminine. We need space for a range of feminine individual gender identities and presentations. One deserves to be taken seriously in CSCW, no matter how one presents their gender, such as if it is in a hyper-feminine way. At the same time, we need to recognize that this is not all people. The space of femininity in computing includes trans femininities, non-binary, genderqueer, aporagender, and neutrois identities.[15] We work to reclaim the feminine in terms of such diverse concepts of individual gender in light of our theory of technology as cis/heteronormative masculine culture.

Feminist scholars, such as sociologist Rhea Ashley Hoskin (2017), argue that even in traditional feminist scholarship, the feminized remains 'subordinated' (p.95) to the masculine. Western feminism has tended to devalue femininity, in that

> 'Femininity became synonymous with female subordination, with male right of access, and with disciplinary practices enforced under patriarchal rule.

[15] The terms aporagender is a non-binary gender identification for those who identify with gender, but have neither masculine nor feminine individual gender identities (Nonbinary Community 2022a). The term *neutrois* is a term that refers to individuals who identify with neither masculine or feminine identities (Nonbinary Community 2022b).

> In other words, femininity became the scapegoat of patriarchal oppression' (Hoskin 2017).

We interpret Hoskin to mean that we cannot assume an individual with a feminine identity (a feminine individual gender) is a passive subject. Assuming that femininely identified people are passive denies the possibility of an active feminine identity.

7.2.3 Diverse genders

In contrast, feminine characteristics have been reductionistically defined as the absence of the cis-masculine presentation. This is problematic, because doing so reinforces a cis/heteronormative binary gender system. For example, Paechter (2006) goes as far as to discuss the need to 'shift femininity from its position as the negated Other of hegemonic masculinity, to break through the dualistic relation and have a more equal construction.' Tong and Botts (2018), drawing on Vetterling-Braggin, question the inherent hierarchy that the patriarchy assigns to gendered traits, placing a higher value on (conventional Western) cis-masculine traits—such as assertiveness, aggression, and rationality—versus conventional feminine traits, such as gentleness, modesty and humility. She continues, 'if society can learn to value "feminine" traits as much as 'masculine' traits, women's oppression will be a bad memory.' (p.16). In this vein, Paechter (2006) writes,

> 'Distancing oneself from stereotypical femininity, on the other hand, is a claiming of power. Whether from feminist standpoint, or through the personal rejection of the feminine declared by tomboy girls and butch women (Halbertsam 1998), to oppose stereotypical or normalized feminine position is to reject the disempowerment that comes with it....Without femininity, masculinity makes no sense; without the rejection of femininity, butch is simply another way of "doing woman"; it loses its transgressive and oppositional quality' (p.9–10).

In this way, we reject pressures for hierarchical values associated with gender traits. We encourage a rhizomatic multiplicity of claimed gender identities and presentations. Paechter continues,

> 'A discourse in which "man", "woman", and, if an individual wants it, "intersex" (or something else entirely) is the noun, the solid term, with "masculine" and "feminine" as qualifiers, is one that allows for variety and variation, over time, place, social circumstances, and biography. It allows for girls and young women to behave in masculine ways, without having this as their central defining quality. Similarly, boys and men can be and act as feminine, without having to see femininity as central to their being.

> This is surely a more flexible and equitable way for us to understand gender, one which treats masculinities and femininities as truly multiple, and as ways of "being a man or woman, boy or girl", rather than central to our whole existence. It allows identity to be related to, among other things, masculinities and femininities, but treats these only as aspects of identity, and does not insist that it depends on them entirely, with one's sense of oneself as male or female as somehow secondary.'

We build, for CSCW research and practice, on this flexible and open rhizomatic multiplicity of gender qualifiers, which can be associated with any gender, at will.

7.3 Intersectionality and doing differences

Critical Computing scholarship within CSCW increasingly addresses issues of intersectionality (Brewer 2022; Erete et al. 2018; Alvarado Garcia et al. 2023; Harrington and Dillahunt 2021; Kumar and Karusala 2019; Menking et al. 2019; Rankin et al. 2020; Schlesinger et al. 2017; Wisniewski et al. 2018; Thomas 2023). In this, we observe a tendency to address intersectionality at a conceptual level, or by discussing a particular data set using some combination of gender, race, and class. We acknowledge how difficult it is to address all aspects of intersectionality, but we note that often elements such as disability and religion are omitted. As stakeholders in a field, we all need to push even further in considering wider intersectional perspectives in analyzing data. Further, as this excellent prior scholarship represents a small fraction of research, we believe that intersectionality needs to be more broadly applied throughout computing.

Thus, in this paper we take initial steps to mix vital voices of intersectionality theory into our conceptualization. As we have mentioned above, issues of race, ethnicity, disability, and class are inherently enmeshed in individual gender identity. So, too, are issues of religion, and sexuality. We cannot afford to look at gender in computing independently of these other intersectional factors (Crenshaw 2017). The relationships among these factors of identity, which become sites of discrimination and oppression, while also gleaming with transformative potentials of social justice, are rhizomatic. They demand practice as branching potentials for inclusion, creation, and mutual support, even though history casts them as hierarchies of privilege and divide and conquer separation. Collins (1990) talks about gender and race as overlapping matrices of oppression, centering on Black women's experience. Thus, a Black woman scholar in computing would be subject to two overlapping sources of oppression. Crucially, these are not additive, but multiplicative, forces. Intersectionality is not a merely a question of identity, but rather considering the privileges and power associated with those different identities. For instance, when bridging historically marginalized gender identities and presentation, we need to be mindful of the power dynamics given that older feminist literature is largely cis and white. Dialog between these communities do not start with equal privilege, and as such the matrices of oppression must be considered.

West, in her collaborations with both Fenstermaker and Zimmerman (West and Zimmerman 1987; West and Fenstermaker 2002, 1995), also addresses relationships among the impacts of race, class and gender. These scholars explore gender in an ethnomethodological sense, as something that is 'done', i.e., performative, as the 'conceptualization of gender as routine, methodical, and ongoing accomplishment' (West and Zimmerman 1987, p.126). This is similar to Butler's conception of gender as performative[16] and Cárdenas' attention to transgender individuals' shifts (Cárdenas 2015, 2022; Liang and DeAnda 2022).

Accomplishment in this sense means enacted and performed, in a particular situated context, subject to the social norms of structural gender. They describe accomplishment as an 'emergent feature of social interactions' (West and Zimmerman 1987). In her later scholarship, West extends her argument about gender, to race and class. Drawing on Collins (1990), she and Fenstermaker write that class and race are similarly situationally 'accomplished', and that,

> '...to the extent that an individual Black woman is held accountable in one situation to her race category, and in another situation to her sex category [, we] can see these as "oppositional" demands for accountability' (West and Fenstermaker 1995, p.25).

Thus, the pressures of race, class and gender (and by extension other aspects of intersectionality, such as disability that are not discussed here) all involve performativity and have different social norms which can be in tension with one another. When they talk about gender, race, and class holding people accountable, they frame the conscious act of negotiating these pressures as 'doing difference' (West and Fenstermaker 1995). In this way, intersectional pressures, and the work of doing or not doing difference need to be included in the rich voices of a range of gender identities. We draw on West's body of scholarship in addition to Crenshaw's (2017), as it draws attention to how these categories themselves are both socially constructed and changing. We encourage further discourse connecting our re-framing with intersectionality.

8 Implications for practice

Visions, data, and theory about how to ensure gender diversity raise the question of what we within CSCW can do to address these issues. Indeed, strides to date have been made. The 'Women's Lunch' at the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI) has over time incorporated an

[16] Butler argues behavior does not follow sex, but is a matter of learning to behave in relation to social norms. West and Zimmerman extend this to remind us that this performance is on going and situated in repeated decisions each and every day.

intersectional range of gender identities. It was re-instantiated as the 'Global Communities, Diversity and Inclusion BLInner' (Goyal 2021). In parallel, the CHI QueerSIG (Special Interest Group) has run annually since 2019 (DeVito et al. 2020, 2021; Spiel et al. 2019a, b). We acknowledge that other examples are active in other CS venues (e.g., Black in AI, Queer in AI). While all of these events are social signifiers that welcome intersectional gender identities, we call on CSCW to do more, to change its norms regarding research practice. We must consider how re-framing computing in terms of diverse gender identities would impact how we frame and ask research questions, what questions we ask, and what methods we use.

8.1 The imperative of diverse gender participation

Data matters. Buolamwini and Gebru developed the Pilot Parliaments Benchmark training dataset for facial recognition in response to prior datasets that were overwhelmingly white and male (Buolamwini and Gebru 2018). This dataset demonstrated how badly facial recognition systems from Microsoft and IBM performed outside of that narrow set, especially on intersectional females. In response, notably Microsoft made their recognizer more effective, reducing false positives for those who had been underrepresented (Raji and Buolamwini 2019). The ACLU also used these results to push other corporations to make their facial recognition systems less biased. This demonstrates the significance of diverse human representation in data. However, at the same time, Keyes (2018) problematizes using binary gender at all in recognition because this gender essentialism erases trans people. A synthesis of these implications needs to be broadly applied in computing research.

Over a decade ago, Barkhuus and Rode (2007) called on HCI and, by extension, CSCW to require specifying the genders of study participants in publications. Recent work by Spiel et al. (2019a, b) calls attention to how non-binary people are frequently excluded by technological systems:

> 'Issues of normalised forms of embodiment have implications for non-binary people, but they also have implications for cis and binary trans people, and interlock with the concerns of Disabled people and/or People of Color, since bodily standards and expectations that are premised on conventional white, western aesthetic standards have long been linked to racist, ableist and body-shaming outcomes.'

Consequently, the research community has begun to confront such necropolitical trans erasure. Taylor et al. (2024) comprehensively analyze how gender-divergent people have been treated in CSCW and call for researchers to improve representation and reporting. Scheuerman et al. (2021) examined non-binary

people's data entry preferences for gender-related topics, showing how individuals are often faced with a choice to either incorrectly classify their own gender or to accept being denied access to a site or service. Spiel et al. (2019a, b) present best practices for how survey questions ask for a participant's gender in CSCW. Scheuerman et al. (2020), add situational recommendations for asking about gender in healthcare, social media, and dating contexts.

Despite Scheuerman et al.'s (2020) development of guidelines and the latest CHI call for papers recommending that researchers attend to the diversity of genders,[17] at present, following such recommendations remains optional. We lack best practices in the CSCW community mandating their use. In fact, we still see the majority of CSCW research relying solely on binary gender data for demographics. This cis/heteronormative practice has continued despite evidence of its adverse social and personal consequences (Spiel et al. 2019a, b). As Berlant and Warner (1998) theorize,

> 'It is hard to see these fields as heteronormative because the sexual culture straight people inhabit is so diffuse,... that their material conditions feel hardwired into personhood.'

As we have described above (Section 4), countries around the world recognize more than two genders (PBS Independent Lens 2023; Fung 2021; Werft and Sánchez 2016) which highlighting the need for our surveys to allow international gender diversity.

Thus, as a matter of caring about, caring for, and caregiving, we call on the CSCW community to:

1. establish community norms for survey questions (Spiel et al. 2019a, b) (e.g., Figure 1) to enable people with historically marginalized gender identities and presentations to authentically present themselves, whenever it is safe and ethical[18] for participants to do so;
2. mandate presenting qualitative and quantitative data regarding minority gender identities, even if not statistically significant;

[17] 'Inclusivity: Authors should ensure their work and writing are as inclusive as possible; where this is not possible, it should be acknowledged. For example, authors should use gender-inclusive language when developing their papers (see e.g., HCI Guidelines for Gender Equity and Inclusivity) and consider what communities their work is – and is not – supporting, as well as their geographical context.' (https://chi2024.acm.org/for-authors/papers/).

[18] We emphasize safe and ethical as being considerations given discussing this information in Global South and the U.S.A. can be dangerous for participants and researchers. However, we advocate the inclusion of divergent genders information whenever safe to do so.

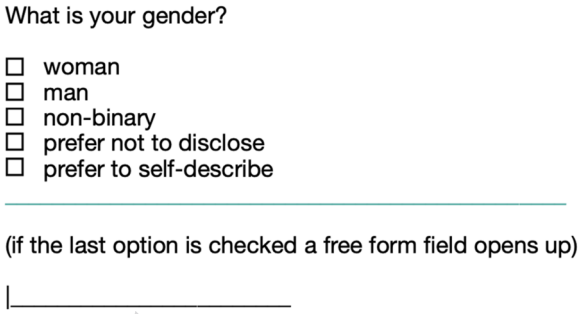

Figure. 1 Spiel and et al.'s (2019a, b) recommended gender question for surveys.

3. ensure that diverse genders are respected and valued during the review of research submissions—including calling out submissions and reviewers that advance necropolitics of erasure; and to
4. ensure members of historically underrepresented gender identities and presentations in CSCW are appropriately represented in datasets.

8.2 Reframing research questions

In recent work, the CSCW community has begun considering gender divergence (Light 2011; Rode 2011b). Scholarship has examined how queer perspectives challenge cis/heteronormative framings of research questions. Research has asserted broadening discussions of pregnancy and menstruation from a 'women's issue' to one of all pregnant or menstruating persons (Marshall and Rode 2018). It has asked what a social media platform would look like that represents a fuller pantheon of gender (Carrasco and Kerne 2018; Bivens and Haimson 2016). As discussed previously, automatic gender recognition research (Keyes 2018; Hamidi et al. 2018; Haimson et al. 2020) has 'troubled' the often-binary gender basis for AI to algorithmically determine gender. Intersectionality is core to the approach of Bennett et al. (2021), who consider how race, gender and disability factor into image captioning for blind users. All of this research shows how including perspectives of historically marginalized gender identities and presentations challenges the framing and conclusions of practice and research questions written from a heteronormative cisgender masculine perspective.

Given that this is the case, then what would it mean if the research questions themselves are shaped by diverse gender identities, such that they consider the multiplicity of identities and commensurate roles that individuals self-associate? Research shows questions in science tend to be framed, likely as a result of implicit biases[19] (Friedman and Nissenbaum 1996) by white, cisgendered,

[19] 'Implicit bias' is a term for choices that an individual makes, does not articulate, and is unaware of due to their own race, gender, (dis)ability or class.

able-bodied men, who are in the majority. This leads to the under-representation of research questions framed in terms of historically underrepresented people's issues (Kearney et al. 2020).

Implicit biases have important implications for how the field of CSCW works in practice. We have encountered people saying, 'It doesn't seem like a CHI [or CSCW] topic,' to dismiss research addressing gender as 'out of scope' in reviews and program committees. The first author, in personal correspondence with many of the authors cited, is aware of a large volume of work on gender, race, and disability that has in this way initially been resisted in our field. This, in turn, has a knock-on effect, limiting intersectional gender perspectives within CSCW scholarship, and limiting the careers of scholars from historically underrepresented groups, which in turn limits representation of intersectional gender minorities at the highest levels of the academy, where large scale decisions are made. Consequently, we call on the CSCW community to articulate, in its community norms, that minority and non- heteronormative research are subject to implicit biases and implement additional checks to ensure adequate representation of Queer, Disabled, Black, Hispanic, and Indigenous people, and other perspectives that have historically been underrepresented.

8.3 A speculative re-framing of gender diverse research questions

In this section we move from systemic effects and prescriptions, to pose speculative research questions that embody integrated trans-feminist intersectional treatment of gender diversity, through an ethics of care:

- What if labs, classrooms, and clubhouses, at all levels of education, research, and industry, are rooted in diverse gender voices? What if they are pervasively represented, rather than marginalized, in design processes for making and learning about circuits, interaction techniques, programming, systems, applications, services, ubiquitous computing, the home, the workplace, and the underlying ethos?
- What if research focuses on intersectional minority identities in computing? What would a study of trans women of color tell us about lived experience with technology in a public space? What would a study of femininely presenting persons with disabilities tell us about identity issues in an online dating platform? What if these minority intersectional gender identities were moved out of the margins of CSCW, to the center, as the object of study?
- What if we reframe home research, which overwhelmingly focuses on cisgender heterosexual couples, in terms of Kath Weston's (1999) *Families We Choose* and Todd Parr's (2011) *The Family Book,* extending investigations to include genderqueer and trans individuals? Weston considers fami-

lies in light of gender-divergent individuals' constructing families based on choice rather than purely based on biology.
- What if we consider widows and widowers who take on cross-gender roles? How can that reshape how we constitute smart home technologies?
- What if we consider gender diversity issues in computing in light of Rode and Sheenan Poole (2018) socio-technical model of the co-construction of gender and technical identity? What would it look like to design technologies with the assumption that they were going to be used by a range of gender identities, who might strategically hide and display their technical skills? How could we design technology to explicitly provide a forum for all historically marginalized gender identities and presentations?
- How can we use selective visibility (Carrasco and Kerne 2018; Dym et al. 2019) in social media to support diverse people in presenting different versions of their identities, with and without linkages, to themselves and different constituencies? This contrasts with Facebook's cis/heteronormative model of a single authoritative identity for each person that includes a set of rules for what does and does not constitute a name. This denies and invalidates trans identities who may use 'unconventional' names and Queer people who are out in some social contexts but not in others.
- What if (like Ogbonnaya-Ogburu et al. (2020); Kesewaa Dankwa (2021); Race in HCI Collective et al. (2021); Salehi et al. (2023)) we use Critical Race Theory and/or the social justice model of disability (Degener 2017; Lawson and Beckett 2021) as the starting point for intersectional design? How would these framings change our exploration of problems relating to race and/or disability?
- What if we normalize reflexive practices in research, drawing on long standing social science precedents (Clifford 1981; Kerne 2005), to encourage and even expect researchers to reflect on their own gender and intersectional identities as an essential part of framing their research contributions?

We challenge the CSCW community to embrace gender diversity and modern intersectional critical theory as starting points for design processes and as theoretical frames for investigating the bi-directional shapings involving society and technology.

8.4 Considering research methods in light of gender diversity

An open question going forward is what methods support us in addressing these research questions. Just as artifacts have politics (Winner 1980), including gender (Berg and Lie 1995) and race (Hankerson et al. 2016), we argue that so do research methods. Methodological choices are critical in avoiding necropolitics of erasure of

historically underrepresented gender identities from scholarly discourse. The aforementioned Harris Poll reports that 10% of 18–34 year olds report their gender as something other than cis- gender (Harris Poll 2017). Similarly, the UCLA Wilson Study (Wilson and Meyer 2021) cites data that 5.9% of the population is LGBTQ and that of that, 11% are trans, which is a small enough number that some 'scientists' might push to ignore this population as statistically insignificant. We argue that statistical significance is sometimes inadequate to capture significant phenomena of CSCW experience, which are essential to our field. **Using the magnitude of the number of gender-divergent people to justify not reporting on them is a cis/heteronormative method for advancing necropolitics of erasure, thus to be inclusive, our field must oppose this.**

The data on trans people is inherently incomplete. We recognize the vicious cycle, that a lack of choices regarding trans identities on surveys, or exclusion criteria for trans people means we are less represented in research (Haimson et al. 2020; Spiel et al. 2019a, b). Additionally, for many, there are safety factors that prevent us from participating (Reed 2023; Scheuerman et al. 2020). Consequently, trans people are consistently and inherently erased due by prevailing necropolitics of cis/heteronormativity—which impacts how likely adults are to identify as transgender both in everyday life and when we share data about our lives with researchers. Based on these methodological issues of erasure, we problematize relying solely on statistically significance in research on trans people. Researchers need to discover alternative methodologies to take into account the socio-cultural impact of this data.

We are epistemologically compelled to highlight the value of qualitative methods as a way of exploring trans identity and avoiding erasure even when numbers are small (e.g., Austin 2016; Dickey et al. 2012; Liang et al. 2023). When data itself is not statistical, reflexive work can contribute theory (Clifford 1986; Dourish 2006). Rode (2011a) builds on Clifford (1986, 1981) to argue that reflexivity allows us examine structural patterns in qualitative data to provide the basis for grounded and critical theories. Kerne (2005) also builds on the Introduction of Clifford's to Writing Culture (Clifford 1986), but they argue that any scientific discourse is as much about the scientist(s) and how they frame as it is about their subject(s) and the data. In other words, cis/heteronormative omission of non-cis/heteronormative people results in biased research.

Thus, resultant theories of reflexivity can impact CSCW broadly by shaping its discourse around diverse gender identities. Theories of reflexivity, combined with ethics of care, have a key role to play in present and future research combating necropolitics of erasure. We see this as a site for potential contributions of trans research, without reductionism to measurable statistical significance of trans people.

8.5 U.S. update 2025

The current time is notable for many deleterious heteronormative changes in U.S. government policy. Trans rights are under attack. Official U.S. policy is now, '...

to recognize [only] two sexes, male and female' (The White House 2025). All U.S. policies that have supported transgender people—e.g., The White House Toolkit on Transgender Equality, Enforcement of Title IX With Respect to Discrimination Based on Gender Identity, Supporting Transgender Youth in School—have been rescinded. NSF grants that address diversity, equity, or inclusion have been terminated (Garisto and Kozlov 2025). These actions constitute a necropolitics of erasure. They show how the synthesis of asserting trans and feminist rights in this paper is imperative and timely.

9 Conclusion

The point of this paper is to build a vision, space, and ethos, based on genders, which is inclusive. Undergirding this space is a new integrated trans-feminist theory. We argued that computing is hostile to forms of gender divergence and needs to open up. We recognize that gender has a range of forms. We believe in manifesting an ethics of care to move against necropolitics of erasure. The data show that, in addition to and beyond material access to equipment and education, social and cultural factors are critical for engendering equity in computing for groups that society has underrepresented and undervalued. Representation and practice—including in CSCW education, in study participation, in research methods, in best papers, in conceptualizations, in design processes, in social media, in AI, in technology for the home, and in research teams—have the potential to function as emblematic manifestations of this ethos of ethics and innovation.

In this paper, we argue the need to reframe an aspect of the discussion about diversity in computing from the basis of sex to the basis of genders. We offer our framing as a safe space for all people with historically marginalized gender presentations and identities to ensure our voices are used to advance research and practice for equity and innovation. We synthesize a rich panoply of theoretical constructs, in order to critique practices that interfere with equity and give support in CSCW research and beyond. These include:

- *Structural gender* refers to a society's system of norms involving gender. Different societies construct structural gender in different ways.
- *Gender essentialism* refers to assumptions that sex and gender designations can be reduced to stereotypical behaviors.
- Similarly, *binary individual gender* reduces gender identity to two forms of sex. Yet, we know that gender is, in fact, a social construction, whose performance people can and do choose in situated social contexts. And there are more physical forms of biological sexuality, such as intersex.
- *Cis/heteronormativity* refers to an invisible, necropolitical, yet pervasive panoply of sociocultural conditions that render cisgender heterosexual practices as normal, while marginalizing queer ways of being.

- Related is the notion of *symbolic gendering* of technology as cis/heteronormative masculine culture, which addresses how technology becomes gendered as cis-masculine through invisible, implicit norms, which promulgates inequities of representation in CS and other fields.
- *Intersectionality* refers to how, when an individual experiences a matrix of sociocultural oppression, such as through dimensions of gender and race, the effects are multiplicative, not just additive, and filtered through power dynamics.
- An *ethics of care* recognizes that acts of caring about, caring for, and caregiving, which have historically been undervalued, have a potentially transformative role to play in beneficial changes for gender, race, and class involving technology.
- Liberal Feminism relies on a reductionist, heteronormative, necropolitical, binary gender system, whose thinking bases policy for equity only the assignment of material resources, while ignoring the roles of social and cultural factors, including gender symbolism, as well as people's actual intersectional gender diversity.

In order to reframe diversity in computing on the basis of genders, we need to replace cis/heteronormative, binary bases of sex with diverse understandings of how gender identities and relationships are socially constructed, and, further, to recognize that structural genders differ globally across cultures. We need to move past Liberal Feminism. Doing so will enable us to avoid both amplifying sexism and gender essentialism and ostracizing our gender-divergent students and colleagues.

We work to build a response to the pervasive hegemony of 'technology as cis/heteronormative masculine culture.' Computing research needs to generally incorporate ways of knowing involving fields including cultural theory, philosophy, and feminist, queer, disability, Indigenous, post-colonial, Black, and Chicana studies. For example, feminist and queer theories, which consider the complex relationship between gender and other intersectional (Crenshaw 2017; Collins 1990) characteristics, are vital in computing. Counter to the social norms of technology as cis/heteronormative masculine culture, in practice, gender is performative and difference is 'done' (e.g., (West and Fenstermaker 1995)). Our methods to study computing in social contexts—such as at home, at work, at play, and through crowds across the cloud—must reflect this. We encourage future research and practice that further builds on this argument to address scopes in and beyond CSCW to diversity in the whole of computing, STEM, and society. We also encourage future research for CSCW that engages with diversity of genders and intersectional theory with regard to race, ethnicity, colonialism, class, caste, disability, religion and other bases of marginalization.

We celebrate a focus on all historically marginalized gender presentations and identities, including gender divergent, transfemininities, transmasculinities, aporagender and neutrois. This is not just a liberal argument that impacts minorities and their inclusion in computing. We adopt an ethics of care (Section 7.1.2) to repair the worlds of computing so that everyone can live in them as well as possible. Recognizing pervasive cis/heteronormativity and building a safe space of alternatives has the potential to even support cisgender men in computing in exhibiting a wider range of identities. Most importantly, it enables new symbolic genderings of technology, to help the technologies we create address the needs and desires of all.

We live in an era where news media, popular culture, and research reviews thereof, are replete with algorithms, computer vision systems, and AI systems that possess racial, gender, and disability biases (Ashley 2021; Collier 2021; Hankerson et al. 2016; Spiel et al. 2019a, b; Weatherbed 2021; Bender et al. 2021). What is more, we need to respond to the historical challenges of our time, especially in America, where marginalized groups are being targeted. This reaffirms the need for marginalized communities to band together. Wielding an integrated trans-feminist theory is a key aspect of this agenda.

Technology conceptualization and design must address these biases to overcome cis/heteronormativity. Given our ideals, that technology should be inclusive and democratizing. We cannot do this without rethinking how to represent intersectional gender values in our designs and making space for diverse genders in computing. Berlant and Warner (1998) write, 'Heterosexuality involves so many practices that are not sex that a world in which this hegemonic cluster would not be dominant is, at this point, unimaginable. We are trying to bring that world into being.' By offering our call to shift diversity work to focus on all genders and not binary sex, we are working to challenge the cis/heteronormative foundations of CSCW, computing, and STEM, in order to broadly repair our world and foster the design of more equitable and participatory interactive artifacts and experiences on the basis of genders.

Acknowledgements
We would like to thank our families for their support of the many revisions of this paper over the course of the last four years. Additionally, we are grateful to many anonymous reviewers, editors, Yifan Feng, Katta Spiel, Rua Mae Williams, Louise Barkhuus and Bea Wohl for comments on drafts of this paper.

Toups Dugas acknowledges the Traditional Owners and Custodians of Country throughout Australia and the lands on which I carry out my research, the Bunurong people of the Kulin Nations. I recognise their continuing connection to the land, waters, and community since time immemorial and that they never ceded sovereignty. I pay my respects to their Elders, past, present, and emerging.

Author Contributions

J.R. wrote the first draft of the manuscript. J.R. provided the overall arguments that gender diversity was missing in computing and provided its basis in feminist theory. Later, A.K. joined in revising the document heavily and co-authored the “Implication for Practice” section. He introduced the"Visions of Gender in Computing"subsection. He introduced the Berlant and Warner theory. After two rejections, we asked P.T.D. to provide insight on trans erasure, and we worked together to expand the trans theory in the paper.

Funding

The authors did not receive support from any organization for the submitted work.

Data Availability

No datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare no competing interests.

References

Ahmed, Syed Ishtiaque, Nova Ahmed, Faheem Hussain, and Neha Kumar. 2016. Computing beyond gender-imposed limits. In *Proceedings of the Second Workshop on Computing within Limits, LIMITS ’16*, eds. B. Nardi, B. Raghavan, and D. Pargman, 1–7. New York, New York, USA: Association for Computing Machinery.

Alvarado Garcia, Adriana, Karla Badillo-Urquiola, Brianna Posadas, and Manuel A. Pérez-Quiñones. 2023. Trajectory of hispanic women professionals: Challenges and strategies. In *Proceedings of the 54th ACM Technical Symposium on Computer Science Education V. 2*, SIGCSE 2023, 1208–1209. New York: Association for Computing Machinery.

Amnesty International. 2018. It's intersex awareness day here are 5 myths we need to shatter. *Blog*. Amnesty International, 26 October 2018. https://www.amnesty.org/en/latest/news/2018/10/its-intersex-awareness-day-here-are-5-myths-we-need-to-shatter/.

Anzaldúa, Gloria. 1992. How to tame a wild tongue. In *Out there: Marginalization and contemporary culture*, eds. R. Ferguson, M. Gever, T. Minh-Ha, and C. West, 203–212. Cambridge, Massachusetts: MIT Press.

Aristotle. 2014. *Aristotle: Nicomachean ethics (Cambridge texts in the history of philosophy)*. 2nd edition. Ed. R. Crisp. Cambridge, UK: Cambridge University Press.

Ashley, B. 2021. *Is the algorithm ableist? Adaptive brands say Facebook and Google have a problem*. Vogue Business https://www.voguebusiness.com/companies/is-the-algorithm-ableist-adaptive-brands-say-facebook-and-google-have-a-problem.

Austin, Ashley. 2016. *"There I am": A grounded theory study of young adults navigating a transgender or gender nonconforming identity within a context of oppression and invisibility*. Sex Roles 75:215–230.

Badgley, Jocelyn, et al. 2025. The gender dysphoria bible. https://genderdysphoria.fyi/en.

Bardzell, Shaowen. 2010. Feminist HCI: taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI conference on human factors in computing systems*, pp. 1301–1310.

Bardzell, Shaowen, Jeffrey Bardzell, Jodi Forlizzi, John Zimmerman, and John Antanitis. 2012. Critical design and critical theory: the challenge of designing for provocation. In *Proceedings of the designing interactive systems conference*, pp. 288–297.

Barkhuus, Louise, and Jennifer A. Rode. 2007. From mice to men-24 years of evaluation in CHI. In *Proceedings of the SIGCHI conference on Human factors in computing systems*, vol. 10, no. 1240624.2180963. New York, NY: ACM.

Bender, Emily M., Timnit Gebru, Angelina McMillan-Major, and Shmargaret Shmitchell. 2021. On the dangers of stochastic parrots: Can language models be too big? 🦜. In *Proceedings of the 2021 ACM conference on fairness, accountability, and transparency*, pp. 610–623.

Bennett, Cynthia L, Cole Gleason, Morgan Klaus Scheuerman, Jeffrey Bigham, Anhong Guo, and Alexandra To. 2021. "It's complicated": Negotiating accessibility and (Mis) representation in image descriptions of race, gender, and disability. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–19.

Berg, Anne-Jorunn, and Merete Lie. 1995. *Feminism and constructivism: Do artifacts have gender?* Science, Technology, & Human Values 20 (3): 332-351.

Berlant, Lauren, and Michael Warner. 1998. *Sex in public*. Critical inquiry 24 (2): 547-566.

Bivens, Rena and Oliver L. Haimson. 2016. Baking gender into social media design: How platforms shape categories for users and advertisers. *Social Media+ Society* 2 (4): 2056305116672486.

Bjørn, P., M. Menendez-Blanco, and V. Borsotti. 2022. The State of Diversity in Computer Science in 2022. In *Diversity in Computer Science: Design Artefacts for Equity and Inclusion*, 1–6. Cham, Switzerland: Springer.

Blackless, Melanie, Anthony Charuvastra, Amanda Derryck, Anne Fausto-Sterling, Karl Lauzanne, and Ellen Lee. 2000. How sexually dimorphic are we? Reviewand synthesis. *American Journal of Human Biology* 12: 151–166.

Booker, Jennifer. 2019. *The new normal: Coming out as transgender in midlife paperback*. No City: The Unbound Press.

Borsotti, Valeria. 2024. *Making trouble: Reconfiguring equity & accessibility in computer science*. Ph. D. thesis, University of Copenhagen.

Bratteteig, Tone. 2002. Bringing gender issues to technology design. In *Feminist challenges in the information age*, ed. Christiane Floyd, Govind Kelkar, and Silvie Klein-Franke, 91–105. Wiesbaden: VS Verlag für Sozialwissenschaften.

Brewer, Johanna. 2022. Playing unbound: Towards a radically intersectional HCI. In *Extended Abstracts of the 2022 Annual Symposium on Computer-Human Interaction in Play*, CHI PLAY '22, 270–272. New York: Association for Computing Machinery.

Buolamwini, Joy and Timnit Gebru. 2018. Gender shades: Intersectional accuracy disparities in commercial gender classification. In *Conference on Fairness, Accountability and Transparency*, 77–91. PMLR.

Burnett, Margaret, Simone Stumpf, Jamie Macbeth, Stephann Makri, Laura Beckwith, Irwin Kwan, Anicia Peters, and William Jernigan. 2016. Gendermag: A method for evaluating software's gender inclusiveness. *Interacting with Computers* 28 (6): 760–787.

Butler, Judith. 1997. Gender insubordination. In *The second wave: A reader in feminist theory*, ed. L. Nicholson, 300–316. New York, New York, United States: Routledge.

Butler, Judith. 2004. *Undoing gender*. New York: Routledge.

Butler, Judith. 2024. *Who's afraid of gender?* Toronto: Knopf Canada.

Butler, Judith. 2006. *Gender trouble: Feminism and the subversion of identity*. Milton Park: Routledge.

Camp, Tracy. 1997. The incredible shrinking pipeline. *Communication of the ACM* 40 (10): 103–110.
Cárdenas, Micha. 2015. Shifting futures: Digital trans of color praxis. *Ada: A Journal of Gender, New Media, and Technology 6* (6). https://doi.org/10.7264/N3WH2N8D.
Cárdenas, Micha. 2022. *Poetic operations: Trans of color art in digital media*. Durham: Duke University Press.
Carrasco, Matthew, and Andruid Kerne. 2018. Queer visibility: Supporting LGBT+ selective visibility on social media. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–12.
Cassell, J. 2002. Genderizing HCI. In *The human-computer interaction handbook: Fundamentals, evolving technologies and emerging applications: Hillsdale*, eds. J. Jacko and A. Sears, 402–411. L. Erlbaum Associates: New Jersey, United States.
Clifford, James. 1981. On ethnographic surrealism. *Comparative Studies in Society and History* 23 (4): 539–564. https://doi.org/10.1017/S0010417500013554.
Clifford, James. 1986. *In writing culture: The poetics and politics of ethnography, chapter introduction: Partial truths*, 1–26. Oakland: University of California Press.
Cockburn, Cynthia, and Susan Ormrod. 1993. *Gender and technology in the making*. London: SAGE Publications Ltd.
Collier, Kevin. 2021. Twitter's racist algorithm is also ageist, ableist and islamaphobic, researchers find. *NBC News*, August.
Collins, Patricia Hill. 1990. *Black feminist thought: Knowledge, consciousness, and the politics of empowerment*. New York: Routledge.
Computing Research Association's Committee on Widening Participation in Computing Research. 2025. The computing research association's committee on widening participation in computing research (CRA-WP). Informational Website. Accessed: 12 February 2025.
Cowan, Ruth Schwartz. 1983. *More work for mother*. New York: Basic Books.
Crenshaw, Kimberlé W. 2017. *On intersectionality: Essential writings*. New York: The New Press.
Crossley, Quinn. 2019. Uplifting diverse genders: Beyond "women and nonbinary". Blog. Medium, March 2, 2019. https://medium.com/@quinncrossley/uplifting-diversegenders-beyond-women-and-non-binary-916c890f2185/.
Czerwinski, Mary, Desney S. Tan, and George G. Robertson. 2002. Women take a wider view. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '02, 195–202. New York: Association for Computing Machinery.
Daly, Mary. 2016. *Gyn/ecology: The metaethics of radical feminism*. Boston: Beacon Press.
Davis, Angela Yvonne. 1983. *Women, race, and class*. New York: Vintage Books.
Dawson, Juno. 2022. *What's the T?: The guide to all things trans and/or nonbinary*. Naperville, Illinois, United States: Sourcebooks, Inc.
Degener, Theresia. 2017. *A new human rights model of disability*. Cham: Springer.
Deleuze, Gilles, and Félix Guattari. 1987. *A thousand plateaus: Capitalism and schizophrenia*. Minneapolis: University of Minnesota Press.
DeVito, Michael Ann, Ashley Marie Walker, Caitlin Lustig, Amy J. Ko, Katta Spiel, Alex A. Ahmed, Kimberley Allison, Morgan Scheuerman, Briana Dym, Jed R. Brubaker, Ellen Simpson, Naveen Bagalkot, Noopur Raval, Michael Muller, Jennifer Rode, and Mary L. Gray. 2020. Queer in HCI: Supporting LGBTQIA+ researchers and research across domains. In *Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–4.
DeVito, Michael Ann, Caitlin Lustig, Ellen Simpson, Kimberley Allison, Tya Chuanromanee, Katta Spiel, Amy Ko, Jennifer Rode, Brianna Dym, Michael Muller, Morgan Klaus Scheuerman, Ashley Marie Walker, Jed Brubaker, and Alex Ahmed. 2021. Queer in HCI: Strengthening the community of LGBTQIA+ researchers and research. In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–3.
Diaz, Merceds Mateo, Robert Engelman, Jeni Klugman, Gretchen Luchsinger, and Elyse Shaw. 2017. *Worlds apart: Reproductive health and rights in an age of inequality*. Technical report. United Nations Fund for Population Activities. https://esaro.unfpa.org/en/publications/worlds-apart-reproductive-health-and-rights-age-inequality. Accessed 17 April 2025.
Dickey, Lore M., Theodore R. Burnes, and Anneliese A. Singh. 2012. Sexual identity development of female-to-male transgender individuals: A grounded theory inquiry. *Journal of LGBT Issues in Counseling* 6 (2): 118–138.
Dourish, Paul. 2001. *Where the action is: The foundations of embodied interaction*. Cambridge: MIT Press.
Dourish, Paul. 2006. Implications for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '06, 541–550. New York: Association for Computing Machinery.
Dym, Brianna, Jed R. Brubaker, Casey Fiesler, and Bryan Semaan. 2019. "Coming out okay": Community narratives for LGBTQ identity recovery work. *Proceedings of the ACM Human-Computer Interaction 3*(CSCW). https://doi.org/10.1145/3359256.
Erete, Sheena, Aarti Israni, and Tawanna Dillahunt. 2018. An intersectional approach to designing in the margins. *Interactions* 25 (3): 66–69. https://doi.org/10.1145/3194349.
European Commission. n.d. Gender equality in research and innovation: Achieving gender equality in research, how it relates to the european research area, networks and news. Accessed: 15 Sept 2022.

Ewuoso, Cornelius, and Susan Hall. 2019. Core aspects of Ubuntu: A systematic review. *South African Journal of Bioethics and Law* 12 (2): 93–103.
Faulkner, Wendy. 2001. The technology question in feminism: A view from feminist technology studies. *Women's Studies International Forum* 24: 79–95 (Elsevier).
Fausto-Sterling, Anne. 2000. *Sexing the body: Gender politics and the construction of sexuality*. New York: Basic Books.
Fisher, Berenice, and Joan C. Tronto. 1990. Toward a feminist theory of caring. In *Circles of care: Work and identity in women's lives*, eds. E. K. Abel, and M. K. Nelson, 36–54. Albany, New York, United States: State University of New York Press.
Friedman, Batya, and Helen Nissenbaum. 1996. Bias in computer systems. *ACM Transactions on Information Systems (TOIS)* 14 (3): 330–347.
Fung, Katherine. 2021. Which countries recognize third gender option on passports? *Newsweek*, October.
Goyal, Tesh. 2021. *Global communities, diversity and inclusion blinner at CHI 2021*. Blog. https://chi2021.acm.org/blog. Accessed 17 April 2025.
Garisto, Dan, and Max Kozlov. 2025. Exclusive: How NSF is scouring research grants for violations of Trump's orders. *Nature*, February.
Gilligan, Carol. 1993. *In a different voice: Psychological theory and women's development*. Cambridge: Harvard University Press.
Gogovor Amédé, Hervé Tchala Vignon Zomahoun, Giraud Ekanmia, Evèhouénou Lionel Adisso, Alèxe Deom Tardif, Lobna Khadhraoui, Nathalie Rheault, David Moher, and France Légaré. 2021. Sex and gender considerations in reporting guidelines for health research: A systematic review. *Biology of Sex Differences* 12 (62): 1–11.
Haimson, Oliver L. 2017. The social complexities of transgender identity disclosure on social network sites. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems, CHI EA '17*, eds G. Mark, S. Fussell, C. Lampe, M.C. Schraefel, J. P. Hourcade, C. Appert, and D. Wigdor, 280–285. New York, New York, USA: Association for Computing Machinery.
Haimson, Oliver L., Dykee Gorrell, Denny L. Starks, and Zu Weinger. 2020. Designing trans technology: Defining challenges and envisioning community-centered solutions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–13.
Haimson, Oliver L. 2025. *Trans Technologies*. MIT Press.
Halberstam, Jack. 2018. *Trans: A quick and quirky account of gender variability*. Berkeley: University of California Press.
Hamidi, Foad, Morgan Klaus Scheuerman, and Stacy M. Branham. 2018. Gender recognition or gender reductionism?: The social implications of embedded gender recognition systems. In *CHI '18: Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–13.
Hankerson, David, Andrea Marshall, Jennifer Booker, Houda El Mimouni, Imani Walker, and Jennifer A. Rode. 2016. Does technology have race? In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems*, 473–486.
Harding, Sandra G. 1986. *The science question in feminism*. Ithaca: Cornell University Press.
Harrington, Christina, and Tawanna R. Dillahunt. 2021. Eliciting tech futures among black young adults: A case study of remote speculative co-design. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, CHI '21. New York: Association for Computing Machinery.
Harris Poll. 2017. *Accelerating acceptance 2017: A harris online poll survey of americans' acceptance of lgbtq people*. Technical report, GLADD. https://glaad.org/publications/accelerating-acceptance-2017/. Accessed 17 April 2025.
Hatzenbueher, M.L., and J.E. Pachankis. 2016. Stigma and minority stress as social determinants of health among lesbian, gay, bisexual, and transgender youth: Research evidence and clinical implications. *Pediatric Clinics of North America* 63 (6): 985–997.
Haulotte, Penelope. 2023. Program for a transgender existentialism. *TSQ: Transgender Studies Quarterly 10* (1): 32–41.
HESA. 2020. Higher education student statistics: UK, 2018/19 - subjects studied.
Hochschild, Arlie, and Anne Machung. 2012. *The second shift: Working families and the revolution at home*. New York: Penguin Group.
Hochschild, Arlie Russell. 2003. *The commercialization of intimate life: Notes from home and work*. Univ of California Press.
Houchschild, Arlie Russell. 2003. *The managed heart: Commercialization of human feeling*. Berkeley: University of California Press.
Homan, Patricia. 2019. Structural sexism and health in the United States: A new perspective on health inequality and the gender system. *American Sociological Review* 84 (3): 486–516.
Höök, Kristina. 2018. *Designing with the body: Somaesthetic interaction design*. Cambridge: MIT Press.
Hooks, Bell. 1989. *Talking back: Thinking feminist, thinking black*. Boston: South End Press.
Hoskin, Rhea Ashley. 2017. Femme theory: Refocusing the intersectional lens. *Atlantis; Critical Studies in Gender, Culture and Social Justice* 38 (1): 95–109.

Hyde, Janet Shibley, Rebecca S. Bigler, Daphna Joel, Charlotte Chucky Tate, and Sari M. van Anders. 2018. The future of sex and gender in psychology: Five challenges to the gender binary. *American Psychologist Journal* 74 (2): 171–193.

Informatics Europe. n.d. Students in informatics doctoral programs - ratio per million people. Web. https://www.informatics-europe.org/data-portal/?page=statistics/phd_all_semesters_ratio.html.

Jaffe, Sara. 2018. Queer time: The alternative to "Adulting". *JSTOR Daily*, January.

Just Between Us. 2019. Non-binary people are not "women-light". Video. Accessed: 5 April 2024.

Kannabiran, Gopinaath, Jeffrey Bardzell, and Shaowen Bardzell. 2011. How HCI talks about sexuality: Discursive strategies, blind spots, and opportunities for future research. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '11, New York, New York, USA, 695–704. Association for Computing Machinery.

Kant, Immanuel. 2012. In *Kant: Groundwork of the metaphysics of morals (Cambridge texts in the history of philosophy)*, ed. C. M. Korsgaard. Cambridge, United Kingdom: Cambridge University Press.

Kearney, Maureen, Gilda Barabino, Joseph Graves, and Shirley M. Malcom. 2020. Science must be for everyone: Racism and sexism are obstacles to making the scientific enterprise worthy of its public funding. *Scientific American August* (16): https://www.scientificamerican.com/article/science-must-be-for-everyone/.

Kelliher, Diarmaid. 2014. Solidarity and sexuality: Lesbians and gays support the miners 1984–5. *History Workshop Journal* 77: 240–262.

Kerne, Andruid. 2005. Doing interface ecology: The practice of metadisciplinary. In *ACM SIGGRAPH 2005 Electronic Art and Animation Catalog*, SIGGRAPH '05, 181–185. New York: Association for Computing Machinery.

Kesewaa Dankwa, Nana. 2021. "All names are pseudonyms": A critical reflection on pseudonymizing names in HCI: "All names are pseudonyms". In *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*, CHI EA '21. New York: Association for Computing Machinery.

Kessler, Glenn. 2021. Robert Moses and the saga of racist parkway bridges. *The Washington Post.* November.

Keyes, Os. 2018. The misgendering machines: Trans/HCI implications of automatic gender recognition. *Proceedings of the ACM Human-Computer Interaction, 2*(CSCW). https://doi.org/10.1145/3274357.

Köllen, Thomas, and Nick Rumens. 2022. Challenging cisnormativity, gender binarism and sex binarism in management research: Foregrounding the workplace experiences of trans* and intersex people. *Gender in Management: An International Journal 37* (6): 701–715. https://doi.org/10.1108/GM-01-2022-0022.

Kumar, Neha, and Naveena Karusala. 2019. Intersectional computing. *Interactions* 26 (2): 50–54. https://doi.org/10.1145/3305360.

Kvande, Elin. 1999. In the belly of the beast' constructing femininities in engineering organizations. *European Journal of Women's Studies* 6 (3): 305–328.

Lawson, Anna, and Angharad E. Beckett. 2021. The social and human rights models of disability: Towards a complementarity thesis. *The International Journal of Human Rights* 25 (2): 348–379.

Liang, Shano, and Michael Anthony DeAnda. 2022. Review of poetic operations: Trans of color art in digital media by micha cárdenas (Duke University Press). *Lateral 11* (2).

Liang, Shano, Michelle V. Cormier, Phoebe O. Toups Dugas, and Rose Bohrer. 2023. Analyzing trans (Mis)representation in video games to remediate gender dysphoria triggers. *Proceedings of the ACM Human-Computer Interaction 7*(CHI PLAY).

Liang, Calvin. 2021. Reflexivity, positionality, and disclosure in HCI. Blog. Medium, September 6. 2011. https://medium.com/@caliang/reflexivity-positionality-and-disclosure-inhci-3d95007e9916.

Light, Ann. 2011. HCI as heterodoxy: Technologies of Identity and the queering of interaction with computers. *Interacting with Computers* 23 (5): 430-438.

MacArthur, Cayley, Arielle Grinberg, Daniel Harley, and Mark Hancock. 2021. You're making me sick: A systematic review of how virtual reality research considers gender & cybersickness. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, CHI '21, New York: Association for Computing Machinery.

Mander, Jerry. 1991. *In the absence of the sacred*. San Francisco: Sierra Club Books.

Margolis, Jane, and Allan Fisher. 2002. *Unlocking the clubhouse: Women in computing*. Cambridge: MIT Press.

Marshall, Andrea, and Jennifer Rode. 2018. Deconstructing sociotechnical identity in maker cultures. In *GenderIT'18: Proceedings of the 4th Conference on Gender & IT*, 91–100.

Martin, Michèle. 1991. *"Hello, central?": Gender, technology, and culture in the formation of telephone systems*. Montreal: McGill-Queen's Press.

Mbembé, Achille. 2003. Necropolitics. *Public Culture* 15 (1): 11–40.
Meerwijk, Esther L., and Jae M. Seveliu. 2017. Transgender population size in the United States: A meta-regression of population-based probability samples. *AJPH Transgender Health* 107 (2): e1–e8.
Menking, Amanda, Ingrid Erickson, and Wanda Pratt. 2019. People who can take it: How women wikipedians negotiate and navigate safety. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, CHI '19, 1–14. New York: Association for Computing Machinery.
Miller, Shae (Shaeleya) D. 2021. Trans aesthetics and similes of oppression: Transinclusive discourse in queer spaces. *Transgender Studies Quarterly 8*(3): 327–348.
Misa, Thomas J. 1999. *Gender codes: Why women are leaving computing*. New York: Wiley-IEEE Press.
Mulvey, Laura. 2013. Visual Pleasure and Narrative Cinema. In *Feminism and Film Theory*, ed. C. Penley, 57–68. New York, New York, USA: Routledge.
Nadeem, Ayesha, Babak Abedin, and Olivera Marjanovic. 2020. Gender bias in AI: A review of contributing factors and mitigating strategies. *ACIS 2020 Proceedings.*
National Geographic. 2008. Five genders? Video. YouTube. https://www.youtube.com/watch?v=K9VmLJ3niVo.
Newel, Allen, and Herbert A. Simon. 1976. Computer science as empirical inquiry: Symbols and search. *Communications of the ACM* 19 (3): 113–126.
Nonbinary Community. 2022a. Aporagender. Wiki Article. Nonbinary wiki. https://nonbinary.wiki/wiki/Aporagender.
Nonbinary Community. 2022b. Neutrois. Wiki Article. Nonbinary wiki. https://nonbinary.wiki/wiki/Neutrois.
Nova, Fayika Farhat, Michael Ann DeVito, Pratyasha Saha, Kazi Shohanur Rashid, Shashwata Roy Turzo, Sadia Afrin, and Shion Guha. 2021. "Facebook promotes more harassment": Social media ecosystem, skill and marginalized hijra identity in Bangladesh. *Proceedings of the ACM Human-Computer Interaction, 5* (CSCW1). https://doi.org/10.1145/3449231.
Ogbonnaya-Ogburu, Ihudiya Finda, Angela D.R. Smith, Alexandra To, and Kentaro Toyama. 2020. Critical race theory for HCI. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, CHI '20, 1–16. New York: Association for Computing Machinery.
Oudshoorn, Nelly. 2003. *Beyond the natural body: An archaeology of sex hormones*. London: Routledge.
Oyěwùmí, Oyèrónke. 1997. *The invention of women: Making an African sense of western gender discourses*. Minneapolis: University of Minnesota Press.
Paechter, Carrie. 2006. Masculine femininities/feminine masculinities: Power, identities and gender. *Gender and Education* 18 (3): 253–263.
Parr, Todd. 2011. *The family book*. New York: Little, Brown Books for Young Readers.
Patrick, Emilee, Dennis Cosgrove, Aleksandra Slavkovic, Jennifer A. Rode, Thom Verratti, and Greg Chiselko. 2000. Using a large projection screen as an alternative to head-mounted displays for virtual environments. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '00, 478–485. New York: Association for Computing Machinery.
PBS Independent Lens. 2023. A map of gender-diverse cultures. PBS. Annotated Map. https://www.pbs.org/independentlens/content/two-spirits_map-html/. Accessed 17 April 2025.
Porter, Dawn. 2020. John Lewis: Good Trouble. Film. CNN Films, AGC Studios, TIME Studios.
Race in HCI Collective, Angela D. R. Smith, Adriana Alvarado Garcia, Ian Arawjo, Audrey Bennett, Khalia Braswell, Bryan Dosono, Ron Eglash, Denae Ford, Daniel Gardner, Shamika Goddard, Jaye Nias, Cale Passmore, Yolanda Rankin, Naba Rizvi, Carol F. Scott, Jakita Thomas, Alexandra To, Ihudiya Finda Ogbonnaya-Ogburu, and Marisol Wong-Villacres. 2021. Keepin' it real about race in HCI. *Interactions 28* (5): 28–33. https://doi.org/10.1145/3477097.
Raji, Inioluwa Deborah, and Joy Buolamwini. 2019. Actionable auditing: Investigating the impact of publicly naming biased performance results of commercial ai products. In *Proceedings of the 2019 AAAI/ACM Conference on AI, Ethics, and Society*, 429–435.
Rankin, Yolanda A., Jakita O. Thomas, and Nicole M. Joseph. 2020. Intersectionality in HCI: Lost in translation. *Interactions* 27 (5): 68–71. https://doi.org/10.1145/3416498.
Reed, Erin. 2023. June anti-trans legislative risk map. https://www.erininthemorning.com/p/june-anti-trans-legislative-risk.
Reisner, Sari L., M. Ralph Vetters, Shayne Zaslow Leclerc, Sarah Wolfrum, Daniel Shumer, and Matthew J. Mimiaga. 2015. Mental health of transgender youth in care at an adolescent urban community health center: A matched retrospective cohort study. *Journal of Adolescent Health* 56 (3): 274–279.
Religious Action Center of Reform Judaism. n.d. A brief history of jews and the civil rights movement of the 1960s. Accessed: 6 April 2024.
Rich, Adrienne. 2013. *The dream of a common language: Poems 1974–1977*. New York: W. W. Norton & Company.

Robertson, Toni. 2000. Cooperative work, women and the working environments of technology design. *Australian Feminist Studies* 15 (32): 205–219.

Robinson, Brandon Andrew. 2022. Non-Binary embodiment, queer knowledge production, and disrupting the cisnormative field: Notes from a Trans Ethnographer. *The Journal of Men's Studies 30*(3): 425–445. https://doi.org/10.1177/10608265221108204 .

Rode, Jennifer A. 2011a. A theoretical agenda for feminist HCI. *Interacting with Computers* 23 (5): 393–400.

Rode, Jennifer A. 2011b. Reflexivity in digital anthropology. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, CHI '11, New York, New York, USA, pp. 123–132. Association for Computing Machinery.

Rode, Jennifer A., and Erika Sheenan Poole. 2018. Putting the gender back in digital housekeeping. In *Proceedings of the 4th Conference on Gender & IT*, 79–90.

Salehi, Niloufar, Roya Pakzad, Nazita Lajevardi, and Mariam Asad. 2023. Sustained harm over time and space limits the external function of online counterpublics for American Muslims. *Proceedings of the ACM Human-Computer Interaction, 7*(CSCW1). https://doi.org/10.1145/3579526 .

Scheuerman, Morgan Klaus, Aaron Jiang, Katta Spiel, and Jed R. Brubaker. 2021. Revisiting gendered web forms: An evaluation of gender inputs with (non-) binary people. In *Proceedings of the 2021 CHI conference on human factors in computing systems*, pp. 1–18.

Scheuerman, Morgan Klaus, Katta Spiel, Oliver L. Haimson, Foad Hamidi, and Stacy M. Branham. 2020. *HCI Guidelines for Gender Equity and Inclusivity*. Technical report. https://www.morgan-klaus.com/gender-guidelines.html. Accessed 17 April 2025.

Schilt, Kristen, and Laurel Westbrook. 2009. Doing gender, doing heteronormativity. *Gender & Society* 23: 433–583. https://doi.org/10.1177/0891243209340034.

Schlesinger, Ari, W. Keith Edwards, and Rebecca E. Grinter. 2017. Intersectional HCI: Engaging identity through gender, race, and class. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, CHI '17, 5412–5427. New York: Association for Computing Machinery.

Schlombs, Corinna. 2022. Women gender and computing: The social shaping of a technical field from Ada Lovelace's Algorithm to Anita Borg's 'Systers.' In *The Palgrave handbook of women and science since 1660*, ed. Claire G. Jones, Alison E. Martin, and Alexis Wolf, 307–331. London: Palgrave Macmillan.

Senior, Jennifer. 2016. Mothers all over are losing it. *New York Times.*

Spiel, Katta, Oliver L. Haimson, and Danielle Lottridge. 2019a. How to do better with gender on surveys: A guide for HCI researchers. *Interactions* 26 (4): 62–65.

Spiel, Katta, Os Keyes, and Pınar Barlas. 2019b. Patching gender: Non-binary Utopias in HCI. In *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*, 1–11.

Strathern, Marylin. 1980. No nature, no culture: The hagen case. In C. MacCormack and M. Strathern (eds), Nature, culture and gender, 174–219. Cambridge, UK: Cambridge University Press.

Stryker, Susan. 2017. *Transgender history: The roots of today's revolution*, 2nd ed. New York: Seal Press.

Stumpf, Simone, Anicia Peters, Shaowen Bardzell, Margaret Burnett, Daniela Busse, Jessica Cauchard, and Elizabeth Churchill. 2020. *Gender-inclusive HCI research and design: A conceptual review*. Boston: Now Foundations and Trends.

Suchman, Lucy. 2008. Feminist STS and the Sciences of the Artificial. *The Handbook of Science and Technology Studies* 3: 139–164.

Sun, Tony, Andrew Gaut, Shirlyn Tang, Yuxin Huang, Mai ElSherief, Jieyu Zhao, Diba Mirza, Elizabeth Belding, Kai-Wei Chang, and William Yang Wang. 2019. Mitigating gender bias in natural language processing: Literature review. In *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics*, 1630–1640. Florence: Association for Computational Linguistics.

Taylor, Jordan, Ellen Simpson, Anh-Ton Tran, Jed R. Brubaker, Sarah E. Fox, and Haiyi Zhu. 2024. Cruising Queer HCI on the DL: A literature review of LGBTQ+ people in HCI. In *Proceedings of the CHI Conference on Human Factors in Computing Systems*, CHI '24, New York: Association for Computing Machinery.

The White House. 2025. Defending women from gender ideology extremism. Website. Whitehouse.gov. https://www.whitehouse.gov/presidential-actions/2025/01/defendingwomen-from-gender-ideology-extremism-and-restoring-biological-truth-to-the-federal-government/. Accessed 17 April 2025.

Third International Intersex Forum. 2013. *Malta declaration. Technical report*, Organisation Intersex International Europe. https://www.oiieurope.org/malta-declaration/. Accessed 17 April 2025.

Thomas, Jakita O. 2023. Intersectional computing—where it all began: A sankofa story (part 1). *Interactions 30* (3): 63–67. https://doi.org/10.1145/3592860.

Thomson, Rosemarie G. 1997. *Extraordinary bodies: Figuring physical disability in American literature and culture*. New York: Columbia University Press.

Thompson, Clive. 2019. The secret history of women in coding. Computer programming once had a much better gender balance than it does today. What went wrong? *The New York Times Magazine* 13.

Thorne, Nat, Andrew Kam-Tuck Yip, Walter Pierre Bouman, Ellen Marshall, and Jon Arcelus. 2019. The terminology of identities between, outside and beyond the gender binary: A systematic review. *International Journal of Trangenderism* 20 (2–3): 138–154.

Tong, Rosemarie, and Tina Fernandes Botts. 2018. *Feminist thought: A more comprehensive introduction*, 5th ed. New York: Routledge.

Tronto, Joan C. 1993. *Moral boundaries: A political argument for an ethic of care*. Routledge. New York, New York, USA: Routledge.

Tronto, Joan C. 1998. An ethic of care. *Generations: Journal of the American society on Aging 22*(3): 15–20.

Turner, Stephanie S. 1999. Intersex identities: Locating new intersections of sex and gender. *Gender & Society* 13.

UK Research and Innovation. 2025. Equality, diversity and inclusion – EPSRC. Website. UKRI. https://www.ukri.org/what-we-do/supporting-healthy-research-and-innovationculture/equality-diversity-and-inclusion/epsrc/. Accessed 17 Apr 2025.

United States' National Science Foundation. n.d. Major initiatives / broadening participation in STEM. Website. NSF. https://www.nsf.gov/focus-areas/broadeningparticipation-stem. Accessed 17 April 2025.

Wagner, Ina. 1994. Connecting communities of practice. Feminism, science, and technology. *Women's Studies International Forum* 17 (2/3): 257–266.

Wajcman, Judy. 1991. *Feminism Confronts Technology*. University Park, Pennsylvania, USA: Pennsylvania State University Press.

Wajcman, Judy. 2010. Feminist theories of technology. *Cambridge Journal of Economics* 34 (1): 143–152.

Walter, Natasha. 2021. Guilt and fury: How Covid brought mothers to breaking point. *The Guardian*, February.

Warchus, Matthew (Director). 2014. Pride. Film. Pathé, BBC Films, Ingenious Media, British Film Institute, Calamity Films, Canal+, and Ciné+.

Weatherbed, Jess. 2021. Video games need accessibility stop gatekeeping fun. *TechRadar.*

Werft, Meghan, and Erica Sánchez. 2016. Male, Female, and Muxes: Places where a third gender is accepted. Website. Global Citizen, June 27, 2016. https://www.globalcitizen.org/en/content/third-gender-gay-rights-equality/. Accessed 17 April 2025.

West, Candace, and Don H. Zimmerman. 1987. Doing gender. *Gender & Society* 1 (2): 125–151.

West, Candice, and Sarah Fenstermaker. 1995. Doing difference. *Gender & Society* 9 (1): 8–37.

West, Candace, and Sarah Fenstermaker. 2002. Power, inequality, and the accomplishment of gender: An ethnomethodological view. In *Doing Gender, Doing Difference*, eds. C. West and S. Fenstermaker, 41–54. New York, New York, USA: Routledge.

Weston, Kath. 1999. *Families we choose; lesbians, gays, kinship*. New York: Columbia University Press.

Wilcox, Lauren, Renee Shelby, Rajesh Veeraraghavan, Oliver L. Haimson, Gabriela Cruz Erickson, Michael Turken, and Rebecca Gulotta. 2023. *Infrastructuring care: How trans and non-binary people meet health and well-being needs through technology*. New York: Association for Computing Machinery.

Wilson, Bianca D. M., and Ilan H. Meyer. 2021. *Nonbinary LGBTQ Adults in the United States*. Technical report. Williams Institute in the University of California Los Angeles School of Law. https://williamsinstitute.law.ucla.edu/publications/nonbinary-lgbtq-adults-us/.

Winner, Langdon. 1980. Do artifacts have politics? *Daedalus* 109 (1): 121–136.

Wisniewski, Pamela J., Neha Kumar, Christine Bassem, Sarah Clinch, Susan M. Dray, Geraldine Fitzpatrick, Cliff Lampe, Michael Muller, and Anicia N. Peters. 2018. Intersectionality as a lens to promote equity and inclusivity within SIGCHI. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*, CHI EA '18, 1–6. New York: Association for Computing Machinery.

Worthen, Meredith G. F. 2016. Hetero-cis–normativity and the gendering of transphobia. *International Journal of Transgenderism* 17: 31–57. https://doi.org/10.1080/15532739.2016.1149538.

Young, Iris Marion. 2002. *On female body experience*. Oxford: Oxford University Press.

Zweben, Stuart, and Betsy Bizot. 2021. *2021 Taulbee survey*. Technical report. Computer Research Association. https://cra.org/wp-content/uploads/2022/05/2021-Taulbee-Survey.pdf. Accessed 17 Apr 2025.