

**A Critical Feminist Approach from the Geosciences to Transform Workplace Climate in
Partnership with Professional Associations**

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Abstract

The ADVANCEGeo Partnership program for transforming workplace climate is informed by critical feminist approaches that seek to disrupt inequities in strongly gendered and racialized disciplines. The program's main organizational change intervention is a community-based model for bystander intervention education, informed by a feminist ethics of care. Persistent demographic trends in the geosciences required an intersectional framework and a focus on exclusionary behaviors that lead to hostile climates. This approach also responds to unique challenges of disciplines with strong field training and research, by recognizing that sexism, racism, ableism, homophobia and transphobia jeopardize field safety. The program also promotes policies that identify harassment, bullying and discrimination as research misconduct and leverage collaborations with professional associations to transform culture in a discipline.

Keywords: STEM, inequities, bystander intervention, care, workplace culture, sexual harassment

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Many efforts to increase faculty gender equity in U.S. academic science, technology, engineering, mathematics and medicine (STEMM), including those funded by the National Science Foundation (NSF)'s ADVANCE program, have focused on recruitment and retention, e.g., through implicit bias training and mentoring programs for individuals to successfully navigate tenure and promotion (Hill et al., 2010; Morimoto et al., 2013; Bird, 2011). Despite these initiatives, large gender inequities persist in STEMM. Even in disciplines where women earn a majority of advanced degrees, men dominate senior and leadership positions. In the earth, oceanic and atmospheric sciences, or geosciences, 20 percent of faculty were women in 2016, a small increase from 16 percent in 2006 (Wilson, 2017). In some subfields, women are 10 percent of faculty (Wilson, 2019). These numbers are unevenly distributed across the academic hierarchy, with a greater concentration in precarious and lower paid untenured and non-tenure track positions. The slow change in representation in the STEMM workforce illustrates England (2010)'s uneven and stalled gender revolution.

Focusing on gender alone hides other inequities. The number of U.S. bachelor's degrees earned by Black women in the physical sciences, biological sciences, computer sciences, engineering, mathematics and statistics stalled or declined from 2008-2018 (NSF, 2021). Of the 40 percent of earth and physical sciences bachelor's degrees earned by women in 2018, only eight percent were earned by Black or Latinx women (NSF, 2021). The number of PhDs awarded to geoscientists of color in the U.S. has not increased in 40 years, demonstrating that efforts to counteract gender bias have failed to diversify the discipline (Bernard & Cooperdock, 2018).

In addition to systemic gender and racial biases, cultural practices and interpersonal behaviors contribute to chilly (e.g., Britton, 2017; Miner et al., 2019) or outright hostile academic environments (e.g., Davis et al., 2015; Zambrana, 2018). Sexism, racism, ableism and harassment are barriers to diversifying the geosciences (Dutt, 2020; Marin-Spiotta et al., 2020; Pickrell, 2020; Morris, 2021). Fifty one percent of early-career women geoscientists surveyed were sexually harassed (Archie & Laursen, 2013). In a study of astronomy and astrophysics, women of color were more likely than white women to opt out of professional activities because they felt unsafe (Clancy et al., 2017).

We make the case for an intersectional, ethics of care, and gendered organizations framework for efforts to improve academic workplace climate in the context of a stalled gender (and racial) revolution in STEMM. The ADVANCEGeo program aims to enact interventions at the individual and collective level through behavior change education and organizationally through ethical codes of conduct that frame harassment and other harmful behaviors as scientific misconduct. As a NSF ADVANCE Partnership award, the project is novel in its design to leverage collaborations with professional associations to influence academic culture from outside the borders of a single university. Originally designed to address sexual harassment, centering a framework of systems of oppression expanded the program's capacity to address a range of exclusionary and discriminatory behaviors to better respond to observed demographic trends. We show that this approach can be adapted to other fields.

Enacting Organizational Change

The “leaky pipeline” metaphor commonly used in the physical and natural sciences ignores a wealth of social science scholarship. Organizational context plays an important role in maintaining gender and racial inequities, especially in white male-dominated spaces (e.g., Bird,

2011; Britton & Logan, 2008; Williams et al., 2012). Inequity is inherently built into the structure of organizations and maintained through multiple factors, including the rationalization and legitimization of hierarchies and workplace interactions (Acker, 1990). Bird (2011) defined universities as “incongruous” due to multiple structural disjunctures, for example, between stated values and reward structures and between formal commitments to codes of conduct and evaluative processes.

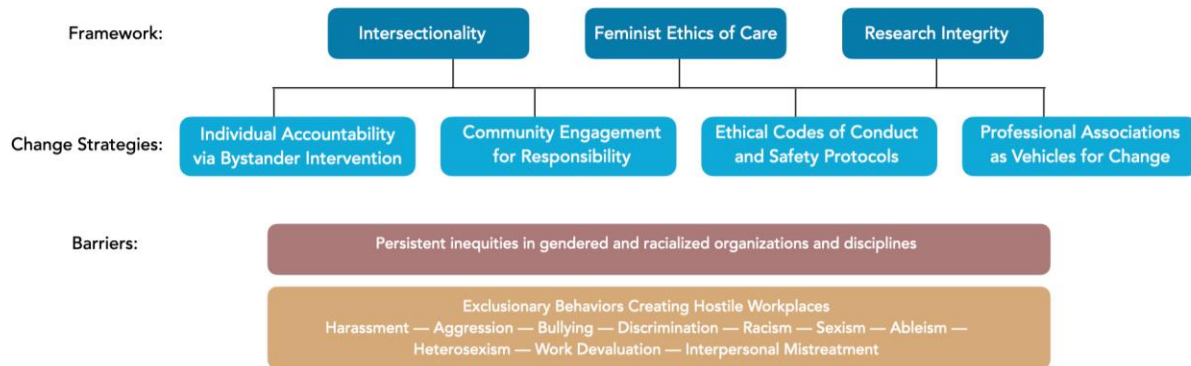
The geosciences are a strongly gendered and racialized discipline. Williams et al. (2012) interviewed women in the oil and gas industry, a main employer of geoscientists, to better understand low retention, and described how gender hierarchies were maintained through organizational structures and policies. Gender and racial bias have been documented in hiring, salary and career advancement, awards, publications, invitations for scientific talks, and prestigious editorial positions (Dutt et al., 2016; Conley & Stadmark, 2012; Lerback & Hanson, 2017; King et al., 2018; Ford et al., 2019; Williams, 2021).

In gendered organizations, organizational climate is influenced by the "distribution of power through hierarchical lines of authority" (Britton, 2017). Efforts to reduce the prevalence of exclusionary behaviors that affect career advancement, satisfaction, and retention (e.g., Settles et al., 2006) need to address workplace climate (Clancy et al., 2020). Negative workplace climate disproportionately affects women (Gardner & Blackstone, 2015; Settles et al., 2012), who are more likely to experience and perceive sexual harassment, gender microaggressions and subtle forms of sexism (Basford et al., 2013). Women of color experience more disrespectful and offensive behavior at work (Cortina, Kabat-Farr et al., 2013) and lower job satisfaction (Britton et al., 2012).

Since 2001, the NSF ADVANCE program has supported evidence-based practices towards faculty gender equity (DeAro et al., 2019), including individual professional development (Morimoto et al., 2013). Organizational change efforts include WISELI's tools to assess workplace climate and educate faculty and chairs on implicit bias (Sheridan et al., 2007); Oregon State's curricula on power and discrimination based on theories of systems of oppression (Shaw et al., 2019); University of Massachusetts, Lowell's training to disrupt interpersonal and institutional microaggressions; and Texas A&M's interventions to address hostile workplaces for minoritized faculty (Carter-Sowell et al., 2020). The multi-institutional ADVANCEGeo Partnership program, funded in 2017, centers intersectionality, equity, care, safety, and accountability into transforming academic workplace culture in collaboration with professional associations.

A Critical Feminist Framework to Organizational Change

We describe a critical feminist framework for organizational change that identifies sexual, gender and other types of identity-based harassment and exclusionary behaviors as barriers to equity in STEMM. Our approach underscores the role of intersectionality in explaining disproportionate impact on historically excluded groups. The program applies a feminist ethics of care in the design of strategies for transforming workplace climate through individual accountability and community-wide participation, and leverages the role of professional associations in setting ethical standards and leading cultural change within a discipline (Figure 1).

Figure 1*The ADVANCEGeo Partnership Program Approach*

Note. The ADVANCEGeo Partnership program for transforming workplace climate applies a critical feminist framework that 1) centers intersectionality, to better understand persistent inequities in gendered and racialized organizations; 2) employs a feminist ethics of care, to instill a sense of responsibility and accountability, and 3) promotes policies that expand research integrity to address harassment, bullying and discrimination. The program specifically focuses on reducing the prevalence and harm of exclusionary and discriminatory behaviors (such as harassment, aggression, bullying, discrimination, racism, sexism, ableism, heterosexism, work devaluation and interpersonal mistreatment) creating hostile workplaces that contribute to persistent inequities in gendered and racialized organizations and disciplines. The program promotes change through interventions at the individual and collective level through bystander intervention and other strategies for community engagement, and structurally through implementation of ethical codes of conduct and safety protocols. The project leverages professional association partners as agents of culture change in a discipline.

Intersectionality

Organizations preserve not only gendered inequities in their structures, policies and practices. Acker (2006) recognized gender, racial and class-based inequities in organizations as inequality regimes reflecting the surrounding society. Overall, race has been understudied in feminist research on gendered organizations (Britton & Logan, 2008) and in the broader literature on organizations, but see Ray (2019). Wingfield (2019)'s review of Black feminist scholarship features the way race, gender and other oppressed identities shape experiences of workplace climate and organizational change leadership.

Intersectionality is a useful framework for identifying problems of underrepresentation and inequities in STEMM as functions of social injustice and oppression and for insight into the disproportionate impact of exclusionary behaviors in the context of unequal power distribution in organizations (Collins, 2015). Texeira (2002) used the term racialized sexual harassment to describe the experiences of African American women in a male-dominated workforce. Lesbian, gay, bisexual, transgender, queer/questioning, pansexual, asexual, and/or nonbinary women and gender minorities in astronomy are more likely to be verbally and physically harassed than cisgender straight women (Richey et al., 2019). LGBT+ physicists of color face greater levels of discrimination than their white peers (Atherton et al., 2016). Armstrong, Gleckman-Krut and Johnson (2018) proposed that feminist, critical race, and intersectional theories are necessary for understanding the role of sexual violence in the reproduction of multiple, intersecting inequities.

Intersectionality provides an effective lens for exploring persistent inequities in STEMM by identifying how different forms of social and institutionalized discrimination affect career advancement (Ong et al., 2011; Settles et al., 2006; Corneille et al., 2019). Hunt et al. (2012) proposed that an intersectional approach is critical to efforts to transform the academy because it

addresses individual and collective struggles by centering the experiences of those disproportionately impacted and historically excluded, draws attention to organizational context by highlighting the role of power in structuring and organizing inequity, and promotes social justice and transformation through research and practice.

A Feminist Ethics of Care

We propose that a sense of responsibility and commitment to a community's well-being is key for efforts to transform workplace climate. Feminist ethics of care is rooted in a focus on collective understandings and connections among people and as such places value on social responsibility and attention to others as core practices (Featherstone & Morris, 2012). This approach values relationality among individuals as part of an interdependent community (Sevenhuijsen, 2003). Sevenhuijsen (2003) proposed a feminist ethic of care framework to guide social policymaking that appeals to basic moral concepts such as “attentiveness, responsibility, competence, responsiveness, trust and asymmetrical reciprocity.” Feminist ethics of care as a philosophical approach has been revised and re-articulated to explore issues beyond gender to those of power and oppression more generally (Koggel & Orme, 2010). For example, O'Brien (2005) proposed that required accommodations for people with disabilities have the potential to disrupt power dynamics by more actively engaging employees in the construction of more equitable and ethical workplaces. This same argument can be made for accessibility and safety in field research and training environments in the geosciences and other disciplines.

Ethics of care approaches are significant for projects addressing gender equity with efforts to collect data for research purposes and to develop and implement practice-based interventions. Acker (1990) proposed that the design of organizational transformations with gender theory would result in the valuing of caring work. In following sections, we address how

the ADVANCEGeo project has applied a feminist ethics of care approach in the content and implementation of its education program.

Harassment as misconduct

Feminist theory provides a useful framework for understanding sexual harassment within a context of power, privilege and discrimination (MacKinnon, 1979; McLaughlin et al., 2012). Sexual harassment is one of the most common forms of workplace mistreatment (Buchanan et al., 2014). A 2018 National Academy of Sciences, Engineering and Medicine report unequivocally identified sexual harassment as a major barrier to gender equity in STEMM (National Academies of Sciences, 2018). Feminist theory can inform interventions to reduce the prevalence of harassment and its disproportionate impacts (Bowman Williams, 2020). Cantalupo (2019) proposed organizational interventions from a social justice feminist perspective that center and support women of color and incorporate intersectionality into bystander intervention training.

Sexual harassment is more prevalent in gendered organizations (McLaughlin et al., 2012). Its persistence is influenced by organizational climate and tolerance, job gender context, and abdication of leadership (Fitzgerald et al., 1997; Clancy et al., 2020). Despite this, there is surprisingly little research on sexual misconduct in academia outside of student interactions (Cantalupo & Kidder, 2018) or on how intersectionality shapes experiences of women of color in STEMM (Corneille et al., 2019; but see Settles et al., 2006; Settles et al., 2016). In a review of university disciplinary proceedings, Cantalupo (2019) identified how racist and sexualized stereotypes increase vulnerability of women of color to sexual misconduct.

Overview of the ADVANCEGeo Program

Funded by a four-year award (2017-2021), the ADVANCEGeo Partnership is a collaboration among individuals from multiple universities, two women's organizations, the Earth Science Women's Network and the Association for Women Geoscientists, and the largest U.S. earth and space science association, the American Geophysical Union (AGU). The research team represents faculty and researchers in the geosciences, ecological sciences, education research and policy, and organizational psychology. The program goals are to collect data on workplace climate in the geosciences; develop and deliver intervention training with discipline-specific scenarios and that incorporate intersectionality; develop curricula that identify harassment, bullying and discrimination as research misconduct; and partner with professional associations for a transdisciplinary model. One of the project's main contributions has been the development of workshops to equip individuals and teams with the skills to recognize identity-based harassment, bullying and microaggressions when they occur and implement direct and indirect behaviors to interrupt hostile behaviors and reduce their harmful impact (active bystander intervention). The workshops provide context on the prevalence of exclusionary behaviors and their negative impacts in academia and other research environments. While focusing on bystander intervention skills, workshop participants learn about strategies that can be used by professional associations, organizations, and departments to address workplace climate, including codes of conduct.

Data Sources

In this paper, we illustrate the need for and effectiveness of a critical feminist framework for organizational change with selected examples of data collected from focus groups, post-workshop evaluations (709 surveys), and one-one-one interviews with the project research team.

Semi-structured focus groups were conducted at several scientific conferences during the project's first year (between October 2017 and February 2018), with facilitated discussions about experiences in academia, the prevalence of harassment and bullying in science, and strategies participants may have used to address hostile work environments. The focus group and interview data were transcribed, then analyzed separately using a qualitative content analysis method (Hsieh & Shannon, 2005).

Discussion

An intersectional framework for disrupting hostile workplace climates

The ADVANCEGeo program provides an example of how gender transformation of organizations can contribute to broader questions of equity beyond a single lens of identity. Centering intersectionality has been key for addressing the context of persistent low diversity in the geosciences as well as the challenges of field-based training and research, which are specific but not unique to the geosciences.

A deeper intersectional analysis demanded significant broadening of the program's initial focus to include behaviors beyond and in addition to sexual harassment, such as other types of identity-based harassment, microaggressions, bullying, racism, and interpersonal mistreatment, etc., that contribute to hostile workplace environments. One focus group participant described "there's a lot of discussion around sexual harassment ..., but I think equally damaging, because it's more insidious, is diminishment of contributions. Because we all know that sexual harassment is bad ... but when our contributions are diminished it's much... easier to internalize and blame oneself." Summarizing research on anti-harassment trainings, Bird (2011) concluded that to be effective, efforts for transforming gendered organizations need to address a range of behaviors that uphold gender and racial inequities.

The expansion of ADVANCEGeo's focus from sexual harassment to hostile workplace climates recognizes that individuals affected by harassment are participants in a system that sustains a suite of oppressive practices and behaviors with uneven impacts. An intersectional lens brings attention to how accountability conveys responsibility, which can also be a way to strengthening connections in a community. As one of the workshop facilitators reflected: "What I wanted people to take away was ... I need to think about how am I interrupting racism in my department. I need to look at how these things are actually connected to each other. Even if I've had this shitty experience multiple times, what am I actually doing to interrupt other forms of repression? ... I think it's empowering to feel like there is still something I'm doing. I'm part of a bigger effort. It's more than me just surviving."

An intersectional approach is especially relevant in disciplines with strong field training and research. Much geoscience fieldwork is conducted at remote sites, where exposure to harsh conditions and greater or unfamiliar risks of environmental hazards, coupled with expectations of physically strenuous work, and unfamiliar or nonexistent codes of conduct and reporting processes can enhance vulnerability to harassment, bullying and other identity-based exclusionary behaviors, such as racism and homophobia. Gendered and heteronormative stereotypes about geoscientists as able-bodied, white, cis-gender rugged men field scientists can create unwelcome and unsafe environments for those who do not conform (Marin-Spiotta et al., 2020; Pickrell, 2020; Atchison & Libarkin, 2016; Nash et al., 2019). Compared to other STEM disciplines, LGBTQ, intersex and asexual scientists in the earth sciences reported less disclosure of their queer identity (Yoder & Mattheis, 2016), as reflected in the exchange between a participant in a focus group at a scientific conference and a facilitator:

Participant: And so it was strange to be in a place where I'm out in the woods with these straight homophobes with hammers and so it was like a legitimate safety concern in thinking about whether or not to disclose.

Facilitator: Did you feel like it impacted your ability to do your science?...

Participant: Certainly, right like a portion of my brain was not on collecting rocks and charting outcrops, it was focused on like am I acting gay?... And am I safe?"

(Personal communication, 2018)

The literature on gender as a social construct (Ridgeway & Correll, 2004) and the role of hegemonic masculinity and sexuality in gendered organizations (Acker, 1990) can provide context to these experiences. Ability status and class also influence both accessibility to and personal safety in the field (Giles, Jackson & Stephen, 2020; Posselt et al., 2019; Stokes et al., 2019).

An intersectional approach, furthermore, has been important for eliciting broad participation in program interventions, including from those who do not typically see themselves as recipients of sexual harassment. During an intentional exercise in the workshops, men publicly reflected on how their own visible and invisible identities, including race, immigrant status or disability, influenced their positionality in professional and non-professional contexts. Metcalf et al. (2018) described how intersectionality frameworks can aid in understanding, contextualizing and addressing the complexity of factors influencing participation in STEMM. Efforts in the geosciences are raising awareness of the importance of centering identity and intersectionality in education and diversity programs (Mattheis et al., 2019; Nuñez et al., 2019; Seag et al., 2019).

A feminist ethics of care for engagement and intervention

Just not being complicit and silent. I think that's so damaging. Even many years later, I can think of times where people have said stuff to me and everyone around is just seemingly okay with it and I felt so betrayed and like you don't support me, you don't care. (Focus group participant at a scientific conference, 2017)

Feminist ethics of care approaches are instrumental to organizational change strategies by developing a sense of collective responsibility for building a more equitable and caring workplace. Community engagement is a primary aim of efforts to interrupt exclusionary behaviors, such as bystander intervention. Focus groups revealed concern for a lack of relevant anti-harassment training for faculty, with participants describing that either trainings did not exist, did not apply to their workplace setting or experiences - for example, lab or fieldwork - or that existing trainings did not teach specific skills that could be used to respond to exclusionary behaviors. One focus group participant related concern for how the most common forms of trainings could create a "counter-culture of push-back" because "people are just so dismissive of it [...] they make jokes about it behind your back." This concern is shared by research showing that anti-harassment trainings based on legal compliance can exacerbate gendered stereotypes (Dobbin & Kalev, 2019; Tinkler, 2013).

In order to cultivate cultural and organizational change, ADVANCEGeo promotes bystander intervention skills training. The main aim of bystander intervention is to instill a sense of responsibility and a sense of caring for what happens to others. In a post-workshop survey, one faculty shared: "I've been lucky to not have encountered this directly, but I've heard far too many cases reported or from colleagues where this occurred in my field. It is important for me to know what I can do." Bystander intervention education begins with an acknowledgement of

one's positionality, recognizing the role of power dynamics in shaping social interactions around identification of hostile behaviors and perceived responsibility to act on behalf of someone else. Research from gendered organizations, such as the academy and the military, shows that bystander intervention holds promise for reducing harassment (Moynihan et al., 2011; Coker et al., 2011, 2015; National Academies of Sciences, 2018).

The ADVANCEGeo program employs multiple strategies to achieve a sense of community and accountability, including group-based trainings. The program has delivered more than 100 workshops for faculty, staff and students in academic units (programs, departments, colleges), administrators, research teams, and conference audiences. Correll (2017) highlighted the value of a team-based approach to organizational change interventions to increase the likelihood of contagion and accountability. In post-workshop evaluations, participants shared that one of the most important things learned was the notion of caring for community and caring for others, reflected in statements about the importance of checking in with others or helping others, protecting people, and working together to achieve a safe and inclusive environment, including through prevention of hostile behaviors.

Another strategy for community engagement is tailoring workshops to the discipline, institution, and research setting of the audience. Ninety percent of 704 participants reported that the scenarios discussed in the ADVANCEGeo workshops were “relevant” or “very relevant” to their own field. One participant described: “I have led field teams where this behavior has affected me personally and the team.” Correll (2017) identified the importance of diagnosing organizational problems with local data and contextualizing research and interventions. Relevance to the audience increases effectiveness of educational programs (National Academies of Sciences, 2018; Clancy et al., 2020).

To increase group commitment, workshop facilitators coordinate with local leaders. Active participation of organizational leadership and support from higher levels of administration can increase the effectiveness of organizational change interventions (Bird, 2011). In post-workshop evaluations, 43 percent of participants described committing to actions relevant to care for community or care for others, such as checking in on victims/targets of harassment, being a source of support or ally for historically excluded racial and ethnic groups, LGBTQ+ students and colleagues, or joining relevant committees at their workplace. Ninety two percent of 700 participants said they were likely or very likely to use the bystander intervention skills learned.

Delivery of the ADVANCEGeo program by practicing scientists further contributes to providing contextual relevance. As one of the facilitators shared: “We are here to learn about how to improve *our* (emphasis) workplace climate.” Collins' (2000) Black feminist philosophical stance that researchers can tell their own truths in collaboration with participants, rather than de-centering their personal experiences is consistent with an ethics of care (Edwards & Mauthner, 2012). Suk et al. (2019) described the power of acknowledgment as an act of communication that speaks to personal vulnerabilities and strength as community. They reference Tarana Burke's (2017) “empowerment through empathy” to describe how sharing of personal stories around trauma creates connected communities.

Reframing research integrity from an intersectional, feminist ethics of care lens

The ADVANCEGeo program combines mechanisms for social responsibility and accountability by promoting pro-social behavioral change through bystander intervention and policy change through the adoption of codes of conduct that reframe harassment, bullying and discrimination as misconduct. This reframing broadens responsibility beyond individuals to

include academic and research organizations, funding agencies, and professional associations (Marín-Spiotta et al., 2016; Page et al., 2019).

The ADVANCEGeo program presents hostile workplace climates as harmful not only to individual health and careers but also to research collaborations, performance and integrity. Deficiencies in existing legal compliance mechanisms to address currently unlawful behaviors (Clancy et al., 2020), and the fact that many other toxic behaviors in the workplace are not illegal demand a focus on cultural transformation (NASEM, 2018). In addition to cultural change, abuses of power and hostile workplace climates should be considered under responsible conduct of research and professional ethics policies (Williams et al., 2017; Marin-Spiotta, 2018; Benya, 2019; Mogk & Bruckner, 2020; Mello & Jagsi, 2020).

Given the importance of experiential off-campus training and research in the geosciences and related fields, an important focus of ADVANCEGeo has been field-based codes of conduct. Nelson et al. (2017) identified the presence of rules and their enforcement as important predictors of field experiences, reinforcing the role of organizational context in understanding culture, practices and policies (Britton & Logan, 2008). The extra-organizational context, specifically, of fieldwork poses a challenge, as academic institutions are ill-prepared to address misconduct that may happen outside campus borders, in remote field locations, or at sites governed by multiple institutions (Nelson et al., 2017). These gaps in accountability are an opportunity for leadership by professional associations.

Professional associations as vehicles for organizational change

ADVANCEGeo's interventions leverage the role of professional associations as custodians of a discipline's core values and norms (*sensu* Frankel, 2000). Inadequacy of academic organizations to address harassment, especially when faculty are involved (Cantalupo & Kidder, 2019), has led to calls for professional associations to codify expectations for ethical

behavior (Favaro et al., 2016; Marín-Spiotta et al., 2016; Foxx et al., 2019). The American Geophysical Union (AGU), an ADVANCEGeo partner, was one of the, if not the first, to define harassment, bullying and discrimination as research misconduct and to identify and enact a range of sanctions for violations, including loss of membership and revocation of awards (Williams et al., 2017; Reardon, 2018). As one focus group participant reflected:

I have recently been learning more about the [scientific association] policy ... that could get people banned from meetings and banned from publication and I felt this giant wave lift off like, wow, I wonder if we could pursue this guy because he's a known harasser in our community and it had never occurred to me that such an opportunity could exist. I'm used to the more sort of traditional kind of institutional-based barriers. In my own experience ... the first arrow I was hit by was the harassment and the offense didn't take me out, it was the second arrow of the institutional failure to respond and fulfill their obligations. Some of that was because we were sitting at different institutes, but the thought that professional societies span institutes and can be kind of these carrot-stick enforcers of certain codes of conduct to me really was hugely eye-opening and I felt kind of this sense of promise. (Personal communication, 2018)

Despite potential conflicts in gendered organizations leading gender equity change (Correll, 2017), associations have the responsibility and opportunity to effect change. Conferences are sites of exposure to harassment and other harmful behaviors (Biggs et al., 2018; Marts, 2017; Settles & O'Connor, 2014). In addition, associations across disciplines are grappling with their own contributions to perpetuating inequities, by interrogating their own data and processes related to membership, publications, awards and honors.

Collaborations with professional associations can help disrupt power imbalances for

those underserved by their home organizations. Professional association codes of ethics can serve as external guideposts (Van Valey & Hillsman, 2007). Many geoscience departments have adopted AGU's code of ethics. Associations possess mechanisms for broadening participation across hierarchical lines, e.g., through the nomination and election of early-career members into leadership and the creation of task forces to work on policy change. Marin-Spiotta et al. (2020) described how professional associations and networks in the geosciences facilitate member advocacy and contribute to building social capital for historically excluded groups. To change inequality regimes in academia, Acker (2006) identified the importance of coupling internal active support with social movement and policy support from outside the organization.

As volunteer-led and member-based organizations, professional associations are nimbler than academic organizations in implementing policies that ultimately shape culture and climate in a discipline. Recent widespread recognition of racial inequities in society and STEMM have underscored the opportunity for social change leadership by professional associations (Cartier, 2020; Tormos-Aponte, 2020). The breadth of actions and strategies possible, from education to policy change and opportunities to redress discriminatory practices (Marin-Spiotta et al., 2020; Ali et al., 2021; Behl et al., 2021), can fulfill many of the objectives outlined in the ADVANCE program and effect necessary equity changes across STEMM.

Transferability to other disciplines

The ADVANCEGeo program has been successfully adapted to multiple disciplines. Partnerships with professional associations have facilitated interdisciplinary and intersociety collaborations in ecology, evolutionary biology, chemistry, engineering, psychology, sociology, and political science, in addition to the originally intended audiences. One reason for this is that the geosciences themselves are inherently interdisciplinary, spanning the biological, chemical,

and physical sciences. The focus on intersectionality, a feminist ethics of care, and research integrity is applicable across STEM, as all disciplines suffer from inequitable representation of individuals with multiple marginalized identities, all benefit from a sense of community solidarity, engagement, accountability and responsibility, and all are governed by expectations of research ethics.

While stereotypes about field scientists and overreliance on field education and training are heightened in the geosciences, leading to unique risks (Hall et al., 2004, Anadu et al., 2020; Demery & Pipkin, 2021), many areas of scholarship share extra-organizational research in novel environments with unknown risks, practices and policies, whether it be an oceanographic cruise or ethnographic research (Hanson & Richards, 2019; Schneider, 2020). Codes of conduct for fieldwork that treat hostile climates as a safety concern also can be adapted to laboratory environments. Finally, inequities and hostile climates are not unique to the geosciences or to STEM. Given the broadly consistent influence of organizational climate on job satisfaction across academic disciplines (Britton et al., 2012), workplace climate change interventions can benefit all employees and members.

Conclusion

The ADVANCEGeo program illustrates how feminist critical theory can inform practices for organizational change. An intersectional framework informs interventions through the examination of structural and cultural conditions that create inequity and with an explicit goal of workplace climate transformation. An ethics of care approach contributes to fostering community participation, responsibility and accountability. An expansion of the program's aim to address a range of harmful exclusionary behaviors that contribute to workplace climate recognizes the role of intersectionality in shaping the lived experiences of historically excluded

groups in STEMM and can address persistent trends in gender and racial inequities. An intersectional framework can also address unique challenges of extra-organizational field-based education and research.

As a partnership with professional associations, the program operates outside of a single institutional framework, allowing broader reach and richer community engagement to tackle systemic exclusionary behaviors. While professional associations are themselves gendered and racialized, they can provide unique opportunities for changing cultural expectations in a discipline and with that, workplace climate in academic organizations. Associations can take a leadership role in advocating for and developing new policies and practices to address equity in their membership and the discipline more broadly. Through multi-society collaborations, the successful implementation of policies that reframe sexual harassment, bullying and discrimination as scientific misconduct has launched new initiatives to increase diversity and equity across disciplines.

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