4 TECHNICALLY, "YOU'RE DIFFERENT, AND DIFFERENT ISN'T FREE"

Technological acumen is a form of social power in US society, which is thoroughly computerized, with the majority of the population frequently engaged in activities involving computers or computer-based technologies. Conversely, the computing workforce is highly segregated, comprised largely of members of dominant classes. This chapter focuses on the production and design of computing technology and the subjectivities of its creators. My concern is labor in computing and how women workers' embodied experiences doing this labor can elucidate the cultural mechanics of the Bro Code. Because I once worked in Big Tech but have since stepped out to become an anthropologist, I include my "insider" experiences in the field as data and then bring a structural analysis made possible from an outsider's perspective. I do so as a feminist, to occupy a similar plane of vulnerability as my research participants (Behar 1996; Forsythe and Hess 2001), and as an action-oriented anthropologist who seeks to underline the importance of collective action among tech workers (Anderson 2006).

The heart of my analysis beats with the cadence of feminist anthropology. Joining this rhythm are other forms of inquiries into gender and computing, specifically the history of computing, social psychology, and feminist science and technology studies (STS). Together, they break down how gender relations in the field were shaped by traditional roles, rules, and cultural stratifications governing US industry and the military (Hicks 2017; Misa 2010; Ensmenger 2010b). Stereotypical ideals of masculine identity and technical identity were fused to exclude women from computer

engineering, and they thus shaped the practices and policies in the postwar days of computing. Over several generations of programmers, these practices calcified into a deeply entrenched, masculinist culture (Abbate 2012; Ashcraft and Ashcraft 2015; Misa 2010; Ensmenger 2010a, 2010b). Women technologists are marked as different, othered, and I will show how this othering comes at a cost.

In social psychology theories, unexamined bias is an oft-cited factor in the perpetuation of gender segregation in science and engineering (Smyth and Nosek 2015; Banaji and Greenwald 2013; Moss-Racusin et al. 2012; Steinpreis, Anders, and Ritzke 1999; Committee on Science, Engineering, and Public Policy 2007). The public perception that computing is detached from social engagement and lacking communal purpose also deters women from entering and persisting in the field (Cheryan et al. 2017; Cech 2013, 2014; Diekman et al. 2010, 2016). Feminist STS finds similar connections between altruism, computing, and women (Blanchard Kyte and Riegle-Crumb 2017; Litchfield and Javernick-Will 2015; Garibay 2015; Hacker 1981; Faulkner 2000a, 2000b; Cuny and Aspray 2001; Margolis and Fisher 2003). Furthermore, feminist STS scholarship illuminates how gender troubles in computing are reproduced by gender schemas, chilly climate, and the historical, interpersonal dimensions of sexism in science (Wylie 2012; Valian 1999; Sandler and Hall 1986; Harding 1991; Schiebinger 1999). Jobs within scientific organizations are designed for workers with little to no reproductive responsibilities, a framework that is gendered in US society (Williams 2000; Acker 1990). This organizational design correlates with the persistent gender gap in these fields, reinforcing women's primary responsibility for labor in the home (Watt and Eccles 2008; Xie and Shauman 2003; Valian 1999; Schiebinger 1999).

These theories of the history of computing, social psychology, and feminist STS offer an interpretative framework that elucidates why women are so grossly underrepresented in technical fields. But the social matrix generating labor norms in the US workforce—the values governing cultures within computer science and engineering educational and industrial sites and the normative processes by which computing technology becomes constructed as masculine (Lerman, Oldenziel, and Mohun 2003)—still needs greater explanation.

FEMINIST ANTHROPOLOGY OF REPRODUCTION

Besides babies, bias, and altruism, what are other causes of gendered labor segregation in computing? Feminists have established that men from dominant groups hold cultural power that allows them to define social relationships, economic values, and the meaning and purpose of science and technology (Rosaldo, Lamphere, and Bamberger 1974; Collins 2000; Lohan 2000). Feminists have also challenged claims of universality and objectivity in scientific knowledge production, leaving the norms of dominant groups open to scrutiny and challenge (Haraway 1988; Harding 1991). The contributions made by feminist anthropologists, especially the insistence that reproduction be made central in cultural and political economic analyses (Chapman 2003; Ginsburg and Rapp 1995; Martin 1992; Davis-Floyd 1992), are integral here. They enable a fresh perspective that shifts the spotlight of inquiry away from the marginalized and toward the practices, values, attitudes, and performances of dominant groups. Thus, feminist anthropological analysis extends reproduction beyond the bounds of the physical to consider instead its ideological function in sites of computing knowledge production.

With notable exceptions (Clancy et al. 2014; Carr et al. 2000), experiences of hostility and overt sexism in sites of computing knowledge production are underrepresented in academic discourse. While unexamined bias, childrearing, and incongruent career and altruistic aspirations are extremely important to understand in efforts to end labor segregation in engineering, we must recognize, investigate, and protest male violence against women and nonbinary people in the scientific disciplines. As a corrective to this dearth of scholarship, this chapter reveals and interrogates hostile environments and inequitable labor relations in computing. It explores the cultural beliefs, values, and labor practices common in computing knowledge production; offers evidence of gender and sexual harassment in domains of today's computing workplace; and documents the ways in which women respond to this violence.

ENCODING AND REPRODUCING TECHNOCRATIC RULE

I take seriously Robbie Davis-Floyd's claim that US society is a technocracy, where technological progress is equated with social advancements, and

this reigning ideology is a source of power for the ruling class (Davis-Floyd 1992). Her work illustrates how a cascade of technical interventions in biomedical birthing practices is driven by a pervasive fear of natural processes and women's power. This fear similarly pervades computer science departments and workplaces. To support this claim, I adopt and expand on Davis-Floyd's conceptualization of technocracy beyond physical reproduction to include the processes and production of computing labor that regenerate historical patterns of labor segregation. In doing so, I am able to use her theoretical construct to explore gendered ideologies shaping technocracy in the US and the opportunities and constraints of women's power in the production of computing knowledge.

Davis-Floyd's (1992) concept of rites of passage is also useful in interpreting participants' stories of discrimination and exclusionary bonding rituals that solidify male hegemony. Hegemony operates through both authoritative rule and popular consent (Gramsci 1971). In other words, coercive powers structure institutional norms of exclusion and inclusion and, when married with everyday norms and "common sense" ideologies, reproduce the power of ruling groups (Gramsci 1971). Excavating and naming rites of passage in computing sites of knowledge production can provide a deeper understanding of the process by which computing labor is gendered and racialized.

According to Davis-Floyd (1992), rites of passage have four purposes:

1. To give humans a sense of control over their environment
2. To protect initiates during their transition from one social status to another and tap into their vital power
3. To cement core values of the culture
4. To celebrate these core values to ensure the reproduction of a belief system

I adopt this analytical tool, first, to better understand the social construction of computing workers who create and maintain computer systems in the US and, second, to interpret male bonding practices, which often involve hostile behaviors. Finally, I question valorizing the technical over the social. Reproducing the belief system that technical knowledge is superior to social knowledge is a highly gendered rite of passage, invigorating and regenerating the value system that makes the rule of technocrats possible. These ritualized rites of passage signify the social matrix that creates the cultural values in computing sites of knowledge production. The core values

developed and reinforced by these rites relate to formal modes of thinking that stress control, efficiency, and compartmentalization of knowledge. Initiates who maintain and reproduce such core values are considered meritorious and deserving of their success. These compulsory logics influence not only computing sites of knowledge production and computing commodities but, more broadly, society.

What do the experiences of women who are valiantly trying to desegregate computing say about *core values* binding masculinity and technology and the cultural reproduction of these values into a powerfully *dominant belief system*? Further, how can the transitioning identity of the geek from a lowly social status to an elite one inform analysis of initiation into the field and cultural nexus of power relations? I argue that processes and value systems by which people become computing professionals reproduce labor segregation in high-tech fields and reflect a culture ruled by gendered, technocratic ideologies.

GEEK MYSTIQUE

Since the advent of the personal computer, the social standing of the geek has changed. Gone are the days when the computer practitioner was a pariah, though the fog of this stereotype still lingers, negatively affecting the field by turning off young women from exploring the computing industry (Cheryan et al. 2009). The lone male computer genius is, in today's mythical landscape, "a true American hero" (Misa 2010, 261). US society labors under this *geek mystique*, where white males have much material and symbolic power but still struggle with a stereotype of social awkwardness. The contradiction between the geek mystique, the power that computing practitioners hold due to expert skills in an elite, prestigious field, and the geek stereotype is critical to understanding the specific kind of social identity that reproduces male hegemony in computing. Computer knowledge producers reflect and reproduce a value system that prizes rigor and precision over collegiality, numbers over stories, and strict codes, including dress. These values privilege dominant group members' identities.

Who is the geek, and who does the geek stereotype claim to embody and empower? As described by five of my participants in remarkably consistent ways, the stereotypical geek is a person of male gender identity who works

in the dark and prefers machines to people. Karen, a white mid-career professor, described the geek stereotype:

> What you see on TV is that brains don't matter and pretty girls can't be smart. The mass media portrayal of tech workers isn't any more nuanced: you sit in the dark, eating pizza and playing video games.

Becca, a white doctoral candidate, had a remarkably similar description of the geek stereotype: "[Computing has] a negative persona attached. It's radical. So, it's a guy in the basement eating pizza and [drinking] Mountain Dew." Colleen Lewis, Ruth Anderson, and Ken Yasuhara (2016) also found the geek stereotype to be characterized as a singularly focused, asocial male. The content and the consistency of the language used to describe the stereotypical image of a computer scientist may be evidence of Davis-Floyd's second rite of passage, whereby an initiate is separated from a preceding social state.

The geek stereotype symbolizes how "competent" computing professionals move from the social world to the virtual one and, in doing so, signal their choice to prioritize the virtual over the social world. Other social activity is discouraged, and a myopic focus on computers is expected. Tony, a white male mid-career professional, explains how this manifested in his initiation to the field:

> I remember really clearly my first class at Stanford [University] in computer science. There was this guy who was on the basketball team. For all I know, he was on a basketball scholarship. And I remember the professor saying to him, "You have to choose—computer science or sports. You cannot do both."

Tony's undergraduate computer science professor is imparting technical wisdom, and he expects disciple-like reverence in return. This is an example of a rite of passage in the computing classroom that encourages one right way of producing knowledge to the exclusion of developing other talents and inquiries. This pedagogical approach also mutes students' curiosity about the integrated computational elements of a program (Turkle and Papert 1990). It translates into labor market practices where devices and systems can be integrated into a worker's labor practice without knowledge of their internal workings. This labor practice, called "black boxing" by computing practitioners, mirrors how the inner workings of the computing field appear to the majority of digital consumers: opaque and veiled in mystery.

Not only is social activity frowned on in computing, so too is socially applied research. Shawna, a graduate student in computer science, described

her struggle to gain support from her adviser Rick to use qualitative social science methods in her research:

> Rick talks a good game, but he's not supportive of education research. It's a softer science. Oh, "veneer of science," that's how he describes it.

Computer scientists' resistance to qualitative science reflects the second stage in rites of passage: protecting computing initiates from dangerous outsiders who threaten ritual conductors'—senior members of computing—unrestricted access to the power that their acolytes supply to their system. As in other male-dominated institutions—for example, christian religious sects that declare that there is only one path to "Truth," one legitimate way to participate in the organization.[1] To make invisible the social, material aspects of computer practices is to create a cultural mindset whereby technical artifacts and those who make and control them are superior to those concerned with social need and social reproduction (Cech 2013). Who do these kinds of social relations serve best?

The geek stereotype has recently shifted from soda choice and social awkwardness to a peremptory bravado reminiscent of the stereotype of the nouveau riche. While many computing practitioners today are quite wealthy, a few obscenely so, this cultural shift is not a story of rags to riches but rather one of outcast to ruler, where the geek once stereotyped as a misfit is now a highly influential figure. The geek mystique not only helps to illuminate the particulars of the workplace environment that women technical professionals must navigate in order to persist in their chosen field, but, more broadly, it suggests a new stage of technology evolution in which power wielded by the newly initiated signals a new pattern of social relations (Hakken and Andrews 1993). This new stage is characterized by a white male hegemony over ideas and artifacts that has reached such a widespread level of dissemination that some computing experts can feel a sense of hubristic control over the paradigms of reality perceived by the majority of people in the US. This hubris informs a specific kind of masculinity at work in high-tech environments, one vital to cracking the code of labor segregation in computing.

CEMENTING CORE VALUES

Male hegemony in computing is a sign of a much larger imbalance of power in US society. Racial stereotyping is also programmed into the Bro

Code. The geek mystique operates in computing as a racial code (Benjamin 2019). For example, Emmanuel, a cisgender male software engineer from Ghana, responded to my question about whether he wore his current attire, a sweatshirt with an expensive label, to his high-tech workplace. "Yeah, this is cool," he said, touching the fabric of his ensemble fondly. "Unless . . ." Then he gently and methodically pulled the hoodie over the back half of his head and looked at me askew. Without saying a word, Emmanuel invoked the memory of Trayvon Martin and drove home the devastating costs of wearing a hooded sweatshirt while Black in the US. In Emmanuel's performance, he showed how traditional garb of coding experts is racialized. The hooded figure, a symbol of the Bro Code in current computing lore and its attendant power in society, is available to whites only.

Like common grooming habits and sartorial standards in US culture, men from majority groups in computing exert power by maintaining cultural norms that maximize their comfort while women and other technologists of color experience heightened scrutiny and surveillance. For example, Emmanuel said there is an unspoken rule among his male peers of color not to be seen walking or congregating in groups larger than three; otherwise, they felt hostility and suspicion from their white peers.[2]

The internal processes by which computing workers are initiated into and disciplined by this labor force elucidate the shifting parameters of power in tech environments as perceived and experienced by workers marginalized by their social identities. For example, the stereotype of the geek as someone who adorns their walls with Star Trek posters and builds towering pyramids of Mountain Dew cans in their cubicles and labs has evolved to reflect the foothold of power that computing professionals have gained in US society. Unfortunately, the evolution of the geek is not following a linear progression to egalitarianism or to a "democratic technoscience" (Eglash 2002, 61). Instead, the geek stereotype continues to signal the power of the "pale male" (Lazowska 2002) and the power structures that prioritize their comforts.

In other words, the geek mystique in broader society enables workplaces cultures that tolerate or even encourage the belief that white men have a greater competency in scientific and technical knowledge production than their peers. This cementing of social identity and technical prowess is a core value of computing culture, bonded by a technical fetish that reigns the day. This core value not only shapes the quality of the workplace environment

but also plays a role in how commodities made by computer scientists are confused with society's triumphant progression toward freedom and democratization (Dean 2009). Some male practitioners leverage this phenomenon in efforts to achieve elite, even mythical, status in US culture.

"CUZ YOU'RE A GIRL"

Feminist ethnographers have documented male students' peremptory attitudes toward others in computing, especially women (Faulkner 2007; Barker and Garvin-Doxas 2004). Early initiates in the training phase of a computing career quickly learn which gender identities are most valued, and some avowedly heterosexual white men leverage this existing hegemony to bolster their feelings of belonging and competency.

Sharon, an Asian American undergraduate student, told me of the hostility her female friend experienced from a male peer:

> My friend's classmate told her that she wouldn't do better than him in Physics 122 because she was a girl. And I was like, "Oh, no, he did not!" Well, she got a better grade than him—so. That's the sweetest revenge!

Evelyn also had an experience with a male peer who presumed he was more technically competent than she was:

> We were doing the group project . . . and one of the guys was like, "Oh, you're a girl. You don't know what you're doing. You can [make] the instructions pretty and all that stuff, but I'll take care of the computer." I'm like, "One, I know how to take care of a fan in a computer. Two, like—grrrr!" He thinks he's a geek god.

Both Sharon's and Evelyn's stories demonstrate that some male students feel the need to prove their competency by leveraging a sense of entitlement related to male identity. Sharon compares her peer's arrogance to a god complex, suggesting that his initiation into the computing field is a rite of passage similar to those who belong to orthodox belief systems predicated on an exclusivity of the faithful. The male peers of Sharon and Evelyn seek to belong in the technological community by dismissing and marginalizing their female peers.

Julie, a white early-career software developer in industry, also spoke about navigating sexist behavior in computing, this time on the part of a computer science and engineering professor:

> He was great . . . but he was the epitome of an egomaniac—I used to joke with some of my classmates that you would get a check minus if you're a girl who questioned what he said in class.

Julie's experience exemplifies women computer scientists' contradictory feelings toward and relationships with men in their field. In this instance, Julie seeks to work with a male professor who she respects, so she uses humor to negotiate his paternalistic attitude toward her. Both Sharon's and Julie's stories illuminate not only the sexism they faced but also the egotism exhibited by some men as well.

Doctoral student Shawna had a similar experience with a senior male computing professor. When she told him that she had decided to incorporate qualitative methods into her dissertation project—focused on helping disable computer users—he replied: "Well, you know, it's okay that you're doing, you know, lesser fields of computer science, because you're a woman." In response, she joked to me that she didn't take him too seriously because she had "more balls than him."

Becca, a white doctoral computer science student, experienced a similar conflict when her intimate partners dismissed her accomplishments because she is female:

BECCA: At my last internship after my freshman year . . . my boyfriend at the time was like, you know, the only reason you're getting this internship is 'cause you're a female.

COLEEN: Someone you cared about told you that?

BECCA: Oh, yeah.

COLEEN: Oh my, that must've been devastating. So, he said the only reason you got your internship was because you were a girl?

BECCA: Yep. That's not all . . . another ex-boyfriend I've had in this department, yeah, he was trying to explain to me how I was, like, of average intelligence and I'd have to work hard. He said he was more capable but didn't have as much work ethic or something like that. He told me that once. And then I started yelling and—basically what I got out of him—I was just drilling him 'cause I'm not afraid to drill somebody. And what he finally said was he was upset that I got so many more fellowships than he did.

Becca's former partners were threatened by her success and turned to sexist reasoning to bolster their sense of belonging in this competitive field. An illuminating exchange between Ava, an Asian American undergraduate student, and Cynthia, her white peer, demonstrates the complex gender relations in computing and how women's perceptions differ:

CYNTHIA: People don't like outright discriminate, or like [say], "Oh, you don't know what you're talking about; you're a girl." Like, I've never heard that or anything.

AVA: I have.

CYNTHIA: Like slightly seriously?

AVA: Very seriously.

Their exchange epitomizes two camps of women that I met during this research into male hegemony in computing fields: those who believe "outright" discrimination is alive and well and those who do not. Cynthia holds a leadership position in her engineering sorority and helps organize undergraduate women *as women* in engineering majors at a top research university. Based on this activism, and my two interviews with her, I believe that Cynthia knows that her field could be more welcoming to women, but she perceives her own and other women's paths in computing to be free of *overt* sexism. In this sense, she is different from some other female computer scientists who responded peevishly to questions regarding gender. For example, a female undergraduate student called the Grace Hopper Celebration of Women in Computing a "celebration of separatism," criticizing this women-only function as unnecessarily divisive and exclusionary.

My goal in the following section is to act as Ava did and offer stories documenting evidence of overt discrimination, including harassment. Others, like Cynthia, who want to fix the low numbers of women in computing, must recognize violence is at play in high-tech workplaces and in the halls of higher education institutions, whether or not their personal experiences confirm it. Taking this seriously and acting on it can inform and invigorate social movements to desegregate STEM and combat injustices that reproduce cultures of exclusion in these fields.

SEXUAL AND GENDER HARASSMENT

> (January 2001): Tim D. was hired as a vice president and became my new manager. In Tim's first team meeting with his direct reports, he told a story about parading about our office building naked. He said a security guard asked him to put his clothes back on. Apparently, he was so tickled with this escapade that he returned to his office and called his 23-year-old female executive assistant at home at 9:00 p.m. to share it with her. I was disgusted and creeped out that he shared this story at our meeting as an "icebreaker."

Tim's antics—and others that followed—were the impetus for my attrition from Big Tech and the initiation of legal proceedings against my former employer, Colossus. The field memo above was taken from said legal proceedings. This naked parade of power was the most absurd thing I had witnessed, but not entirely out of character for an organization that actively cultivated and fostered male-bonding rites of passage to cement a stereotypical masculinity as a core value of the organization as it moved from being a start-up to a Wall Street darling.

I share my own story to support my argument that sexism and hostile environments in high-tech are reproduced not only through unexamined bias and microaggressions but also by sexual and gender harassment and the silencing of those who protest these injustices. Sexual and gender harassment were common in my research participants' lives, too. A male senior manager at Gryzzl (Cary 2015) groped a student participant repeatedly during her internship. A male student stalked a full professor, and when she brought this to her male chair's attention, he said she was "a bleeding heart liberal" who deserved what she got.

Julie, a white early-career user experience designer, connects this kind of sexism with hate:

> So there are the geeky kids who respect intelligence. Then [there are] the ones that have the ego problems that are threatened by women; it just doesn't end up going well. I mean, I can cater to it for a while, but I just lose. I mean, with women—like an ego-driven boss or manager—it's just a pain in the ass, but it feels like it's *really* a pain when it's a male having the ego issue being that you're female. Then you're dealing with hate issues—and sexist issues.

The emotions present in Julie's account tell us much about sexist male leadership in computing. The words "pain" and "hate" signal the level of violence imposed by male managers with "ego problems." To further support Julie's insights into male violence in computing, I share the details of an incident of harassment at a technology conference. Ada, an African American mid-career computer scientist, spoke out against sexism at a March 2013 PodCon conference and quickly became the target of hate. During a panel presentation, two men behind her made sexual innuendo jokes. Although flustered, she tried to ignore them. Then the conference featured a young girl learning to code. Ada says that this girl motivated her not to sit back and endure another instance of sexual harassment: "I realized I had to do something or she would never have the chance to learn

and love programming because the ass clowns behind me would make it impossible for her to do so."

She tweeted a photo of the two offenders with the note: "Not cool." Ada was supported by the PodCon conference staff who spoke to the men and reminded them of PodCon's code of conduct. Her post went viral, and Ada was fired from her company "for dividing a community she was supposed to unite." In addition to losing her livelihood, she was the target of a barrage of racist and misogynist messages, including threats of rape, murder, and dismemberment. In this case, speaking out against sexism was deemed divisive, and a woman who broke the code of silence regarding sexism was threatened.

Like Ada, I was reprimanded at my high-tech workplace for calling out unexamined bias publicly in meetings. Both colleagues and superiors told me that these types of complaints were better handled one-on-one and in private. In private, I made repeated complaints of bias and both gender and sexual harassment to my boss and to human resources (HR) staff. I complained three times to HR about one repeat offender, a peer with whom I worked closely. My colleagues also made two complaints about him, and an anonymous female employee spammed our entire department about this man's incessant habit of sitting on the edge of a desk in front of women colleagues and scratching his testicles. The anonymous spammer insisted that he stop this form of sexual harassment. Not only was his behavior tolerated, but this former Navy officer was promoted to a senior leadership position by the department's vice president, also a former Navy officer.

CODES OF SILENCE

In her book *Lean In: Women, Work, and the Will to Lead* (2013, 12), Sheryl Sandberg asks technical women what they would do if they were not afraid; "I asked myself that a number of years ago," she wrote, "and I started getting on stages and talking about being a woman." It is telling that the woman whom *Forbes* magazine named the fifth most powerful women in the world in 2011 (Sandberg 2013) was afraid to speak about her gendered standpoint in cultures in computing. At the 2013 World Economic Forum's annual meeting in Davos, Switzerland, Sheryl recounted how her lawyer warned her not to speak out about discrimination in her field, to which she responded: "If someone wants to sue me because I'm talking about gender discrimination, go ahead" (Sandberg, quoted in Stewart and Wearden 2013, 2). In a more

just society, it would be the harassers and the institutions that tolerate them that would be worried about being sued, not the people targeted by harassment. Instead, in computing, men's treatment of women—undermining, objectifying, and harassing—is normal; it is simply the way things are, and women who speak out about this treatment risk punishment (Carrigan, Green, and Rahman-Davies 2021; National Academies 2018).

Still, it is important that women working in technology fields are finding the courage to share not only their experiences of sexism but also their experiences of a coercive pressure to remain silent. These testimonies break with cultural norms that marginalize women's voices and experiences as alien and unwelcome and expose these codes of silence. Still, as Ada's and Sheryl's experiences demonstrate, the potential consequences of transgressing normative codes in computing are steep. For example, Josephine, a white senior software developer whom I met at a computing conference, was mad about her company's "leadership problem." She backed up her feelings with numbers—only five senior managers out of 800 were women. After sharing this data point, she stopped herself, turned bright red, and said: "Hold on—I want to keep my job." Lawsuits, harassment, and unemployment are just some of the consequences women must consider before challenging male hegemony in computing.

Interpreting women's experiences in computing through the lens of Davis-Floyd's conceptualization of rites of passage in technocracy reveals several core values. First, women are not technically competent, and those who were "allowed" in the field are trespassing on male domain. Second, women are objects who exist for male gratification. Those who protest these normative values may face retribution, including lawsuits and unemployment.

RITUAL MATING: REPRODUCING THE BOND BETWEEN MASCULINITY AND TECHNOLOGY

The ideological marriage of masculinity and technical competency is maintained and reproduced by rites of passage related to organizational belief systems and power relations that favor the dominant class. Women's lived experiences and their emotions help to excavate the fundamental systems of belief undergirding computing: control, normative masculinity, precision, hysteria, hostility, hero posturing, and the superiority of the technical

over the social. These beliefs, forged in the crucible of patriarchal power relations, form the social matrix of computing technology production. This social matrix is reproduced in ways best understood by Davis-Floyd's (1992) fourth intention of a rite of passage: celebrating the culture's belief system in order to reproduce it. Gendered and gendering labor processes serve to indoctrinate computing workers' to the core values in computing commodity production, including constant observation, intense evaluations of others, and the devaluation of sociality, with concerning implications for broader cultural domains in the US.

CONSCIOUS AND PERMANENT VISIBILITY

Just as consumers of digital technology sacrifice privacy for the convenience and pleasure of its tools (Solomonides and Levidow 1985; Zuboff 2019), so too do its producers. Some Big Tech corporations use proprietary open-source software to allow employees to oversee their peers' work. Lynn, a white early-career software engineering, defines this work style as "a cultural issue that does not appeal to women." It is not intended to exclude women, she said, but inadvertently has that effect because it is not an anonymous process and can make underrepresented group members feel that much more conspicuous within the organization. Thus, in addition to being tethered to one's mobile communication devices, computing professionals are accessible to their employers through competitive jockeying and peer oversight. Companies benefit from these practices because they foster a sense of urgency that gets work done more quickly. This scrutiny can stress even the most accomplished workers, like Lynn, who disdain the spotlight and would prefer to work without being constantly observed. Thus, in both the production and consumption of computing technology, actions are publicized and under constant observation.

HAZING CANDIDATES

Another rite of passage specific to initiation into the computing workforce is the public process of hiring interviews at technology corporations. Carol, a white senior software engineer, describes the interview process at her former job, saying: "We just drove the hell out of candidates." Her male colleagues, however, went easy on the female candidates and later doubted their competency. Carol vocally objected to her male colleagues' negative stereotypes about female candidates' competence but does not make a connection

between this and the aggressive and grueling hiring process. Janice, a white senior leader in academia, *does* makes the connection between bias against women candidates and the structure of the interview process, stressing that the common practice of hazing job candidates needs to be transformed in order for gender parity in the computing workforce to be realized. Within the context of other labor practices common in computing, hazing candidates in the interview process makes more sense. It is the first of a series of rites of passage that convey repetitiously to initiates that excellence is defined not only by one's competency but also by one's ability to "hack" it: to endure and withstand derision and hostility in one's workplace.

RIGOR AND COMBATIVENESS

Many women who persist in computing take pleasure in particular aspects of their technical work, especially in the precision that coding requires. However, a dark side of this aspect emerged in this study, one that serves as another example of a rite of passage. The demand for control and precision in computing can lead to a combative climate that is differentially harmful to underrepresented groups. Diane, a senior academic who is white, told me, "[In] our field, because we're computer scientists, we're very precise, and I think we badger each other too much about precision. Like, if something isn't precise, you're going to be challenged, you know. And I think it's meant well, but I think it's wearying."

Other technical women reiterated Diane's sentiments, frequently citing the field's emphasis on "precision" and "rigor." Significantly, research participants viewed these values and practices negatively, describing them, for example, as "shoddy," "hypercritical," "nasty," "a bully mentality," "put-you-down BS," and "adversarial rudeness." Cultural norms on being precise and intensely accurate in order to ensure rigor creates "abrasive" communication practices and behavioral norms, thus eroding collegiality in sites of computer knowledge production. For example, Theresa, a white mid-career professional, described her experience:

> What I would see is, like, you know, we'd start these bug meetings every morning called "war team meetings." Literally, who yells loudest gets the floor. I would really feel good when I hear things like, "Damn, she's such a fucking steamroller." Absolutely! But then . . . on the way home, I would actually feel bad about my behavior at work, you know. I would cry a lot at work, because I also felt like I had no sense of self.

Another participant suggested that this combative behavior might trickle down from the top: "I have sat in the room with [one of the wealthiest people in the world] when he just goes, 'That's the stupidest thing I think I've ever heard. What are you trying to do, just destroy this company?'" When she told him that his behavior was inappropriate and to change the tone and tenor of his delivery, she was confronted with both the tears and anger of this powerful global leader. His employees who mimicked this behavior, like Theresa at "war team" meetings, reported feeling bad afterward. Tony, a white mid-career professional and former McTech employee, explained:

> I saw a lot of people be mean to each other and . . . people there would talk about how tough they were, but I saw so many people acting abrasive and tough and going back to their office and being upset about it. You know what I mean, like people are like; a lot of techies are actually very sensitive.

Tony asked us to consider the sensitive side of computing professionals. Theresa asked us to consider the divided consciousness that emerged while she negotiated a hostile workplace environment and her personal values. Both participants, I argue, exhibit signs of oppositional consciousness (Sandoval 2000), a rupture catalyzed by their attempt to reconcile their personal values with their organizational workplace culture. The sensitivity that Tony reminds us to consider happens away from public view. However, these private moments of reflection and reckoning uncovered in this ethnography offer possibilities for interventions that could help computing laborers integrate their personal values and their computing work. These moments represent computing workers' yearnings for a change in the core values espoused by their leaders. Women leaders are standing up to powerful men and refusing to tolerate their histrionics, suggesting that more senior women leaders could help change the entrenched combative cultural norms rife in computing workplaces. The impact that Big Tech bosses have on their workers' behaviors also suggests that educating senior executive leaders on the importance of collegiality may go a long way to improving organizational cultures in computing workplaces.

Cultures in professional high-tech settings are rigorous in the sense that they are harsh environments with extreme conditions, even for dominant groups members, let alone those already taxed by injustices in broader social domains. In other words, while hostile work environments are bad for all workers in the organization, these conditions have a differential impact on

group members who are also targets of racism and sexism. For example, consider what it means to inhabit a woman's body when outnumbered in a male-dominated environment that rewards combativeness among colleagues. Now consider me, the only woman in a 600-square-foot conference room with three men. The vice president of information technology (IT), a 300-pound former Marine, screamed at us while pounding his hand on the table. All I could think was, "He's blocking the door. I can't get away." This frightening experience of fearing violence in my high-tech workplace has led me to pay close attention to fear in other women's narratives to better understand men's coercive power at work in computing and how this power operates in concert with the ideologies of technocracy to reproduce male hegemony in one of the world's most influential, lucrative fields.

PERFORMING THE AMERICAN HERO

A male executive from Transco shared another example of how some men perform power in computing. He described his experience of his supervising two groups—software engineers and hardware engineers. Before important product launches, the male-dominated hardware team would find a big bug a week before launch and want to hold up the time line. The storyteller refused them, so they would stay in the office all night and day, not shower or go home, eat pizza and drink soda, and "heroically" deliver on time. Afterward, the boss would give them all awards. One day, the female director of the software team said to her manager: "Do you notice my team goes home at five every day, including during launches, and we deliver no problem on our deadlines—no drama and no awards?" The male executive was stunned to reevaluate the situation in this light. He reflected, "The women-led, more diverse team made the work look effortless—on time, every time."

The male-led hardware engineer team periodically created crises in order to look like the "heroes." Janet Abbate (2012) argues that since the advent of computing in the 1950s, the field has constituted itself as being in "permanent crisis" (Abbate 2012, 73), and she claims the manufacturing of crisis was a challenge to disciplinary boundaries and gender identity. Similar dynamics were at play in the gender performances in the IT department at Transco. The male computer scientists, in this instance, performed a particular kind of heroism that included a willful denial of self-care and positive health practices. Were they trying to embody the now-elite status of the stereotypical geek while also performing the popularized discourse

of the new "American hero" (Misa 2010), blazing cyber-trails in the digital landscape? My interviewee stressed the gendered nature of the performance and his own reverence of it. Why did he reward this behavior, even though his female-dominated software team produced steadily reliable, positive results? The Transco executive's story pulls back the curtain to reveal the patterns of behavior creating "heroic power" in computing culture, whereby heroes are celebrated for their feats and their behavior idealized for other members of the culture to emulate.

I was very familiar with these types of histrionics in my interactions with the software architects and engineers at my former job. The nontechnical members of our interdepartmental team—all men, save me—would often roll our eyes at our colleagues' theatrics and referred to them wryly as "the high priests of IT." Masculine ideals in computing and increasingly prestigious occupational identity combine to generate a mythical image of religious proportions. The "latter-day priesthood of nerds" (Misa 2010, 259) reflects a cultural aspiration of some technical workers, characterized by elite status, male separatism, and a not insignificant amount of dramaturgy.

EXPERIENCES OF BEING OTHERED

Senior women with whom I conducted life-history interviews frequently mentioned weariness or told stories of the exhaustion of their peers and mentees. Listening to their reflections on critical phases of their careers, I got the sense that the transition from advanced education to the professional world was particularly stressful. In other words, for women in computing, the early-career stage, the passage to professional life, is particularly perilous. Proving oneself and finding new networks of support after leaving others behind is difficult enough without the additional taxation of being a member of an underrepresented group in a field that prizes aggressive critiques.

Diane, the senior academic quoted earlier, explained:

> It's not that people are bad, or people are negative, or people want to put you down—it's just the way we think, and the way we behave, and the way we're trained. And it's just wearying after a certain point, but it's especially wearying if you're a woman and you're not really ever getting any good validation, and criticism is all you're ever hearing. It's very wearying. I'm getting really tired of it.

Women's attrition from scientific fields in the early- to mid-career stages is often explained as the woeful overlapping of the tenure clock and the

biological clock (Xie and Shauman 2003; Williams 2000). This is an incomplete conclusion. Regardless of whether a woman computer scientist wants to bear children, she must still confront dominant gender norms that reward women for some behaviors and punish them for others.

For example, Susan, a white senior computing professional, augments Diane's discussion of women's exhaustion, connecting it with epistemic violence:

> It seems that we still have to prove ourselves more than the men do, still have to show we're just as smart as everyone else in the room. For many of us, over time that effort simply gets exhausting, and we leave the profession.

Susan illuminates how women's capacity as knowers is doubted in computing, an injustice that seeks to denigrate women's intelligence and constrain them from articulating, and perhaps even consciously understanding, their experiences within male hegemonic modes of knowledge production (Fricker 2007).

Carol, the white senior software engineer quoted earlier, told me that epistemic violence works not only to disqualify women's scholastic, strategic, and creative contributions but also our lived experiences. Carol had been in computing for almost 30 years, having got her start by working for a fast-paced company much like the one depicted in Tracy Kidder's (1981) classic tale of bringing the personal computer to market. As Carol explained: "One of the biggest barriers [to equality] is having to be a guy. You're surrounded by guys. You want to fit in. You don't want them to see you as different because as soon as you're different, you don't belong." She worries that speaking from her standpoint as a woman and using her own "modalities" to describe things would violate gender norms proscribed in her workplace. To minimize being different, she not only adopts male-centered modalities of thinking, she also censors herself:

CAROL: I just found, after decades, that to be exhausting. I think it grew on me in ways that I didn't expect it to, you know. It's just little things, right. It's just like—there's just probably a thousand different little things that you would do different, like lunchtime conversation. All the things you can't say. You know, "Oh my God, I have cramps today." Or . . . "Goddamn, I forgot my earrings this morning." I mean [those things are] just irrelevant, but you're running this filter all the time. As long as you're running that filter, you're not just you but they are themselves—they are comfortable.

COLEEN: So, say you did bring up something that goes beyond "the filter." What would be the consequences?

CAROL: Uh, you get marked as being different. . . . You know, you're different—you're different. And different isn't free.

Carol suppresses her emotions at work and feels it necessary to hide elements of her personality related to her female identity. If Carol's "outsider within" (Collins 2004) perspective equates difference with oppression, then, paradoxically, being free means not being herself at work. This type of discomfort that some women feel when transgressing boundaries of gender and technology may be culturally designed to maintain male hegemony. Participants in this study reported how much they worked to "prove" their competency, rigorously performing their technocratic worth, despite their "othered" bodies. I was privileged to interview many powerful women who possessed self-confidence, a high regard for their competencies, and influence in their organizations. But these qualities came at a cost—an energetic cost. Much like Theresa (the "steamroller" quoted earlier), who felt she had lost her sense of self in her workplace, Carol relinquished a part of her authentic, embodied self and assumed a muted comportment to conform to masculine norm in her workplace. Over time this has taken a toll on her energetically. The experiences of participants in this study suggest a type of alienation unique to women and men of color in the computing workforce that could play a role in their high attrition from the field.

Sherry Turkle and Seymour Papert (1990) call for epistemic pluralism in computer science. Carol's experience asks us to demand more—ontological pluralism—the freedom to be fully human, fully oneself in the computing labor force. Carol feels exhausted from filtering out the elements of her being and behavior related to her body and gender performance. Her coerced behavior appears a manifestation of what Kenji Yoshino (2007) calls "covering," toning down a disfavored identity to fit the dominant norms of one's culture. In Carol's experience, the cultural norms at her company, whose products are used by billions of people, insist on gender performances that conform to stereotypical masculine characteristics. These relations of power reinforce the ideological bind between computing competency and a particular kind of racialized gender identity that oppresses through cultural norms and penalizes individuals expressing "othered" embodied experiences.

Assimilating into white male hegemonic practices, epistemologies, and behaviors does not necessarily mean that you pass, but it may mean that you successfully avoid "being singled out." For example, when male colleagues draw attention to a female coworker's gender, it can serve to maintain male hegemony and valorize maleness as a measure of prestige and competency. The often violent "other-ing" of femaleness in computing signals the "fragility" of male gender identity (Harding 1986) and the regeneration of sexist labor practices in a global industry that, paradoxically, prides itself on innovation.

CONCLUSION

Nancy Hartsock (1998, 107) argues that "women's lives make available a particular and privileged vantage point on male supremacy, a vantage point which can ground a powerful critique of the phallocratic institutions and ideologies." In our digital era, many people consume computing commodities, but very few create them or critique them. A significant majority of the creative few are male. Women computer scientists and engineers have a unique social identity, and their stories and experiences paint a concerning picture of the institutions that produce computing technology and the gendered labor conditions within them. Far from meritocracies, many computing organizations are instead ritualized sites of initiations for an elite class. I found patterns in my participants' experiences that elucidate values and behaviors unique to dominant group members in computer science and engineering fields.

The stories of women in computing and their underrepresented male peers illuminate the *geek mystique*, a cultural phenomenon whereby the geek has transformed from unpopular to powerful, thus incorporating the values, practices, norms, and symbolic identities of this unique stereotype of masculinity into everyday sites of computing knowledge production (Smith 1990). This cultural phenomenon is made possible in this digital era of technocracy. We live in a culture that worships technological artifacts, reveres its makers and often equates the two with human advancement. However, in the production of technology, the geek mystique rewards and empowers some people while denying and denigrating others. Despite the triumphant, even revolutionary rhetoric that heralds the innovative promise of computer technology, the power relations in

computing classrooms and workplaces suggest regressive and oppressive behaviors rather than egalitarian, democratic ones.

Mapping the structural, epistemological, and interpersonal elements that constitute the geek mystique illuminates the ways that dominant class rule in computing is maintained and reproduced. In this chapter, gender dynamics made plain the means, method, and scope of male hegemony, which ranges from naked parades of power to dogmatic impositions of combative behaviors, precise rationality, and intense evaluative styles. Rites of passage characterized by precision, aggression, hysteria, and the eschewing of social activities and socially relevant research make clear the core values that form the social matrix of computing technology production. These core values—enforced and reinforced through these rites of passage—stress control, normative masculinity, hostility, and the superiority of the technical over the social. Initiates who maintain and reproduce such core values are considered meritorious and deserving of their success. These compulsory logics have implications for computing commodities, organizations, disciplinary norms, demographics, and, more broadly, society.

Despite popular claims to the contrary (see Ceci and Williams 2011), overt discrimination is alive and well in technology fields. Research participants' private moments of reflection and reckoning reveal a conflict between their personal values and their organizations' values. These contradictions make the violence of the dominant group's rule visible. Women in high-tech fields face marked differences and constraints, and how they navigate and evaluate their experiences of being in the minority informs strategies that can eradicate the barriers that prevent them from accessing powerful, lucrative positions. Furthermore, transforming computing culture from hostile and aggressive to welcoming and collegial has the potential not only to change who produces computing technology but also the core values of its production, with possible impacts on social applications.

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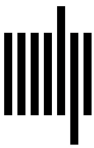

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