Collaborative Ethnography and Matters of Care in Counterspaces

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Abstract

This paper offers a reflexive analysis of an interdisciplinary and cross-race collaboration to advance equity in engineering called LATTICE (Launching Academics on the Tenure-Track: an Intentional Community in Engineering). We engage two bodies of scholarship—matters of care in feminist science and technology studies (STS) and critical race theory on counterspaces—to theorize on the data infrastructure and narrative practices that we developed when applying critical methodologies to collective action in technoscience. We discuss how our care practices conflicted with traditional ethnographic practices and thus, inspired us to innovate on methods. These methods—member-checking and polyvocal memo-ing—make transgressing the boundaries of LATTICE counterspaces for public dissemination possible by invoking caring as praxis. We conclude that using these methods to discuss the contradictions and challenges in STS collaborations is an opportunity for advancing mutual intelligibility among interdisciplinary scholars and a politics of knowledge production grounded in values of care and friendship that may contribute to equity and justice in technoscience.

Keywords

collaboration; engineering; feminism; ethnography; counterspaces

Introduction

In this paper, we analyze a group of scholars who created LATTICE (Launching Academics on the Tenure-Track: an Intentional Community in Engineering). LATTICE is a joint effort between the University of Washington, North Carolina State University and California Polytechnic State University, San Luis Obispo. Our team consists of scholars who identify as African American, Asian American, Jewish American, and white American women and non-binary scholars. We also represent a range of academic disciplines, including: industrial and systems engineering, electrical engineering, chemical engineering, biology, sociology, anthropology, and design engineering. Founded in 2015 with funding from a directorate in the National Science Foundation (NSF) that aims to broaden participation in science and engineering, our goal is to advance faculty diversity and institutional change in technoscientific knowledge production. In the US, only 2.4% of faculty members in technoscience are African American (while representing 13.6% of the broader US population), 3.8% are Hispanic American (16.8% of the US population) and women of all backgrounds only represent 19.9% of technoscientific faculty positions (Roy et al. 2020). Women and African Americans doctoral candidates leave technoscience fields at much higher rates than the overall doctoral population (Turk-Bicakci and Berger 2014) and leave faculty positions before tenure more often than white men (Reif 2010). Even when women and scholars of color remain in academia, they are less likely to hold leadership positions.

To rectify this entrenched segregation in the US scientific workforce, the LATTICE co-principal investigators created multi-day symposia and on-going peer mentoring circles for early-career women in engineering, focusing particularly on women of color. Though our team hails from different scientific disciplines, our joint work is best described as a social movement to desegregate US science and engineering and integrates three separate national models for diversifying faculty positions in higher education. Our heterogenous collaboration aimed to create counterspaces, places within the academy for practitioners who navigate technoscience as underrepresented members to challenge the dominant narratives of what counts as engineering and who can do technical labor competently.

The LATTICE team was united in our commitment to counterspaces, a critical race theory which we conceptualize as physical, ideological and/or conceptual spaces where dominant narratives can be challenged and minoritized groups may experience a haven from isolation and microaggressions (Ong et al. 2018). They are settings that "promote the psychological well-being of individuals who experience oppression" (Case and Hunter 2012, 257). A counterspace is a space where taken-for-granted traditions in scientific knowledge production can be challenged and transformed. Institutional transformation, a goal the team shared with our funding source, requires interdisciplinary expertise, a commitment to dynamic exchanges and close examination of cultural mechanisms reproducing racism. This work needs to be done in spite of, and indeed, away from those who mistrust and oppose structural critiques from groups underrepresented in technoscience.

Indeed, counterspaces offer a place where underrepresented group members' lived experiences and identities are validated. An individual in a counterspace does not have to justify who they are, their value, what they have gone through, or the nature of their own lived experience (ibid., 2012; Ong et al. 2018).

LATTICE chose to build counterspaces where these reckonings could thrive, partially protected from those who deem oppositional standpoints corrosive or threatening to technoscience. The risks and innovations we present in this paper signify our commitment to both the hallmarks of counterspaces—i.e., collective resistance and adaptive responses in relationship to others—and a politics of knowledge production grounded in intersectional, interdisciplinary and collective values that advances care, equity and justice in technoscience.

The crux of our analysis hinges on the "why" and "how" of creating and disseminating of the manuscript you are reading. It is a story of how we came to understand ourselves, our work, and the meaning of our data collectively, and how we might care for all these elements within the broader norms of science, including publishing. It is an unsettling artifact because it requires a tricky balance among funders' expectations, disciplinary norms, (i.e., authorship, data sharing, epistemological authority) and commitments within the LATTICE team to care for each other and the well-being of scientists and engineers targeted by discrimination in their technoscientific workplaces.

Few studies document the work change agents do to desegregate engineering and the processes they innovate and codify to advance such efforts. This article aims to rectify this oversight, highlighting Participatory Action Research (PAR) as critical to ethical research collaborations. Within the LATTICE team, differences abounded not only across race, ethnicity, sexual identity, religion, institution and discipline, but also across generations and career stages. The LATTICE collaboration required generating mutual intelligibility across these differences. The ethnographic component of this project leveraged these differences as opportunities for reflexive knowledge production. Thus, we extend commitments to care, dialogue, and mutuality (Farías 2016) and describing the ways in which our relationships and data mutually shape and are shaped by each other.

In LATTICE, our differing methodological, epistemological, and social positionalities required new ways of "doing data"—managing data, translating across epistemic differences and creating shared practices and processes (Lippert and Douglas-Jones 2019). Here, we draw attention to three dimensions of the LATTICE ethnography: 1. data collection; 2. data analysis; and 3. data sharing, i.e., dissemination. To collect data, the ethnographers used group interviews with the LATTICE team, individual interviews with team members, and participant observations at team meetings and the LATTICE symposia for early career women in engineering over the course of five years. The transformative aspects of doing data in this ethnographic project arose in the data analysis phase of the research, in which our professional commitments to PAR and our personal relationships within our team's counterspace required innovating on methods. We refined PAR methods, like member-checking, and developed new ones, like "polyvocal memo-ing," an iterative process in which the LATTICE team came to consensus on external representations of our co-laboring. We did so in response to the demands of configuring data about highly underrepresented, renegade scientists and engineers within ethnographic traditions that have both colonizing histories and liberatory potentials (Harrison 1991).

The purpose of this paper is to not only describe the labors of the LATTICE team, but also to offer our work as an example to other ethnographers whose work skates along the "critical edge" of STS knowledge production (Puig de la Bellacasa 2011; Feenberg 2017). Rather than elide tensions and bemoan the gaps between our aspirations and execution of this ethnographic project, we instead render these gaps and tensions as opportunities for mutual learning in collaborations to desegregate technoscience. In other

words, this paper is an object to think or reflect *with* ([Turkle 2007](#)) for *how* STS scholars might replicate the work of researching with care and nurturing interdisciplinary, cross-race collaborations working toward institutional change ([Dace 2012](#)).

Here, we document the process of learning to speak across differences, the everyday doings of knowledge construction within a counterspace in technoscience ([Puig de la Bellacasa 2011](#)) and the labor involved in preparation for breaching said counterspace in disseminating findings from the LATTICE ethnographic research. Feminist scholars of STS have theorized care as motivation for action, a "call to intervention" in scientific scholarship ([Liboiron 2016, 69](#)). How does care in STS operate after the intervention has been executed and the ethnographer needs to avoid making colleagues vulnerable to public persecution ([Liboiron 2016](#))? This paper is a call to solidarity to those in STS who want to care for peers doing interventionist research, whose data does not, cannot, look like traditional forms of empiricism because of commitments made within counterspaces of coordinated action to resist traditional institutional norms and refuse to reproduce inequitable systems of power. In this way, we join other STS scholars who are taking up refusal in ethnographic research as creative, generative praxis ([Simpson 2016](#); [Simpson 2007](#); [Tallbear 2013](#); [Benjamin 2016](#)). Refusal not only refers to sovereign acts by research participants but also to ones enacted by the researcher themself ([Benjamin 2016](#)). For example, Audra Simpson ([2007](#)) and Kim TallBear ([2013](#)) "both refuse to represent indigenous communities in particular ways for ethnographic consumption" ([Benjamin 2016, 969](#)). Collaborating with participants at all phases of this research meant honoring their wishes not to breach the LATTICE counterspace in the dissemination of knowledge. Refusal is born from an ethical responsibility not to harm research participants and serves to highlight the risk of collective harm that comes with doing positivistic science ([Tuck and Yang 2014](#)).

Caring for equity and justice in STS research can force ethnographers to cultivate sensibilities regarding mess ([Law 2004](#)) and innovations regarding risk in dissemination. In this current work, this collaborative ethnography of counterspaces has been animated by the following questions and the risks that prompted them:

1. How do "feminist scholars of STS enact care in our relations with the worlds we study" ([Martin et al. 2015, 626](#)), creating new knowledge within the bounds of counterspaces, while also maintaining accountability relations and methodological commitments to anonymity, friendship, care, and justice in the dissemination of this knowledge?

2. When the field site is a counterspace, how might an ethnographer theorize *with* and not *about* research participants? These questions drove us to emulate other collaborative ethnographers to create "polyvocality" and account for, and indeed, mobilize racial, social, political, institutional and epistemic differences and the tensions resulting to tell a complex story from a range of viewpoints about the joys and challenges of community action (see [Lassiter 2005](#); [Breunlin and Regis 2009](#); [Lassiter et. al. 2020](#)).

Theoretical Framework

This paper draws on two bodies of scholarship—matters of care in feminist STS and counterspaces in critical race theory—to frame our methodological analysis of care within the counterspaces as envisioned and enacted in the ethnographic component of the LATTICE collaboration.

A Counterspace within Technoscience

As a team funded to enact transformational change in technoscience, our charge required us to develop and codify practices that foster interdisciplinary collaboration that work across differences identities. Coherence across this range of differences was an aspiration that we did not always achieve. Misalignments served as productive challenges and required us to excavate norms and assumptions in our work together. For example, we learned through trial and error the differences in authorship and data sharing practices across disciplines. Coming to consensus on these differences in our collaborative work was productive (Lassiter 2008). This process of reflexivity enhanced trust and communication within the team and was fruitful for innovating on traditional anthropological approaches (Greiffenhagen et al. 2015). Our rapport and success in unsettling established norms was also enhanced by our funding source, which prizes inclusive, interdisciplinary and intersectional approaches to science and engineering. We all participate in professional communities with ties to this funding source and so had a range of social, epistemic and material resources in common as we tackled challenges to our group's cohesion.

Around year two of LATTICE, we defined our group's work as a counterspace. Counterspaces are designed for members of minoritized groups to collectively challenge stereotypes of certain racial identities. Andrew Case and Carla Hunter (2012) call this process—"narrative work." It is one of three dimensions of community building practices that constitute counterspaces:

1. narrative identity work
2. collective acts of resistance
3. adaptive responses in relationship to others.

Narrative identity work may take several forms. This includes combating oppression narratives, which make the invisible visible; resistance narratives, which highlight strength and capacity (as opposed to victimization); and reimagined personal narratives, wherein individuals can construct or reconstruct their understanding of their own identities. This work enhances participants' ability to respond and adapt to exploitations (ibid.).

Counterspaces have had uptake in education studies as a means of forming a science identity (Case and Hunter 2012; Ong et al. 2018). LATTICE's symposia were designed along these lines. In both the LATTICE team and symposia, we created counterspaces. Resisting systems of oppression presented epistemic, social, and emotional challenges, and our efforts within LATTICE counterspaces generated new knowledge on the white, male-dominated technocratic spaces that all scientists and engineers navigate daily. There is a legacy of dominant group members taking up spaces in institutions of power. For example, white bodies take up physical, emotional, intellectual and spiritual space in the academy, to the exclusion of people of color (Ahmed 2012). Critical to forging our counterspaces was strategizing on how best to reclaim usurped space in higher education in order for scientists and engineers of color to also thrive in their chosen professions.

Counterspaces, however, do have limitations. For example, while LATTICE chose to prioritize race, gender and discipline, heterosexual norms remained majoritarian in both the practice and values of LATTICE. Though we discussed whether or not to include queer politics in our counterspace, we did not reach consensus, and normative kinship structures remained at the center of this project. Both the opportunities and constraints of counterspaces highlight the political predicaments we encounter in ethnographic research.

A Matter of Care

In feminist STS, care is taken up as both a conceptual concern—what do we care about?—and a methodological one—why do we care? (Martin et al. 2015; Puig de la Bellacasa 2011; Viseu 2015). Care is used to excavate and investigate hidden labors, deleted from the "heroic" myth-building of technoscientific work, like the mythology of the "lone genius" (Forsythe 2001; Martin et al. 2015; Murphy 2015; Puig de la Bellacasa 2011; Star 1991). We join other feminist STS scholars in "expanding the scope of theorizing care beyond sites like health care and domestic labor, while gathering up these more traditional modes of affective engagement and embodied labor to deepen how we think about care in other sites" (Martin et al. 2015, 626).

Here, we seek to contribute new knowledge as to how women's labor in technoscience becomes "fetishized . . . and the social relations and labors are obscured" (Suchman 2015, 140). In our symposia, we countered these relations by configuring a space for women's voices, particularly the voices of women of color.[1] In our scholarly outputs, this paper for example, we want to share our experiences of creating knowledge and collectively doing data, thus counteracting testimonial injustice (Fricker 2007); pain narratives common in social science research about marginalized communities (Simpson 2007; Tuck and Yang 2014); and the obfuscation of racism and sexism in technoscience. Both aspirations—creating a counterspace in technoscience and sharing new knowledge that grew from said counterspace—require care.

The politics of care in the LATTICE team's counterspace align with Michelle Murphy's (2015) call to "unsettle" matters of care in STS by collectively engaging with the achievements of anti-racist analytics. I, the first author, approached the ethnography of the LATTICE counterspace with both a vision of care and practice of care (Viseu 2015), which pivoted on "decolonizing oppositional practices" inherited from cultural eras of the past (Sandoval 2000, 32). Caring requires a commitment to listening to and documenting the ignored, silenced and neglected experiences of marginalized group members of technoscience. Puig de la Bellacasa (2011) frames care not as an "epistemological" concern but rather a methodological one. She invokes standpoint theory in her thinking through the "meanings of care for knowledge politics in STS," a politics predicated on "oppositional standpoints" (ibid., 85).

Oppositional consciousness is foundational to feminist standpoint theory, a body of scholarship spanning decades and disciplines that debates and delineates the politics of knowledge production and the specific situatedness of "competent" knowers that is gendered and racialized within engineering. Standpoint theory aims to recover and valorize subjugated knowledge and resist social and epistemic injustice (Collins 2009; Hesse-Biber 2012; Bailey 2014; Dotson 2015; Haraway 1988; Harding 2004; Hartsock 1998; Wylie 2012). It has roots in W. E. B. Du Bois's "double-consciousness" (Du Bois [1903] 1994). Double-consciousness requires an underrepresented group member to move between two worlds—the cultures of

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[1] For both speakers and symposium participants, senior leaders on the LATTICE team reached out to their networks—cultivated across discipline-specific professional societies as well as groups focused on diversity, equity and inclusion (e.g., Women in Engineering ProActive Network, the National GEM Consortium and the National Science Foundation ADVANCE Principal Investigators). For the 2019 symposium, several speakers were past participants from Dr. Christine Grant's Mentoring Summits from the 2000s.

the dominant class and the marginalized culture to which one claims membership—in order to survive and resist everyday injustices (ibid.). This dual perspective generates unique insights into structures of power, who they serve and to what effects.

For "science studies scholars to take a more critical stance toward politics of care in technoscience" (Murphy 2015, 719), we must recognize the indebtedness that feminist theories of care in STS have to critical race scholarship. In this paper, we are trying to model conversations between the two fields that we'd like to see more of in the broader STS community. In the case of both the LATTICE team and our symposia, care meant manifesting standpoint theory in action, whereby subordinated class members of the academy collectively opposed the dominant social order and nurtured and realized oppositional consciousness to "alignments and orientations that stratify technoscience" (ibid., 732).

Methodology
Participatory Action Research (PAR)
The research design is a key outcome of the politics of care that informed this ethnographic collaboration. The LATTICE ethnography drew upon PAR (Denzin 1997; Merriam 2009; Mohan 1999; Brown and Strega 2005; Madison 2005), which informed the design of ethnographic methods to generate not only data, but also built rapport among team members. Keep in mind that the team members are also the project's research participants. In both group and individual interviews with the LATTICE team, I, the lead ethnographer and first author, aimed to elicit "honest knowledge of ourselves and of the systemic nature of oppression—which includes the exploration of the oppressions we embrace and internalize to become part of the academy" (Dace 2012, 4). Rapport was not merely a way to gain access, but to also generate friendships that would inform our relationships within our counterspace and also STS scholarship. Cultivating friendships in STS research require innovating methods and processes of consent at all stages of research. It is a reciprocal practice of care—a mutuality—in the politics of knowledge production, to pose as minimal risk as possible to those already at risk in the academy. As Puig de la Bellacasa (2012, 199) explains, the feminist vision of caring "cannot be grounded in the longing for a smooth harmonious world, but in vital ethico-affective everyday practical doings that engage with the inescapable troubles of interdependent existences." A feminist vision of caring therefore must include thinking *with* and not thinking *for.* Thinking *with* allows for a sense of kinship and alliance while thinking *for* appoints oneself as the authority on underrepresented populations (Cantillion and Lynch 2017; Puig de la Bellacasa 2012).

To navigate this complexity and honor the tenets of PAR, I oscillate between my own analyses and the LATTICE research participants when speaking here. I use the singular first person and switch to the plural first person when I am confident that the data supports a collective integration of our perspectives. Within this complexity, I am also theorizing *as* (Tuck and Yang 2014)—*as* a friend and colleague within a counterspace fashioned with great care and trust and *as* a white social scientist in the world of engineering. I am an STS scholar with degrees in cultural anthropology. Two senior members of the LATTICE team, Rona and Fiona, invited me to brainstorm and co-design this project at its earliest stages. I passed on some of the knowledge imparted by my critical race feminist mentors in anthropology to both my junior and senior LATTICE colleagues so we could co-interpret our data and come to consensus on how best to share it.

I use pseudonyms to protect the identity of LATTICE team members. I also innovated on traditional ethnographic methods by first, member-checking an inclusive form of PAR where informants can see what

is written about them and either consent or refuse the way they are represented. Second, inspired by participatory experiments as method in STS (Lezaun et al. 2017), I created two new collaborative research processes, polyvocal memo-ing and sheltering. I explain polyvocal memo-ing below. Sheltering, a cultural production of communal resistance, combines care, refusal and performative ethnography to minimize risks of retaliation and harm while maintaining the integrity of the research and communicating the veracity of its outcomes (see Carrigan 2023).

Table 1 provides an overview of the data infrastructure of LATTICE (Star 1999), enumerating the texts generated in enacting innovative methods and how these texts circulated within the LATTICE counterspace. The fabrication of this infrastructure and the practices within it constitute a matter of care, an application of STS knowledge production concerned with the politics of race and gender in technoscience. The texts in table 1 are in order by which the ethnography unfolded and evince our co-laboring. We used PAR techniques to care for data within the LATTICE counterspace in preparation for transgressing the counterspace in the production of scholarly outputs. I formally codified and put into motion this iterative process of data generation and circulation between 2016–2019. In table 1, each text is labelled: MC (member-checking), PV (polyvocal memo-ing) and TR (traditional ethnographic methods). The PAR design of this ethnographic collaboration made data gathering and analyzing exciting, but also uncertain and complicated (Law 2004). Further, the labor involved in this participatory research process was not only iterative but also time-consuming.

Table 1. Caring for Data Infrastructure in Counterspaces

		Texts	Authorship	Circulation
1	MC	Field notes of team meetings and programmatic interventions	Ethnographer	Inside Counterspace
2	MC	Transcripts of individual interviews	Collaborative	Inside Counterspace
3	TR	Codebook	Ethnographer	Not circulated
4	PV	Memos on group interviews	Collaborative	Inside Counterspace
5	PV	Significant quotes document	Collaborative	Inside Counterspace
6	PV	Thematic analysis memos	Collaborative	Inside Counterspace
7	PV	Thematic analysis memos	Ethnographer	Inside Counterspace
8	MC	Epistolary reports re: doing data and outputs	Ethnographer	Inside Counterspace
9	MC	Emails on doing data and Deadlines	Ethnographer	Inside Counterspace
10	MC	Mobile device texts on doing data and deadlines	Ethnographer	Inside Counterspace
11	MC	Draft slides for dissemination at Conferences	Ethnographer	Inside Counterspace
12	TR	Slides and data at conferences	Ethnographer	Outside Counterspace

13	PV	Draft finding section of manuscripts (based on significant quotes document and thematic analysis)	Collaborative	Inside Counterspace
14	PV	Draft manuscripts (team input on findings incorporated)	Collaborative	Inside Counterspace
15	PV	Close-to-final draft of manuscripts (final approval)	Collaborative	Inside Counterspace
16	**TR**	**Published manuscripts**	**Collaborative**	**Outside Counterspace**

Member-Checking (MC)

Member-checking is a PAR technique in which research participants have the opportunity to read, edit and add further insights on transcriptions of conversations (Miles et al. 2014). PAR involves participants in the design and implementation of research, allowing me to theorize *with* and not *about* my research participants. Member-checking is one way to destabilize the "authority" of the ethnographer. Participants decide what is most relevant in the data. Table 1 enumerates the process of member-checking (see texts labelled "MC" for member-checking). I asked LATTICE team members to read through ethnographic texts, like transcriptions of interviews they participated in, and annotate what they would like changed or omitted entirely. This process enabled me to see what our team members cared about and discern patterns in what they refused to share outside our counterspace.

Polyvocal Memo-ing (PV)

As an extension of member-checking, I created a method for collective data analysis that I call "polyvocal memo-ing." To illustrate, after my research assistants and I had member-checked transcripts, coded them and began to develop themes, I then used shared collaboration technology to circulate written memos on emerging themes with our LATTICE co-organizers. Colleagues memo-ed on these themes, adding context, analysis and their unique perspectives. From there, the ethnographic team created a document of significant quotes (pulled from the transcriptions, and collaborative memos) and shared this text with the notice that we were considering using these data in our manuscript draft. Research participants again memo-ed on the data, cutting or highlighting any quotes and sharing any thoughts relating to the evolving data that were important to them. These generated different, sometimes contradictory, interpretations of the data. From there, we used polyvocal memo-ing three times in the process of writing each journal manuscript (see table 1, 13–15).

Member-checking and polyvocal memo-ing involved more than circulation of texts on which we all co-labored, but also lengthy discussions about these texts at our virtual team meetings. The following is an exchange illustrating such dialogue and the coordination of the final opportunity for collaborative input to a peer-reviewed journal article:

> Sarah: Coleen, do you want us to take another read of the whole thing and put in more edits?

> Coleen: Yes, I think I can put in all the things we talked about in this meeting by next Wednesday. Then I will share again with you, come back from vacation, make your final edits and submit it.

Sarah: So you'll send us an updated version?

Coleen: Yes.

Josephine: So if I make suggestions now, will that mess you up?

Coleen: Yes, don't edit yet until I've made the updates we discussed today.

Josephine: Ok, please send me a text.

Coleen: Ok. [holds up three fingers and counts off three commitments] I'll send you an email, put it in our shared drive and then text you.

Josephine: Ok, I'll hold off printing until then. How exciting!

This exchange reflects the LATTICE team's efforts to manifest Puig de la Bellacasa's "matters of care" ([Puig de la Bellacasa 2011](#)) in interventionist STS research. Designed in the spirit of PAR, this infrastructure and the narrative work within it are a matters of care that enabled building consensus on what knowledge we would share beyond the bounds of our group's counterspace and what knowledge we would refuse to share. Excavating this labor makes visible the narrative work in which we engaged to be accountable to one another and generating meaning and new knowledge, both within the bounds of our counterspace and beyond ([Jerak-Zuiderent 2015](#)).

Analysis

The first part of our analysis details some challenges that arose in the course of the research. While there exist some inherent tensions within interdisciplinary research teams, this tension is not necessarily a barrier to research ([Lassiter 2008](#); [Turner et al. 2015](#)). In LATTICE, these challenges represented opportunities to reimagine our methods. The second part then will focus on the decisions made in terms of data collection, analysis and dissemination in the context of an interdisciplinary, collaborative project and account for the intellectual labor of our efforts to create new knowledge on ethnographic methods and the productive frictions they generated. The quotes below reflect the values and perspectives of individual LATTICE members.

Caring Within Counterspaces

Counterspaces is not an etic term imposed by the ethnographer but rather, was generated in the process of the LATTICE collaboration. Rona, a LATTICE team member, explained that the "premise of the [LATTICE] model is creating a sanctuary, a counterspace . . . to have safety that you might not feel in the academy." Note how Rona compares counterspaces to a place outside of one's workplace, a space that offers restorative and psycho-spiritual support. The use of the term "sanctuary" invokes a liminal space designed to bring a new level of awareness that is not possible in the routines and constraints of the academic workplace. She continued: "Fiona and I were just at a [science] convention, and we saw . . . people are scared to have all sorts of conversations. So that's really a core value of this model . . . is to create space for people to have whatever version of that conversation."

In the course of this research, another LATTICE team member Fiona said that Rona, her long-term friend and collaborator, "is not afraid to have any conversation." Rona is consistent in doing the narrative work required in construction and sustainment of counterspaces. She works to dispel people's fear to have explicit conversations about how one's experience in science is influenced by one's social identities. Further, she facilitates opportunities for scientists to tell stories counter to the dominant narratives of their fields. Having worked closely with Rona for many years, I would augment Fiona's observation by noting that while Rona is definitely courageous in all communications, she also is masterful at pivoting conversations and reframing topics in ways that advance her commitments to underrepresented scientists' well-being. In other words, she will meet her interlocutors where they are at, but then facilitate the conversation in a way that changes the direction of it if she thinks it would enhance someone's adaptive responses to their professional challenges. Rona's skillful framing process helped not only individual faculty members feel heard and supported but also generated collective bonds of trust needed within counterspaces.

Why is courage required in talking about how one's social identity influences one's experiences in science? Charlotte hypothesized that safety is critical when inviting scientists and engineers to speak to their experiences, explaining:

> Being able to talk about these issues surrounding identity, specifically race and gender and how that might be impacting your career—or just even issues where you're feeling any sense of insecurity—are all things that we're kind of trained not to talk about, especially around other people within our field and other academics. You're taught not to reveal those weaknesses. People who aren't social scientists don't always connect their individual experiences to being part of a [larger system]. The safe space allows them to share their stories, which then allows them to realize that [their issue] has more to do with some sort of systemic structure.

Charlotte's analysis explains how the narrative work of counterspaces primes scientists to see their experiences as something larger than themselves, something systemic and thus enables them to participate more fully in collective resistance to oppressive structures. De-individualizing underrepresented scholars' experience in the academy helps to dispel the fear of speaking about one's lived experience because first, it collectivizes the risk of critiquing scientific institutions and second, helps people see they are not alone and their challenges do not necessarily stem from their individual faults or failures.

Scholarship on counterspaces documents the tensions between safety and effective resistance to oppression (see [McConnell et al. 2016](#)) and, in this regard, LATTICE was no exception. Fiona, for example, spoke explicitly about the difference between safe spaces and counterspaces:

> A lot of the work that we're doing is trying to create counterspaces—not safe spaces but counterspaces where the individuals in that collection are valued from the get-go and that the space and the conversation and interactions are designed with the intention of serving the individuals not in the majority group. . . . The term 'safe space' just doesn't suggest that vulnerability piece to me, and I think that great change really comes when you're willing to scramble things you know and think, and be vulnerable and open to new ideas and new pathways or questions or going against some norm that might not work for you, and those are things that don't feel safe to do . . . creating a space that is counter to the majority culture.

Counterspaces are therefore not always comfortable and safe because they are places in which to challenge traditional norms. Specifically, in LATTICE counterspaces, the norms of positivist science are challenged in

two ways. First, we share and promote the idea that it is preposterous and oppressive to tolerate the presumed incompetence of scholars of color and women engineers. Second, a counterspace interpellates the stories of scholars' lived experiences and subjectivities in science, which, as Charlotte noted, is in tension with the methodologies of positivism and the commitments scientists and engineers trained in these traditions have made to objectivity. These elements combined may make some scientists and engineers who participate in counterspaces feel like they are taking risks rather than participating in a safe space.

Caring as Friendships

Friendship was key to developing a counterspace within our racially diverse, interdisciplinary collaboration. Friendship is a feeling of love, trust and rapport, that cannot be artificially created but instead can be cultivated in the process of creating and sustaining counterspaces, specifically through narrative work, communal resistance to forms of oppression and mutual support. Many friendships on the LATTICE team existed prior to this project. Our successes were achieved not only because the work enriched existing friendships, but also from the new friendships born out of this collaboration. In fact, forging and sustaining friendship in research collaborations, especially interdisciplinary collaborations, where mutual subject area expertise may not exist, may be key to persisting through the "unhappy affects of staying in the trouble" and reckoning with the politics of dispossession in technoscience (Murphy 2015, 731).[2]

In this section, we highlight how LATTICE team members—out of concerted effort, mutual goals and respect—generated and sustained friendships critical to our counterspaces. My friendships with Rona and Sarah, for example, which were established years prior to this project, are one of the reasons why my epistemological and methodological orientations are highly valued in LATTICE—a valorization of critical, qualitative work that is uncommon in many STS collaborations (Richter and Paretti 2009; Bauer 1990; Hackett and Rhoten 2011; Viseu 2015; Stavrianakis 2015). For this reason, I consider the LATTICE collaboration a counterspace not only for minoritized scholars, but also for qualitative research, an epistemic orientation that can occupy an ambiguous, marginal space in science (Carrigan and Wylie 2023).

I began working with Rona and Sarah, both of whom are engineers, at the very beginning of my graduate education when the distance between our levels of professional academic experience was very wide. They have been more than mentors, more than sponsors; they are my friends, people with whom I am in community. There are many dimensions to Sarah and Rona's influence on my life, but here I will focus on their intellectual support. These two engineers not only lack a general bias against ethnographic research, they recognize that the particulars of contextualized lived experience must be documented and shared widely in national and local efforts to resist oppression in technoscience.

Sarah and I had a federal grant that funded social scientists to teach engineers the tenets and practices of social science research. In our case, I taught Sarah about ethnography. Now, Sarah will often preface a social insight by declaring herself "Sarah: The Great Social Scientist." This is an example of how

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[2] For more interdisciplinary engagements with friendship we offer the following: Anzaldua 1987; Lorde 1984; Lugones and Spelman 1983; Mackinlay and Bartleet 2012; Sheffield and Howatson 2008; Epicurus 1964; DeNora 2001; Devere 2013; Parker and Corte 2017.

Rona and Sarah used humor to signal support, a trend that continues in the broader LATTICE team. We had a running joke that always got a laugh in LATTICE team meetings when someone asked me: "What's the difference between epistemology and episiotomy?" I found this humor flattering because, in a subtle way, it signaled an acceptance of post-positivist scholarship by my colleagues, the majority of whom have doctorates in fields that, by virtue of the ideological hierarchy between social and technical knowledge, have greater status in academia ([Cech 2013](#)). "We learned that to interrupt the deeply entrenched systems of racism in engineering, we had to connect engineering and social science. We sought to expand our team's literacy in core principles from the liberal arts to understand systemic inequities, cultural phenomena reproducing racism in engineering, and ways to dismantle this racist system" ([LATTICE 2020](#)). These moments in which critical, non-quantifiable knowledge was valorized by technoscientists felt, to me, like a victory against the unequal power relations that calcify and proliferate epistemic prejudice that, too often, impedes interdisciplinary collaborations ([Richter and Paretti 2009](#); [Bauer 1990](#); [Hackett and Rhoten 2011](#); [Viseu 2015](#); [Stavrianakis 2015](#)).

Humor became a highly useful tool for my colleagues to acknowledge acceptance *of* and receptivity *toward* my critical STS orientations, even when I challenged the epistemic and methodological tenets of their disciplines. Once the other scientists and engineers on the LATTICE team saw that value of qualitative methods and critical theory, their trust in ethnography grew. This trust empowered me to take risks and innovate on approaches in our social movement to desegregate technoscience, co-producing knowledge with transformational practices, such as member-checking, sheltering, and polyvocal memo-ing.

My experience of transforming from Rona and Sarah's mentee to a trusted collaborator was not unique in our LATTICE collaboration. Josephine, another LATTICE collaborator, framed this kind of relationship evolution as "building community," which she described as the feeling that emerges when your mentee begins to guide and support you. This happened in LATTICE, both between various team members but also within the very design of our programmatic interventions—the LATTICE symposia—whereby we invited senior engineers to mentor early-career faculty engineers. We designed mentoring activities at the symposia to operate bi-directionally, whereby senior faculty not only mentored junior scholars but learned approaches and frames for navigating the academy as well as from the early career LATTICE participants. The success of this aim for mutual aid was confirmed by LATTICE evaluation data. This definition of "building community" requires us to think about mutual networks of support in terms of longevity and within sustainable communities of practice across career-stages and generations.

The ways in which our team bridged differences of race, disciplines and epistemologies within our team by finding commonalities in friendship is an achievement made possible through our practice of care in counterspaces. Without this rapport, I myself may not have taken the risk to innovate on the traditional methods of my own discipline. This heightened my consciousness of the level of risk. I was asking my collaborators to share their subjective standpoints in the dissemination of our work together, a practice counter to their technoscientific education.

Transgressing a Counterspace

The dynamics of our counterspace shaped our data and methods, verifying that friendship matters in renegade research. The LATTICE team navigated a paradoxical terrain, which asked us to take risks and be vulnerable at the same time, a balance which felt especially tricky when it came to decision-making about

sharing our data. Because of the work we were doing and the variety of social standpoints from where we arrived at this collaborative, transformational labor, dissemination in LATTICE presented a problem common in feminist STS ethnography: balancing evidential rigor with anonymity and privacy (Tilley and Woodthorpe 2011). On one hand, breaching the counterspace could violate the terms of this ethico-political collaboration, but on the other hand, not publishing violates the terms of research in the academy. Further, every member of LATTICE had different approaches to and stakes at play in sharing our new knowledge. Personal interests and professional demands shaped what we wanted to share with the broader world while also protecting and caring for our group and our experience collectively and individually.

We also grappled with differences in our gender identities and how to account for and mitigate the complexities of intersectionality in the LATTICE symposia. We had many dialogues about who we want to serve—the impact we aspired to make—and how best to do so. For example, Josephine remarked:

> I don't think we really explore differences [between women,] and I think we need to talk about that and talk with each other. I think that makes for a rich conversation, like even just kind of considering that, of course, all underrepresented women's experiences are not the same.

We also explored differences between generations, which highlights the tension between anonymity and individual uniqueness. For example, Marion implored us to consider "differences between someone who's from a different generation . . . their experiences might be very different than mine." Marion, in dialogue with Josephine, was expressing an ethic of care, one of its key tenets in particular: the importance of individual uniqueness in knowledge production (Collins 2009). Josephine drove this point home at the second LATTICE symposium where, during her facilitation, she wove together her professional development advice with personal stories, prefacing each of her stories with the caveat:

> This is my story. It may not be your story. This is my story.

Our team thus faced the dilemma of how we might share the stories we learned within our counterspace with the wider world and took care to consider what is at stake. For example, we cared that women of color scientists' stories about their lived experiences in technoscience could be interpreted as aggression or excessive critique (Latour 2004). The very act of telling them is a form of resistance against powerful institutions upon which many of us rely on to subsist. The potential for retaliation against such storytellers is not negligible, especially in the political climate of the US during the time when this research was conducted, which is why we were deeply committed to enacting the tenets of counterspaces. Our counterspace provided the infrastructure for us to amplify our care interventions. For example, learning from our first symposium, and galvanized by the national discourse on sexual harassment in general (e.g., #MeToo), and in STEM specifically (e.g., the 2018 National Academies report on sexual harassment in STEM), we designed a session at the 2019 LATTICE Symposium to address sexual harassment of women of color in engineering. We agreed that, even within a counterspace, recounting experiences of incivility, discrimination and harassment can be painful. So that these conversations did not inadvertently cause more harm or provide misinformation, we received supplemental funding to bring a trauma-informed expert to the program and to create mechanisms for support during and after the symposium.

Honoring difference between individual women without fragmenting coalitional possibilities was another challenge we faced. The production of differences in the dissemination phase of LATTICE constitutes work that is not necessarily safe because it complicates anonymity and heightens the risks of subjects being identifiable. Thus, I heeded the call of scholars who refuse the norms of empiricism demanding evidence of our claims when that evidence and those claims may put vulnerable participants at risk (Reese 2019). For example, when discussing incidents of racism or homophobia at LATTICE symposia, I "shelter" specific details of the incidents and focus on how majority members in diverse groups of scholars can prevent this violence and intervene in such contexts (see Carrigan 2023). Our refusal to comply with traditional norms, in other words, to trouble anonymity and what counts as evidence, is methodologically intentional.

Consensus with Care

These dilemmas also heightened our care practices in data collection and analysis. For example, when preparing a solo presentation on this project for the Society for the Social Study of Science (4S) annual conference, I shared with my LATTICE colleagues a draft of my conference paper, asking them what they would like to cut or if they had any interpretations to add. This polyvocal memo-ing process aided our team in discovering misalignments with our data interpretations and offered opportunities for discussion towards interpretations that make sense to all LATTICE members.

In the process of polyvocal memo-ing, Fiona, a white scholar, reflected on Josephine's recommendation to be mindful of difference between women and interpreted this as a call to "decentering whiteness" both on our team and at LATTICE symposia. "Decentering whiteness is," Fiona reflected "one boundary we keep trying to breach and be aware of in our work as a group. By not starting from whiteness as an assumed reference point, other dimensions of women's experiences emerge." This illustrates how the technique of poly-vocal memo-ing not only put two LATTICE team members in conversation to participate in the interpretive work of this ethnographic project, but it also surfaced a moment in which coherence was not achieved. This is because Fiona's terminology "decentering whiteness" was not agreed upon. Feedback from women of color on our team signaled dissatisfaction with the concept "decentering whiteness" because it is a self-reflexive activity with which only white women must grapple. For women of color, whiteness was never a center.

Regardless of consensus, this collective theorizing on difference first helped us to develop intentionally design as an inclusive, welcoming counterspace at the LATTICE 2019 symposium, making difference across race a centerpiece of our symposium's facilitations. Second, it also helped us better prepare future dissemination products, for example, this manuscript. Third, this moment of misalignment also illuminates an example of how women of color and white women can converse in ways that excavate cultural and epistemic assumptions necessary for building both interventionist alliances and theories to counter unjust norms, practices and beliefs in science. The successful outcome of this alliance would be, as Josephine envisioned, a capacity to "understand and celebrate each other's differences and learn about each other's [differences], and get empowered." Fourth, the above account works to highlight the "ethical predicament of speaking as oneself [an individual researcher], and simultaneously, as part of a collective with internal disputes" (Tuck and Yang 2014, 242). Finally, this data point serves to illustrate the messiness of the material enactment of care in interventionist STS research.

Discussion: Matters Of Care In Counterspaces

Creating interdisciplinary counterspaces in technoscience requires care. It requires fluency, time and labor in order to communicate, reach consensus and care about one another across significant differences. Our vision of care was to collectively support both the health and persistence of scholars disenfranchised in academic technoscience. Our practice of care included generating and sustaining counterspaces for these scholars, including the LATTICE organizers, longstanding change agents in the social movement to desegregate STEM in the US. We analyzed scientists' collaborative efforts to resist oppressive structures in technoscience and highlighted the critical role Participatory Action Research played in our collaboration as its methods shaped and were shaped by our relationships and data infrastructure. Sharing the complex, emotional, intellectual and ephemeral nature of the labor and creativity of this particular collaboration required me, as an STS ethnographer in this world of engineering modalities and norms, to think reflexively about the ways in which I legitimized the methods of my discipline, while also troubling the limits of them. My response was to extend and innovate on PAR methods, including member-checking, and polyvocal memo-ing, in order to mitigate potential harms to our collective effort to desegregate engineering. To not innovate on traditional methods, I would risk reproducing positivist modes of knowledge production to the detriment of groups marginalized and sorely disenfranchised in US technoscience.

Embracing care in counterspaces was an attempt at a mode of research engagement called for by Niewöhner (2016): co-labor-ing with one's research participants in knowledge production. Member-checking, and polyvocal memo-ing, born from the analytical frame of counterspaces, expanded possibilities of analysis in this research, adding degrees of freedom to the collective process of interpretation, a process that relied on the critical race analytics to first, care about racial segregation in technoscience and next, create counterspaces to oppose it. Putting critical race theories and STS in conversation is important, not only to address critical questions about access to technology, but also questions about how technoscience is produced, and the social and ideological values and norms upon which sociotechnical assemblages are predicated (Benjamin 2019). Cross-racial co-laboring will only be possible if feminist STS recognizes the indebtedness it has to critical race scholarship and conversations between the two fields have greater uptake in the broader STS community (Fitsch et al. 2020).

Probing the contradictions within our collaboration illuminated connections between disciplines, methodologies, interventionist research and people as well as reflexivities and incommensurability within scholarly collaborations. In detailing this process, we aim to join the "new mainstream" in STS (Farías 2016) of participatory, collaborative action research done by a heterogeneous collective, in our case conceived of as an inclusive counterspace, committed to caring, dialogue and learning based in mutuality and friendship. Translating across disciplines and their power dynamics *within* LATTICE, *between* LATTICE and then *beyond* LATTICE to our sites of publication is, of course, a laborious task of translation that requires fluency based in expertise in multiple, rather than a singular or specialized, areas or worlds. In other words, we achieve shared understanding or mutual intelligibility through building fluency between ways of understanding in differing worlds and their epistemologies.

In the act of making these translations, I have drawn attention to areas in which we did not always achieve the coherence we sought. Here, I have framed incoherence as opportunities for mutual learning in collaborations to decolonize and desegregate technoscience. By documenting our gaps between our methodologically aspirations and the "situated actions" (Suchman 2007) of the LATTICE program and

research project, we aim to spark further consideration in STS conversations about the field's epistemological and methodological orientations and disciplinary aspirations about what we care to contribute to society. The process illustrates how our "doing data" ([Lippert and Douglas-Jones 2019](#)) shaped and were shaped by our individual social identities, the relationships between us within a counterspace, and anticipations of how our work would be received in broader academic communities. Multiple perspectives and slippage between our shared aspirations and the everyday work of scientific collaboration tilled fertile ground for new methods to emerge, facilitating the social process of a cross-race, interdisciplinary collaboration.

Questions remain. For example, honoring differences between women requires disaggregating data by race, ethnicity, sexuality and class for example, to generate data on intersecting systems that support some scholars and harm others. But disaggregating data on underrepresented scholars poses the risk of identification and thus, retaliation. How might troubles with anonymity illuminate ethnographic research practices, destabilizing them and transforming them? How might STS interventionist ethnography of institutional change help bridge STS and critical race theory and support collaborations between women of color and white women to facilitate collaborations *in* and *beyond* technoscience? What worlds might care open up and what worlds might they close down? To answer these questions, future work will require building capacity and the necessary fluencies for supporting additional dimensions of difference among scholars including age, career stage, relationship status, sexual orientation and gender identity. In friendship, LATTICE created counterspaces where polyvocality could flourish and innovated methods that enabled means by which our co-laboring could be shared with minimal risk in public forums. In this way, we contribute to STS theories of care, standpoint, and social relations in collaborative research and account for the data infrastructure and labor practices needed to produce collective forms of knowledge about making institutional change in service of equity and justice in technoscience.

Acknowledgements

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