If "Diversity" Is the Answer, What Is the Question?

Understanding Diversity Advocacy in Voluntaristic Technology Projects

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In July 2006, a few attendees of the Hackers on Planet Earth (HOPE) Conference in New York City offered for sale homemade silk-screened T-shirts that riffed on a recent gaffe by Senator Ted Stevens (R-AK). Stevens, a senator charged with regulating the Internet, had recently remarked, "The Internet is not something you just dump something on. It's not a truck. It's a series of tubes" (Wired Blogs 2006). This comment was widely circulated online and roundly mocked by many who insisted that Stevens understood neither the technical aspects nor the principles of the regulation he oversaw, which concerned "net neutrality" and whether Internet service providers should be barred from giving delivery priority to favored content.[1]

The activists hawking T-shirts at the HOPE Conference not only swiped at Stevens's lack of support for net neutrality. They also lobbed a separate critique at their own community: their T-shirt featured Stevens's quote "The Internet is a series of tubes" as the caption for an anatomy-book representation of the female reproductive system (figure 1). One woman claimed that she would not sell shirts to men unless they first said out loud to her "uterus" or "fallopian tubes" (Dunbar-Hester 2008a, 119). In other words, these activists creatively and humorously challenged the notion that a technical domain such as the Internet is a masculine one.[2] Significantly, they did so at a conference for computer hackers, an event dominated by male speakers and audience members (participants estimated the ratio of men to women as 40:1, though there is no way of verifying this officially). In this context, asking men to say out loud words related to women's reproductive organs before letting them buy T-shirts was a kind of flag-planting gesture. It also provided fodder for storytelling after the fact, emphasizing both the scarcity of women in spaces like hacker conferences and the fact that this scarcity was not proceeding unchallenged.

And this episode is only one minor, fleeting example: contestations surround who participates in technology production abound in our contemporary historical moment. This chapter uses the empirical site of advocacy around "diversity" in

FIGURE 1: Activist T-shirt, ca. 2006. Courtesy Steph Alarcón.

software and hackerspace communities to ethnographically assess technology and technical practice as a site of purposive political action.[3] This chapter explores multiple framings surrounding the overlapping issues of who participates in amateur technology cultures, to what ends, and with what consequences. It argues that activist engagement with media technologies may challenge elite cultures of expertise that often accompany technology, including "universalist" notions that efface social difference and position in order to present technical practice as universally appealing and attainable. At the same time, presenting technical practice as a main plank in attaining social equality carries risks, including mistaking "technological inclusion" for social power.

Gender advocacy within amateur technology projects like free/libre and open source software (FLOSS) and hackerspaces illustrates how technologies acquire political meanings within technical communities.[4] In this site, we can observe how activists who are concerned with expressing political beliefs do so through engagement with technologies. Geek communities are important because they are situated between "downstream" end users of technology and "upstream" so-

cial groups like policy makers and designers. "Geek" as a social identity is constructed around the formation of strong affective relationships with highly specialized pursuits (including fan cultures, though in recent decades "geek" has acquired a dominant meaning related to technology, especially electronics and computers) (Dunbar-Hester 2016a). While geek pursuits may sometimes appear idiosyncratic to those outside their communities, technologically oriented geeks are significant because of the interpretive work they conduct. They mediate between those who build and regulate technology and everyday users of technology. Geeks' interventions into the politics of artifacts have a profound impact on how technology may be built, enabled, or constrained by policy, or taken up by those of us who are not geeks.

Contemporary social studies of technology treat technology neither as wholly socially determined nor as conforming to or flowing from an internal rational logic. Technologies and technical practices are understood as durable (but not immutable) assemblages of social relations and technical artifacts. In keeping with this tradition, but specifically in relation to gender, feminist social studies of technology "conceives of technology as both a source and a consequence of gender relations" (Wajcman 2007). Gender structure and identity are materialized in technological artifacts and practices,[5] and technology is implicated in the production and maintenance of a relational system of gender.[6] Technical domains such as electronics tinkering, including computers and ham radio, have historically served as sites of masculine identity construction (Douglas 1987; Dunbar-Hester 2014; Haring 2006; Edwards 1990; Light 1999; Wajcman 1991). Looking at these issues in their present-day context, scholars have noted that "in spite of the possibility of emancipation from corporeal realities imagined by early theorists and boosters of new media and cyberspace, bodies and social positions are anything but left behind in relationships with computers. . . . It is still the case within the so-called high tech and new media industries that 'what kind of work you perform depends on how you are configured biologically and positioned socially'" (Sara Diamond, quoted in Suchman 2008, 149). In other words, social context and position, including gender, matter greatly as we consider who participates in technical practices and who possesses agency with regard to technology, both historically and in the present.

Having established that geeks act as mediators of technology, and that technology is a site of gender production and maintenance, I discuss methods, and then turn to the empirical case.

Research Methods and Position

Diversity advocacy is multisited and multivocal.[7] My research methods here are informed by an ethnographic sensibility, but lack the "deep hanging out" component that is a hallmark of traditional single-site ethnographic studies (Geertz 1998). Instead, I have sought to mirror the distributed nature of this advocacy, conducting participation observation at a number of sites (North American hackerspaces, fablabs, software conferences, "un-conferences" for women in open technology, corporate events, and software training events/meetups). An alternative approach would be to embed myself and closely attend to a single FLOSS project or hackerspace, but the networked nature of this phenomenon requires that I traverse multiple sites. What this approach loses in granularity and depth at a single site is

offset by the benefits of a comparative approach, as discussed by Karin Knorr Cetina, who writes that "using a comparative optics as a framework for seeing, one may look at one [site] through the lens of another. This 'visibilizes' the invisible; each pattern detailed in one [site] serves as a sensor for identifying and mapping (equivalent, analog, conflicting) patterns in the other. A comparative optics brings out not the essential features of each field but differences between the fields" (1999, 4). Since multiple emphases and orientations within diversity advocacy are occurring, comparison is a valuable enterprise, and allows more meaningful analytical points to be made.

One thing to note is the relevance of my own subject position and social identity to this research. As a white, middle-class, highly educated and literate person in North America, these communities and their conversations are relatively accessible to me and hospitable to my presence; my presence requires little justification in most cases. That said, my training, expertise, and commitments are those of the academy, specifically interpretive social science, not computer coding, geeking or hacking, navigating NGOs or start-ups, or feminist activism. Of special importance is my position as a person with a feminine gender identity. Many of these sites are literally closed to people who do not identify as women (though most are explicitly genderqueer and trans* inclusive, some require that people identify as women "in ways that are significant to them"). This means that my gender is implicated in my ability to conduct this research; such strictures draw out quite plainly the fact that the knowledge I make here is situated (as all knowledge is).

Fieldwork and data gathering spanned 2011 to 2016, with continuous attention to listservs and online traffic, and punctuated conference attendance and interviewing. This period is meaningful because it saw several feminist hackerspaces appear as well as growing attention to gender in mainstream open source; at the same time, it presents a snapshot of an unfolding story with both a prehistory and a future that are outside the scope of the present research. It is significant that several initiatives that became research sites were born during this period; while this indicates that I "have my finger on the pulse" of a meaningful social phenomenon, it also means that the objects of study were a moving target and hard to identify before the fact, which creates a methodological challenge.

I have interviewed participants in these activities as well as founders of hackerspaces, open source software projects, and initiatives to promote women's participation in technology (20 formal and informal semistructured interviews to date), mainly in North America but including a few Europeans. And I follow much online activity, lurking on project lists and following social media, which again mirrors the fact that much of these efforts are coordinated and distributed across space, even as they also include local, static components "in real life" such as hacker- and maker-spaces, or project- or programming-language-based meetups. Conferences, of course, are important for participants (and researchers) for the ritual elements that occur when a community comes together for a short time, not only for the information that is transmitted within them (Coleman 2010). (Software and hacker conferences can also be occasions for scandal, including controversy and behavior and boundary policing within a community, which are of anthropological interest.) In weaving together these threads of activity, I gain the ability to map the meaningful (and contested) discourses that surround diversity advocacy, situating them within varying social contexts. It is not an exhaustive or "god's-eye" (Haraway 1991) perspective on these initiatives, but it is not wholly idiosyncratic either; I trace multiple skeins of distinct and interwoven activity in

order to draw out meaningful contrasts, and interpret the implications of these varying positions within the space of this advocacy.

Diversity Activism in Open Technology Cultures

In "diversity" advocacy in FLOSS and hackerspaces, self-consciously feminist activists and allies have identified low rates of participation by women in particular in these spaces. Here they confront technical cultures around the issue of "diversity" itself. These initiatives begin with a critique of the liberal Habermasian citizen in how the activists frame and address the problem: they openly admit that there is inequality in their communities, and acknowledge the effects of positionality in producing different rates of participation between men and women. (Not everyone in these technical communities agrees with this assessment, but among the advocates addressing "diversity," it is not controversial.)[8] This is consonant with the acknowledgment by Wendy Faulkner and others that context matters, and "one size does not fit all": "the same measures [to improve gender inclusion in work with communication technologies] may not be effective with different groups or in different settings" (Faulkner 2004, 14; see also Sørensen et al. 2011). Such a framing stands in tension with forms of technologically engaged activism that present technical engagement in universalizing ways (see Suchman 2003; Haraway 1991; Dunbar-Hester 2014; Kerasidou, this volume).

Our contemporary moment is saturated with exhortations for women (and members of other underrepresented groups, but particularly women) to take up participation in science and technology (the common abbreviation is STEM, for science, technology, engineering, and math). Rationales for this push vary, but common ones are national competitiveness and women's empowerment. Both could be found on the Obama White House's website in 2015: (1) "Supporting women STEM students and researchers is . . . an essential part of America's strategy to out-innovate, out-educate, and out-build the rest of the world"; and (2) "Women in STEM jobs earn 33 percent more than those in non-STEM occupations and experience a smaller wage gap relative to men" (Office of Science & Technology Policy n.d.).[9]

Industry, too, often regards increasing women's participation in technical fields as desirable. Google neatly summarizes the corporate agenda surrounding "women in technology" on a web page: "Technology is changing the world. Women and girls are changing technology. . . . We always believed that hiring women better served our users" (Google n.d.-a).[10] In other words, the corporation's full market potential is not being realized without a developer base that can cater to diverse users. On another page, titled "Empowering Entrepreneurs," Google explicates the global reach of its vision and reiterates that "technology" is a route to empowerment: "Archana, an entrepreneur from Bangalore, shows how women are using technology to better their businesses, improve their lives and make their voices heard around the world" (Google n.d.-c). (Note that while my research sites are predominantly North American, Archana is in India; technical work is used to bring people in to globalized capitalism, literally and figuratively [Freeman 2000].)

These agendas reflect the complex social reality within computing and technical fields, in which "what kind of work you perform depends on how you are configured biologically and positioned socially," as noted above. They also provide a backdrop for the object of focus in this project, "diversity" initiatives emanating

from FLOSS and hacking communities. Consciousness about diversity (including but not limited to gender) is evident across a wide swath of groups and sectors, including FLOSS development projects, informal hacker groups, and technology-based political collectives (loosely lumped together as free culture or open technology projects). Activists, advocates, and developers are increasingly addressing disparities including gendered divisions of technical labor and the gendered "baggage" of some media and information technologies, including computers and electronics hardware more generally. Indeed, there has been a veritable explosion of interest in holding conversations about the gender implications of work with communication technology.

Reasons for this are complex and varied. As historians of computing have shown, women were programmers of electronic computers in their earliest days, assisting the Allied wartime efforts in Great Britain and the United States (Light 1999; Abbate 2012; see also Misa 2010). Nonetheless, programming was predominantly associated with masculinity within a decade after the war; women's work in computing was effaced (Abbate 2012) and men flooded the growing computer-related workforce and established the academic field of computer science (Ensmenger 2010). In 1991, MIT researcher Ellen Spertus famously asked, "Why are there so few women computer scientists?" By the first decade of the 21st century, women's rate of participation in academic computer science had declined even further in the United States. US Department of Education statistics indicate that in 1985, a few years before Spertus's essay, 37% of computer science majors were women; in 2009 this number had dropped to 18%, and steadily hovered around that percentage during the 2010s.[11]

Beginning in the mid-2000s, the FLOSS community reacted not only to this longer trajectory of men's dominance in computing but to a policy report released by the European Union in 2006. This report showed that while women's presence in proprietary software was around 28%, in FLOSS it was an astonishing 1.5% (Nafus et al. 2006; see also Ghosh 2005). The reasons for this disparity were wide-ranging, probably including such factors as domestic divisions of labor that set up men in heterosexual partnerships to have more leisure time to pursue affective technical passions, wider historical and cultural factors that gendered computing masculine, and the persistent notion that FLOSS projects were liberal, egalitarian spaces where social identity was irrelevant, among others (see, e.g., Lin 2006; Nafus 2012; Reagle 2013; Karanovic 2009).

The numerical breakdown provided by this report served as a rallying cry: this statistic was mobilized to justify increased attention to women's participation in FLOSS. As one person stated in 2009 on a newly launched listserv for women in FLOSS, "There is nothing particularly male about either computers or freedom—and yet women account for fewer than 2% of our [FLOSS] community."[12] (Notably, the agendas of FLOSS and amateur technical projects that seek to promote diversity may exhibit contiguity with, but are not necessarily identical to corporate and policy diversity initiatives.[13] But similarities are rampant: in an online post, one advocate for diversity in open source writes, "Our [diversity imbalance] is reducing our ability to bring the talent we need into our profession, and reducing the influence our profession needs to have on society" [Fowler 2012].)

My project here is distinctly *not* to ask (or answer) questions pertaining to the issue of "why aren't there more women in STEM?" or "how can we bring more women into STEM?," for example. Rather, I uncover a range of motivations behind amateur interventions into diversity questions, in order to evaluate the political

potentials and limitations of such projects, including the placement of technology at the center of a project of social empowerment. In other words, the multiple framings of who participates in technology development, and to what end, are taken to be objects of inquiry in their own right. (Note that I do not attempt to define "diversity" myself; I am interested in the work it does as actors identify it as a concern and mount interventions based on this concern [Ahmed 2012].)

In some ways, the diversity advocacy that I examine in this chapter bears similarities to the government and corporate agendas mentioned above. At the same time, unlike White House policy or Google programs, the initiatives I examine are driven by the voluntaristic ethos that surrounds FLOSS. We have to account for why fairly grassroots civil society groups are also pouring their energies into this diversity advocacy, usually as volunteers. Diversity advocacy here is not necessarily identical to corporate or government agendas, though there is certainly overlap. What these sites have in common is that they are not especially institutionalized and are suffused by a voluntaristic ethos.

Many scholars of hacking and tinkering have focused on the fact that these activities often take on meaning as communal and shared actions.[14] Anthropologist Gabriella Coleman has demonstrated that hackers deploy a range of stances including agnosticism and denial of formal politics (exceeding software freedom),[15] though implications for intellectual property in particular are at least implicit and often explicit in the technical and social practices of hacking (Coleman 2012).[16] Scholars have noted that the denial of formal politics makes FLOSS an unlikely site for gender activism, at least historically (Nafus 2012; Reagle 2013). But FLOSS projects are not monolithic, and have matured over time.[17] They are also in dialogue with the wider culture, which is, as noted above, currently awash in "women in tech" discourses (including the publication of and reaction to Facebook COO Sheryl Sandberg's 2013 *Lean In*). The raft of initiatives around "diversity" must be placed within this context, while keeping in mind that geek politics exist along a continuum.

A salient reason that FLOSS participants emphasize diversity is because they believe that free software is emancipatory, and they seek to build a broad commitment to its use, development, and principles (see, e.g., Söderberg 2008, 30). The following quote is a neat summation of this sentiment: "The free software movement needs diverse participation to achieve its goals. If we want to make proprietary software extinct, we need everyone on the planet to engage with free software. To get there, we need people of all genders, races, sexual orientations, and abilities leading the way. That gives the free software movement a mandate to identify under-represented groups and remove their barriers to access" (Free Software Foundation 2012). Here the aspirational goal is nothing less than to have "everyone on the planet" engaged with free software, as the underpinning of an inchoate political agenda tying user empowerment and "freedom" to the ethics and practices of free software. Proponents of FLOSS also express this desire to open up free software user communities as a commitment to furthering affective pleasure, the jouissance that will bind empowered users and user-developers to free software and thus build its reach. One person wrote in a 2009 blog post, "I have strong feelings about Free Software. . . . [One reason to] to improve diversity in FLOSS is to increase contributor retention by increasing joy. . . . [And] the most obvious reason to reach out to groups of people who do not typically contribute is that we can *increase our numbers*" (Laroia 2009, emphasis original). In a similar vein, another advocate writes, "We need more and better software developers to produce valuable software that improves our lives" (Fowler 2012). In general, even when the "why"

of FLOSS was underspecified, the reflexive self-importance of participation in this pursuit was unquestioned; in the words of anthropologist Jelena Karanovic, "Many . . . internet professionals ravenously read books by communication theorists on the ways in which the internet [is] transforming sociability and [are] very interested in how their own practices might contribute to realizing the revolutionary potential of the internet" (Karanovic 2009).

For our purposes, it is important to note that like the government and industry agendas discussed above, free software proponents also believe that computing technology is an engine driving society (Smith and Marx 1994) and its use is empowering. Note also that the first quote occurred on the occasion of Ada Lovelace Day (Lovelace was a 19th-century mathematician famed for working on Charles Babbage's difference engine; she is, along with Grace Hopper and Anita Borg, commonly referenced as a figurehead representing women in computing). The second quote, meanwhile, was written by an avid proponent of women's participation in free software who has made an effort to couch his arguments for diversity in broader terms than gender (here, South Asians in free software; elsewhere, "shy people"; etc.).

And of course, within "diversity," gender diversity is commonly understood to be a primary goal, most often expressed as the inclusion of women. Groups with titles like LinuxChix (founded ca. 1998), Debian Women (the Debian operating system project, ca. 2004), Ubuntu Women (2006), the Geek Feminism project, and, more recently, PyLadies (from the Python computer language community, 2011) proliferate, and the list goes on and on.[18] One person on a listserv for women in FLOSS, with a masculine username, addressed the list to recruit women to FLOSS projects in which he was involved:

> I had a look at the projects I'm directly professionally involved in—[Project A] and [Project B]. And, well, they're pretty much your typical F/OSS sausage fests [normative, masculine-dominant spaces], I'm afraid. We do actually have a few women involved, but they're all Red Hat [company] employees; on the volunteer side, it's all men so far.
>
> So I'm hoping to encourage people—women in particular—reading this list to come and get involved with [Project A] and [Project B].[19]

This email represents a banal example of list traffic, and did not generate controversy. (Another list subscriber replied, "Thanks, [Name], for taking the time to make that bid for participants in your project. It was exactly what the world actually needs[,] much more so than almost any other single action.")[20] I include these quotes to illustrate a typical, mundane framing of the issue of "gender diversity" as inclusion of women in free software projects (which, as noted above, should be read in part as a direct reaction to the FLOSSPOLS report).

A more controversial topic on this list, however, did surface: picking a logo for the list. One list subscriber proposed, "If we took the picture of a GNU used by FSF [Free Software Foundation] [and] added lipstick, eye shadow, and mascara, replace the beard by a string of pearls, and replaced the horns by a feminine hat, with a flower sticking up from the hat, I think that would convey the idea."[21] (The GNU symbol she references is the logo of a Unix/Linux-related operating system, a line drawing of the gnu antelope, replete with beard and horns as described in the email; see figure 2.) In other words, the subscriber proposed adorning the GNU with normative markers of femininity. Responses to this suggestion indicated

FIGURE 2: GNU logo. Used with permission under the Creative Commons Attribution-ShareAlike 2.0 License.

discomfort with it. One person commented, "I . . . am not a big fan of this idea. Most women in free software do not adhere to traditionally feminine styles of dress/grooming—I have seen very few wearing makeup let alone pearls at free software events—and I think this sort of appearance would be alienating to many of us."[22] The original poster agreed with this ("You're right. . . . Most of us don't dress over-the-top feminine. I certainly don't.")[23] and added that the original suggestion was intended to be a humorous way of depicting women in FLOSS. Posters to the list struggled with how to represent the presence of women without falling back on representations of normative femininity that many of them found "alienating." (They also touched on race, as one commenter wrote, "I think the gnu is more appealing than the WASP-y noses and dainty lips [in other ideas for logos].")[24]

But they also identified another issue. One person commented, "I think the question of gender identity goes deeper than 'do we all wear pearls here at [Womeninfreesoftware]' to, are we really limiting our reach to 'women' or is there also room for gender queer techies who don't identify with the gender binary?"[25] In other words, using normatively feminine images to represent women in FLOSS was problematic for two reasons. First, these images invoked and threatened to reinscribe a version of femininity that many geek women did not relate to. Second, the emphasis on femininity undermined a commitment to gender diversity common in techie circles, where the prevalence of nonbinary-gendered and trans*-identified people seems relatively high (or is, at least, visible and vocal). Gender diversity did not stop with "women." (As noted above, many projects and hackerspaces with a commitment to gender inclusion explicitly address and include people who identify as queer, nonbinary, and so forth. One representative example is from a hackerspace that describes its community as, "We are intersectional feminists, women-centered, and queer and trans-inclusive" (Double Union n.d.).

Scholars of postfeminism have persuasively argued that much of the cultural work to single out and hail women and girls *as women and girls* in the contemporary moment has to do with constructing feminine, consumerist, individual subject positions within capitalism, aligned with and enacted through neoliberalism (Banet-Weiser 2012; McRobbie 2008). Those insights are useful here, especially as many strains of diversity advocacy align with values of bootstrapping, workplace preparedness, and configuring consumers (often, diverse developers/producers are assumed to better serve consumers). As noted above, reasons for diversity advocacy

span a spectrum of political possibility; many do plainly configure subjects for the workplace with an ultimate goal of constructing and serving diverse consumers (difference is mobilized in order to be commodified; see also Dunbar-Hester 2016b). And others leave the "why" of "diversity" underspecified, potentially ripe for appropriation by multiple and possibly incommensurate agendas (e.g., Boston PyLadies, whose website states, "Our goal is to get a larger number of women coding and involved in the open source community"; PyLadies Boston n.d.).

At the same time, some strands of diversity activism exhibit collectivity formation that is more politicized, and often more attuned to structural issues of social inequality. One person wrote on a listserv for women in open technology, "The change I want to see, for mothers, non-mothers, women, people who want a stable balance between work and all the rest of life . . . isn't about leaning . . . anywhere . . . it should be about actually changing the system and inequalities around leave and work environments and people's attitudes."[26] Notably, her reference to "leaning . . . anywhere" is a dig at Sandberg's *Lean In*, which was lambasted by many critics for being insufficiently attuned to structural issues in its exhortation that women "lean in" and take responsibility for perseverance and success at work (see, e.g., hooks 2013). (Sarah Fox et al. [2015] found that feminist hackerspace members used Sandberg's book as a litmus test to understand the degree of politicization of people at their events; they write, "Attitudes toward [*Lean In*] became a gauge by which people could assess each other.") Even so, the poster's emphasis on work-life balance illustrates that she imagines herself and her audience primarily as workers, not as people engaging with technology for other purposes; certainly the jouissance or emancipation sometimes imagined in open technology cultures is not given primacy in her discussion.

By contrast, in 2007, to commemorate International Women's Day, feminist techies based in Europe coordinated a virtual march through Internet Relay Chat channels. They adopted handles associated with women in technology, including Ada Lovelace and Grace Hopper, and other varied feminist figures from history, literature, and pop culture, including experimental novelist Kathy Acker, musician-performer Peaches, and Victorian writer George Eliot, and "marched" through IRC spouting feminist slogans. An excerpt:

> <peaches> When men are oppressed, it's a tragedy. When women are oppressed, it's a tradition.
> <graceHopper> It's better to act on a good idea than to ask for permission to implement one.
> <charlottePgilman> When the mother of the race is free, we shall have a better world
> * sistero (sister@ [IP address]) has joined #back chat
> <tux> hey sister welcome to #backchat!
> <charlottePgilman> happy iwd [International Women's Day] 2007!
> <simoneDeBeauvoir> Well-behaved women seldom make history
> * [M—] (milena@ [IP address]) has left #backchat
> <graceHopper> Bread and Roses
> (Genderchangers.org 2007a)

According to the organizers of the march, marchers were kicked out of a number of IRC channels because other users thought they were "bots" due to the coordinated nature of their appearance: "Naturally we were deftly kicked and banned

from most servers as a result of our actions. One set of tech operators apologised and lifted the ban when they realised we weren't bots: they found us so co-ordinated they couldn't believe it to be otherwise" (Genderchangers.org 2007b). They make this claim with obvious relish because it signifies the marchers' effectiveness at creating a spectacle. It constitutes storytelling about the marchers' disruptive feminist and feminine presence in a space where hegemonic masculinity tended to reign uncommented upon. Moreover, the marchers' claim that they were assumed to be bots before actual live women users does work to establish the ostensible strangeness of feminine presence here.

Likewise, the Geek Feminism site and wiki (founded 2008) is devoted to providing a community for feminist techies to come together. It conjoins the project of feminism with the culture and aesthetics of geekdom: wiki pages address, for example, fan fiction, "recreational medievalism," and cosplay (dressing up as a character from a story, particularly anime) (Geek Feminism Wiki n.d.): "Things that are on-topic . . . : 1. geeky discussion about feminism; 2. feminist discussion about geekdom; 3. geek feminist discussion of other things" (Geek Feminism n.d.). Crucially, the website also offers a wiki on feminist topics in order to "avoid Feminism 101 discussions"; it assumes conversance in topics such as "privilege, sexism, and misogyny" and recommends visitors to the site unfamiliar with such concepts start by reading as opposed to contributing to discussion (Geek Feminism Wiki n.d.; see Reagle 2016).

The space is moderated, and various forms of behavior are not tolerated, contra the more anarchic and libertarian strands of open source culture where "anything goes" and norms of free expression trump other boundaries, at least rhetorically (Reagle 2013).[27] Geek Feminist actors have advanced a series of critiques of tech cultures, among them lobbying for codes of conduct at tech conferences, establishing a series of "unconferences" for women in open technology (which are explicitly separatist, as people who do not identify as women may not attend), and in general placing priority on the creation of "safer spaces."

Such an emphasis is informed by the Geek Feminists' collective understanding that women in the wider culture (and in tech culture in particular) routinely suffer systemic and gender-based harassment and abuse. One person wrote in a post, "When trying to explain how hostile an environment the geek world can be, I'd tell people, 'I've been attending cons [conferences] of various types since I was thirteen, and I have never, not once, been to a con where I wasn't harassed'" (Geek Feminism 2013). Not infrequently, dark, ugly reports come to light,[28] prompting members of this network to offer support and advice to victims of these incidents. Though digitally distributed and at core united in technological affinity or geek identity, these efforts resemble practices of consciousness-raising and crisis counseling established by feminists in the 1970s.[29] These commitments in some ways run counter to norms of openness upon which open source rests (Reagle 2013), but organizers unapologetically come down in favor of keeping spaces gated and participants vetted.

Moreover, the lesser status and routine mistreatment of women in these communities are assumed to stem from structural inequalities, including different levels of privilege and protection for men and women (again, both in the society at large and in the tech community). At a feminist women*-only hackerspace in San Francisco founded in 2013, the Wi-Fi password when I visited in 2014 was "meritocracy is a joke."[30] This is notable as an identity display within FLOSS or open tech culture, as "meritocracy" has been a shibboleth within that culture since the early days (Reagle 2013),[31] and has been used as an explanation for the lack of representation of women in FLOSS; arguments have been made that if women were

more interested in programming, or better at it, more of them would be present.[32] (Relatedly, diversity advocates reject arguments that attention to "diversity" will dilute contributor quality: "A common argument against pushing for greater diversity is that it will lower standards, raising the [unfounded] spectre of a diverse but mediocre group" [Fowler 2015].)

The Wi-Fi password "meritocracy is a joke" confronts "meritocratic" framing of FLOSS head-on and invites reflection upon and agreement with this statement, as the user literally has to enter these words into her computer in order to get online. However, it is inviting only in-group engagement; the hackerspace is not for "everyone" in the tech community. (I myself had to make contact with research informants to gain an introduction and invitation, and, again, would have had a much harder time if I did not identify as a woman.)

The event at the San Francisco hackerspace to which I had to be granted an invitation was a 'zine-making night. Around ten participants sat around a communal table clipping pictures from magazines, chatting and passing back and forth glue sticks and magic markers. Each person was to leave her pages with the 'zine maker who had proposed the event, who was planning to assemble them into a 'zine representing the hackerspace. At another evening meetup for a budding feminist hackerspace in Brooklyn, NY, in August 2015, four young women sat around a table in relative silence, each immersed in her laptop screen, breaking for light chitchat when food for dinner was delivered. One was working on coding the gender drop-down menu for a website, adding options beyond the binary choices of "male" or "female." Another was working on code for an e-reader that ran off a Raspberry Pi (single-board computer). Both had rushed from workplaces to the meetup, and both had forgotten crucial pieces for their projects including power cords and connectors, meaning they could not work long on the projects or accomplish much beyond rudimentary next steps. I include these descriptions in part to show that the activities that occur in women-centered hackerspaces do not all center around electronics, and are not necessarily "productive" in the sense of demonstrable progress being made toward tangible products (see Couture, this volume). What was palpable in both spaces, though, was the sense of a separate space where the sense of being a feminine craft or tech enthusiast—or, more accurately, the fusion of feminine craft *and* tech enthusiast—was displayed and reinforced.

Conclusions

Having sketched the differing impulses guiding "diversity in open technology" initiatives, we can step back and assess them. On the positive side, some strands of this advocacy offer an acknowledgment that—the "openness" ideal of open source notwithstanding—some people have historically been more equal than others when it comes to engagement with these technologies. In this, activists have begun to confront the legacy of electronics and computing as white, elite, masculine domains, as discussed by historians of radio and computing, with an eye to change. The geek feminists' emphasis on the formation of feminist collectivity and safer spaces for people in technical fields and hobbies who have experienced isolation and harassment within these communities are also positive developments.

That said, these initiatives seem to come up short in other ways. First and foremost, the emphasis on gender diversity often misses an opportunity to frame

"diversity" more broadly, especially attending to issues of class, race, and disability status.[33] Though exceptions exist, and emerging feminist hackerspaces in particular often gesture toward "intersectionality" (Crenshaw 1991), the dominant discourse is around gender, which critics note has the potential to allow white women to stand in for all women, and to give white, educated women the possibility of forming alliances with and moving into greater positions of power vis-à-vis white, educated men, with little change to technical cultures beyond the relative empowerment of educated white women. This serves to perpetuate the marginalized status of poor white women and women of color in technical cultures (hooks 2013). Furthermore, exhortations that various groups underrepresented in technology fields "learn to code" in order to improve their social position shoulder *individuals* with the onus to bootstrap or lean in.[34] This draws attention away from social and economic policies that contribute to their occupying more marginalized social positions in the first place, and places an immense burden on people most afflicted by conditions of precarity and structural inequality.

In addition, as noted above, gender diversity initiatives struggle with how to represent the presence of women without reinscribing normative femininities. Ironically, the struggle to render women's presence visible means coming into contact with gender stereotypes and symbolism that have been critiqued by both feminists and geek women as problematic for them. Programmatically making women visible is hard to do without inadvertently presenting them as a monolithic class of people. And the problems of how to represent "women" without essentializing them is additionally complicated by the salience of queer, nonconforming, trans*, and other identities within these technical cultures. In addition, representation as a goal has limits as a project of empowerment, as noted by scholars of postfeminism and race such as Sarah Banet-Weiser and Herman Gray (Banet-Weiser 2012; Gray 2013).

Finally, whether technical engagement is empowering in domains exceeding workplace preparedness is largely unexamined and underspecified in these diversity initiatives. It is fair to say that at present, geek communities are struggling with how a formerly marginal and derided social identity (Dunbar-Hester 2008b) is colliding with the exaltation of computers and tech work and the celebration of Silicon Valley as the seat of cultural innovation. In other words, while geeks are enjoying a cultural moment where they are at least as revered as reviled, they have not historically been a monolithically politicized constituency (see, e.g., Wisnioski 2012). Having social power conferred upon their class may not lead them to goals greater than building better products, or taking home better pay under more stable working conditions. Job precarity in tech fields is legion (Turner 2009, 77; Neff 2012). Programmers have struggled to retain their autonomy in the face of managerial control for decades (even as the idea of a looming shortage of workers leading to "software crisis" is also a decades-old discourse) (Ensmenger 2010). Women in these communities are entirely right to suspect that they have it harder than male peers, given the statistics on the wage gap and the punishing conditions of start-up culture, and so on. Yet it is unclear that many of the collectivities of "women in tech" are pressing for more than the opportunity to be valued as workers ticking boxes for corporations that are valorizing diversity as a means to capture a "diverse" consumer market. While job security or value as a worker is hardly something we can fault people for pursuing, the wider emancipatory politics imagined by some who pursue and promote technical engagement is not consistently audible here.

What is so appealing about activism around technology for some is perhaps the way that technology as a focus can seem to skirt or avoid some of the problems that

attend movements for social change. At first glance, technology seems more neutral; thorny issues of identity and positionality are not visibly at the fore.[35] But of course they are there, baked into the legacy of electronics tinkering, computer programming, and all manner of technical pursuits. As shown in the above examples, technical communities focused on equality and emancipation are quickly faced with the question, *do we change the dominant culture or start our own space?* The above cases represent partial answers to that charge. In taking their measure, we might conclude that activism around technological participation is useful for changing technologically oriented communities, but it is more limited as a strategy to build a more just social world. Social initiatives centered on participation in technology are likely to reinscribe the placement of men, college-educated people, and whites at the center of social power (see Dunbar-Hester 2014; Wolfson 2014). Gender advocacy in technical cultures challenges the primacy of masculinity, but does little to destabilize other ways in which power and privilege have consolidated around communication technologies.

We should also be very careful with what we mean by participation (or access) in the first place. For example, many poor women and women of color do in fact have plenty of experience with ICTs (Eubanks 2012). But "empowerment" is not a defining feature of their encounters with ICTs. Rather, ICTs are implicated in their surveillance and configuration as wards of the state, or as low-wage, low-status workers. Therefore, they have good reason to regard ICTs with what Virginia Eubanks calls "critical ambivalence" (Eubanks 2012). Such experiences also prime them to reject taking up identities like geek, hacker, or maker. This serves as a potent reminder of why we need to locate technical practices in culture, as suggested by feminist STS. It also underscores the problems with "bringing women in," since gender, class, and race are mutually constitutive.

Recognizing that there are profound differences between participation and social power is all the more important in a context in which "participatory culture" and voluntaristic forms of organization—widely assumed to be key features of digital cultures—are expected to level social inequalities. What this chapter has shown is that it is unlikely that voluntaristic diversity advocates will be adequately equipped to solve these problems. This is not necessarily surprising, nor is it evidence of diversity advocates' shortcomings per se. More fundamentally, it points to how essential it is to be conscientious about what "problems" one is trying to "solve" as a precondition for intervention, voluntaristic or otherwise. Present calls for "diversity in tech" are largely muted in terms of their political potential. A fuller appraisal of what is at stake in FLOSS diversity advocacy calls for greater attention to justice and equity, exceeding the domain of "technology."

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Notes

1. The mockery of Stevens appeared as widely as Jon Stewart's *Daily Show* on the Comedy Central cable network (for example, "Net Neutrality Act" segment, July 19, 2006).
2. Cleverly extending the metaphor into reproductive politics and women's right to choice, the back of the T-shirt read, "Senator Stevens, don't tie our tubes!"
3. An earlier and abbreviated version of this argument appears as Dunbar-Hester (2017), and a fuller one appears as Dunbar-Hester (forthcoming).
4. FLOSS is alternately referred to as free software, Free/Libre software, and open source software production (with each label carrying different emphases); for shorthand this chapter lumps all of these forms of practice into the label "FLOSS." I also include related informal hacker groups and technology-based political collectives, with the acknowledgment that this category of practice is certainly not monolithic.
5. It is widely acknowledged that gender occurs not in isolation but within a matrix of factors that affect social identity, which include class, nationality, ethnicity, and race.
6. In spite of the attention given to gender identity, I mean in no way to discount social structure (along with gender symbolism) as an important site of production of gender (Lerman et al. 2003, 4; see also Faulkner 2007). It is tricky business, but both individual agency (individuals "doing") and social structure (which may act on individuals and groups) are tenets of gender identity.
7. George Marcus discusses "multi-sited ethnography" as a way to adapt to more complex objects of study (1995).
8. For more on hostility to issues of gender parity in FLOSS communities, see Nafus (2012) and Reagle (2013).
9. The page also quotes President Barack Obama as having said in February 2013, "One of the things that I really strongly believe in is that we need to have more girls interested in math, science, and engineering. We've got half the population that is way underrepresented in those fields and that means that we've got a whole bunch of talent . . . not being encouraged the way they need to." (As of this writing, efforts to promote women in STEM had vanished as a White House priority under the Trump administration.)
10. The page "Google Women, Our Work" additionally states, "Our goal is to build tools that help people change the world, and we're more likely to succeed if Googlers reflect the diversity of our users" (Google n.d.-b).
11. As reported in Raja (2014); see also Gelvin (2016).
12. [Womeninfreesoftware] listserv, September 24, 2009. It should be noted that within the United States, women's presence in academic and industry computing fields fell in the 1990s and 2000s. National context matters, and there are significant cultural and national variations in whether women do tech work (see, e.g., Lagesen 2008; Mellström 2009).
13. Nafus et al. write, "The goals of rectifying the loss of a talented labour pool and with it the opportunity to build better technologies is something that is already recognised as a problem within F/LOSS communities, and is far more likely to motivate action than social justice concerns" (2006, 6).
14. See, for example, Coleman (2012).
15. The Free Software Foundation explains, "To use free software is to make a political and ethical choice asserting the right to learn, and share what we learn with others. Free software has become the foundation of a learning society where we share our knowledge in a way that others can build upon and enjoy" (n.d.).
16. Christopher Kelty adds that arguments among geeks about "technical" details are not restricted to technical issues, insofar as technical and political-legal structures are inseparable for these actors: "Techniques and design principles that are used to create software or to implement networking protocols cannot be distinguished from ideas or principles of social and moral order" (2005, 186).
17. The current attention to "diversity" represents a turning point within a collectivity focused on FLOSS as a product, though of course this turn is not universal in FLOSS. See Hess (2005).
18. It is beyond the scope of this chapter to comment on the prehistory of gender activism in FLOSS but it would certainly include WELL and Usenet discussion groups; Systers (a play on "sisters" and "sys," as in "sys admin"), a mailing list for technical women in computing founded in 1987; the Anita Borg Institute's Grace Hopper Celebration (begun in 1994); and various cyberfeminist efforts of the 1990s.

19. [A—] to [Womeninfreesoftware], email, September 28, 2009.
20. [K—] to [Womeninfreesoftware], email, September 28, 2009.
21. [M—] to [Womeninfreesoftware], email, September 24, 2009.
22. [K—] to [Womeninfreesoftware], email, September 24, 2009.
23. [M—] to [Womeninfreesoftware], email, September 24, 2009.
24. [A—] to [Womeninfreesoftware], email, September 24, 2009.
25. [Womeninfreesoftware], email, September 24, 2009.
26. [L—] to Adacamp Alumni, email, March 1, 2015.
27. Coleman argues that free software communities frequently form collective rules, but the norm of individual freedom is extremely salient nonetheless (2012).
28. See Lisa Nakamura's discussion of "glitch racism" (2013).
29. This network is also activated to name and shame abusers; names and details are reported not uncommonly, both to support victims and to offer strategic advice. This also illustrates how these virtual and "real life" spaces are not quite public.
30. Fieldnotes, July 2014, San Francisco.
31. Notably, the coiner of the term "meritocracy" intended it as a satirical concept, which was lost on many who advocated for it in subsequent decades. See "Down with Meritocracy," *Guardian*, June 29, 2001, www.theguardian.com/politics/2001/jun/29/comment. Thanks to Peter Sachs Collopy for directing me to this column.
32. Meritocracy can also be mobilized to argue for initiatives supporting diversity. Martin Fowler writes, "I'm a strong meritocrat, who believes that we should strive for a society where everyone has an equal opportunity to fulfill their potential. A diversity imbalance suggest [*sic*] that there are many women, who would have good careers as programmers, who are not getting the opportunity to do so" (Fowler 2012). Part of what this discussion shows is how strongly ingrained the pro-meritocracy arguments are within FLOSS. Meritocracy also rhetorically links participation in FLOSS to career empowerment.
33. Certain FLOSS projects have imagined the (dis)abilities of users for a long time and include attention to accessibility issues in their practice and rhetoric fairly consistently (e.g., GNOME), while others are less attuned to these topics (and, for example, the FLOSS graphics editor project GIMP [an acronym for GNU Image Manipulation Program] has been criticized for its name).
34. For more on bootstrapping and romantic individualism in the context of the Internet, see Streeter (2010).
35. Thanks to Lucas Graves for discussion on this point.

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