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#SAYHERNAME: ANCHORING BLACK FEMINIST EPISTEMOLOGIES AT THE CRUX OF POSTSECONDARY STEM CULTURE

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This conceptual paper presents our position on why the field of postsecondary science, technology, engineering, and mathematics education (STEM) should reorient and anchor diversity, equity, and inclusion efforts in Black feminist frames. Reviewing the culture of science and Black feminisms, we propose a reimagined space that centers Black women's ontological experiences and epistemologies as a means to fully embrace and embark on a field that is justice oriented and ultimately benefits all. Through this reimagined perspective of postsecondary STEM, we consider how embracing, emboldening, celebrating, and promoting Black women creates opportunities to do the same for everyone else in a truly equitable, inclusive, and diverse fashion.

KEY WORDS: *Black women, postsecondary STEM, Black feminisms*

1. INTRODUCTION

Wednesday, September 23rd, 2020, the world sat and watched the continued dehumanizing and devaluing of Black women as the law, as evidenced through the vote of the Grand Jury in Louisville, KY, demonstrated its lack of concern for Breonna Taylor and her life. And while we, the authors, were not surprised by the outcome given that this story has played out time and time again, we were still hurt and upset. What was seen in that moment is a narrative that plays out across all social institutions within the United States, including postsecondary STEM education. This narrative is that Black women, as the "mule uh de world" (Hurston, 1937, p. 24), give their lives to enhance society while society in turn dejects them. The basis of society's dejection of Black women is one situated within the undergirding systems of oppression rooted in frames of whiteness that favor and privilege a white racial identity, a cisgender male identity, or other social identities that can closely approximate a variation of the two (Ahmed, 2007).

Given our current critiques of postsecondary STEM education specific to the positioning and treatment of Black women, we take the position that in order for postsecondary STEM to truly achieve the goals of diversity and inclusion, critically examined, then we as STEM scholars and practitioners must "weed out" whiteness and intentionally center the knowledge and realities of those oppressed within STEM spaces, specifically Black feminist epistemologies and ontologies. Our perspective is based on the mindset of situating the "least of these" (Ladson-Billings, 2014) at the nexus of STEM ideology. Black women have offered several theories and frameworks to engage with the oppression they experience on a daily basis and within the realm of education. As such, we present Black feminist thought (BFT), critical race feminism (CRF), and intersectionality. While these frameworks derive from varying academic disciplines and fields, scholars invested in diversity, inclusion, and equity must consider and redress the positioning of Black women in relation to larger context and societal ills.

This paper calls for the centering of Black feminist ideologies in postsecondary STEM education research, given the manifestation of intersectional oppression that constrains existing diversity, inclusion, and equity efforts in STEM. The desire to center Black feminist ideologies prompts justice-oriented STEM education research and praxis (Parsons and Mensah, 2010). In providing a brief review of the existing literature on STEM culture through the perspectives of Black women, we highlight why postsecondary STEM needs a catharsis and critical reimagining centered on Black feminist epistemologies and ontologies. We then present a synthesis of the three frameworks—Black feminist thought (Collins, 2000), critical race feminism (Wing, 1999, 2014), and intersectionality (Crenshaw, 1991)—to demonstrate the power of Black women's ideologies to appropriately name and challenge the existing conceptions of "normality" in postsecondary STEM culture, policies, and practices, a.k.a. the culture of whiteness. Leveraging these frameworks, we offer guiding concepts for postsecondary scholars, policymakers, and researchers invested in diversity, equity, and inclusion that facilitate the process of (re)thinking, (re)analyzing, and (re)defining STEM education, through centering and building from Black women's experiences and livelihoods as legitimate.

2. POSITIONALITY

The authors of this paper are a group of Black scholars (six cisgender women and one cisgender man) invested in equity, diversity, justice, and liberation within the context of STEM teaching and learning as well as larger society. As a group of Black scholars with a myriad of life experiences and professional expertise (one undergraduate student, three graduate students, one postdoctoral fellow, one assistant professor, and a chief diversity officer), we come to this work as both conspirators and co-conspirators (Love, 2019) with fire for radical change and transformation in STEM education. Additionally, as scholars who are familiar with, yet adjacent to, formal STEM learning spaces, we often witness how the culture of such spaces impacts our own experiences as researchers, practitioners, and learners. However, our standpoint as functional outsider-insiders can limit our perspective, as our current accounts of STEM experiences come from the

retelling of others' stories or featuring of stories on different platforms to feature their voices. Recognizing the challenges associated with what can be seen, unseen, and unforeseen when engaging this work (Milner, 2007), we are conscious and critical of how our experiences both constrain our lens as well as expand possibilities that could still be beneficial to STEM overall.

Given our various identities and experiences, as well as our similar commitments and actions toward liberation, our collective positionality for this paper is one in which we look to understand STEM through the ideologies of Black feminisms. As we noted earlier, it is our collective belief that in attending to STEM—its norms, policies, and practices—through the perspectives of Black feminisms, we can address oppression in ways that is specific to the "least of these" given the social hierarchy generated by society, knowing that these specific changes will benefit others (Ladson-Billings, 2014). As such, we provide a review of the existing literature specific to postsecondary STEM culture through the lenses of Black women.

3. STEM CULTURE THROUGH THE LENSES OF BLACK WOMEN

Research calling for the specific focus on Black women in STEM traces back to the 1970s as scholars noted the distinct experiences that came with operating within the "double bind" (Malcolm et al., 1976). This research noted how systemic oppression in STEM operated on Black women in a different capacity than that of Black men or white women, given the intersectional nature of their identity. Examinations of the different and unique experiences for Black women in STEM carry forward (Malcom and Malcom, 2011) as even to this day Black women continue to note the heightened challenges: implicit and explicit forms of intersectional oppression they face given STEM culture and the "perceptions of normality" that it reifies.

3.1 STEM Culture

Existing research that attends to postsecondary STEM through both inter- and intradisciplinary lenses depicts STEM as being dominated by white or Asian men, competitive, and isolating (McGee et al., 2017). There is a myopic view as to what concepts are considered within the domain of STEM disciplines, STEM content and procedural knowledge, and STEM praxes (Morton et al., 2019). Previous researchers have described STEM culture as a space that reproduces hegemonic norms of how to "perform" as a STEM student (Gholson and Martin, 2019). Western, Eurocentric STEM is considered the dominant viewpoint, and other ways of knowing and participating are devalued.

Western, Eurocentric STEM perpetuates autonomy, competitiveness, and individual achievement as delineating variables of success (Anderson, 1988; Boykin, 1986; Lewis, 2004; Seymour and Hewitt, 1997). It drives objectivity, isolation, and elitism (Burton, 2009; Martin, 2013; Pawley, 2009), which foster negative gendered and racial stereotypes of Black women (Joseph et al., 2017; Ireland et al., 2018; Morton and Parsons, 2018) and white supremacist or neoconservative ideologies designed to oppress Black

students (Martin, 2013; McGee, 2016). This culture results in the othering of STEM pupils who do not fall within the axes of these identities or norms; or worse, it means the narrowing of access to anyone outside of this Eurocentric patriarchal representation of STEM. This narrowing actualizes in barriers such as financial burden, microaggression, or tokenism (McGee, 2016; McGee and Robinson, 2020). As a result, about 40% of Black students leave STEM before they graduate or leave STEM due to weed-out courses (Riegle-Crumb et al., 2019; Seymour et al., 2019).

The perspectives of what counts as STEM are generated and perpetuated by the ideologies and practices of postsecondary STEM education that promote white empiricism while intentionally excluding and rejecting the knowledge and lived realities of Black women (Prescod-Weinstein, 2020). As such, the undergirding ideologies that drive STEM (i.e., norms, practices, beliefs, and values) are rooted in a culture of whiteness—perceived norms, values, beliefs, and expectations that position the white, cisgendered, heterosexual, able-bodied, middle-to-high socioeconomic status man and his epistemological and ontological understandings as the "standard" (Le and Matias, 2019; McGee, 2016; Mensah and Jackson, 2018).

We are not the first to call out the hostile paradigm that is a whiteness-centered STEM culture. Scholars continuously critique the STEM environment as it continuously marginalizes individuals who are not white men (e.g., McGee and Robinson, 2020). Scholars have discussed the experiences of nondominant STEM participants who have succeeded despite the culture—they discuss the microaggressions Black women face in these educational spaces, or the racism and sexism that is rampant within the STEM environment (Chapman, 2020; Cox, 2020; McGee and Robinson, 2020). As notions of meritocracy are often used to limit and constrain Black women, scholars maintain that there remains a need to use critiques, models, and theories that center the experiences and realities of Black women (Bullock, 2018; Dortch and Patel, 2017; Ireland et al., 2018; Joseph et al., 2017).

3.2 Implications of STEM Culture for Black Women

The culture of whiteness that manifests through STEM minoritizes and oppresses Black women as it attempts to control and regulate their physical, epistemological (knowledge), ontological (reality), and phenomenological (essence) existence within and outside of STEM learning environments (Berry and Roby, 2020; Bullock, 2018; Joseph et al., 2017; McGee and Bentley, 2017; Morton and Parsons, 2018; Wright and Riley, 2021). Minoritization within STEM spaces reflects how the culture of whiteness attempts to control how Black women author STEM innovations, content, and procedural knowledge, as well as how they can fully access and engage STEM learning (e.g., Berry and Roby, 2020; Gholson and Martin, 2019; Lane and Id-Deen, 2020). Black women are reported to experience isolation, lack of opportunities to learn from other Black women due to underrepresentation, and overt and covert forms of gendered racism (Alexander and Herman, 2016; Ferguson and Martin-Dunlap, 2021; Miles et al., 2020; Simon, 2021). Their perception of being invisible in STEM

spaces is attributed to the focus on the dominance of the white male in the STEM community and how Black women must perform like them to be formally recognized or run the risk of being overlooked and made to enact resistance strategies (Ireland et al., 2018; Morton and Nkrumah, 2021).

Black women's abilities within STEM spaces are often viewed through a deficiency lens (Gholson and Martin, 2019). For example, in the book *Black, Brown, Bruised*, Tinesha, an undergraduate Black woman in STEM shares, "I came to realize these people [college administrators, teachers, and her peers] don't expect too much of me in class… I've always had this idea even when I was younger, like in elementary school, if you tell me that I can't do something, then I want to prove to you that I can" (McGee, 2021, p. 69). Dr. McGee provides another example from an undergraduate Black woman, Rasheeda, "I'm used to being in an environment where it ain't no love here, it ain't no support" (McGee, 2021, p. 54). These quotes demonstrate specific examples of Black women's undergraduate STEM experiences.

Deficiency perspectives of Black women extend beyond undergraduate education to include their graduate studies and professional experiences. McGee and Bentley (2017) detail the experience of a Black woman doctoral candidate studying computer systems information. In this story, the participant recalls being told she was insufficient as a Black woman. The participant shares "Because [he's] telling me to do something, I'm saying, 'Okay, well, that sounds good, but in my class, I learned this procedure. You don't think that this would be a better procedure?' He just looked at me. 'You could learn a lot from women in my culture'" (McGee and Bentley, 2017, p. 281). This quote, along with the others, are but a few examples of how the culture of whiteness in STEM minoritizes Black women. The mindsets, practices, and cultural norms all communicate to Black women that they are "insufficient," "not intelligent," and "incapable."

Minoritization within STEM leads to Black women exiting formalized STEM learning across their K–16 journey (Collins et al., 2020; McPherson, 2017), as Black women were reported to receive just 2.9% of all STEM degrees in the United States during the 2017–2018 school year (National Science Board, 2018). Minoritization outside of STEM learning environments includes how STEM is weaponized to dictate and determine Black women's lives and well-being (e.g., Prather et al., 2018; Skloot, 2010; Strings, 2019; Washington, 2006). Despite the STEM community telling Black women they are not welcomed, Black women persevere through a very racialized and gendered environment by saying "I will not give up on what I came to accomplish." Black women have and continue to offer theoretical solutions to the continued oppression they face throughout society (Collins, 2000; hooks, 2015; Wing, 2014). Black women have boldly named the oppression that they face in society and in educational spaces as well as provided clear solutions to arriving at equity, yet educational spaces—and STEM cultures in particular—have managed to adhere to dominant norms and reject these recommendations as solutions. These perspectives attempt to socially relegate Black women to both the margins of society (Bullock, 2018) and the bottom of the perceived social hierarchy (Harris-Perry, 2011; Hurston, 1937; Roberts, 2017).

The minoritization of Black women in STEM via STEM culture exists despite continued, targeted efforts put forth to enhance STEM through diversity, inclusion, and equity-focused initiatives (Berry and Roby, 2020). Black women, when faced with challenges or feeling excluded or hidden due to the STEM culture, have to persevere through difficult situations in order to remain in STEM (Ireland et al., 2018). For example, while solutions such as having professors who are mentors who encourage Black women to get involved in STEM organizations helps promote a sense of community for them (Miles et al., 2020), such practices fail to redress the minoritization of Black women in and through STEM, largely due to the lack of attention paid to transforming the structure and culture of STEM within and across different higher education institutions (Bullock, 2018). In critically examining the influence of institutional culture and STEM culture on the lived experiences of Black women, research indicates that Black women's experiences are distinct from other women of color and white women, where Black women experience more hostility at predominantly white institutions (Dortch and Patel, 2017; Leath and Chavous, 2018; Morton and Nkrumah, 2021). Black women's experiences in STEM are different from those of Black men, where Black women experience both racially protective (i.e., being surrounded by Black culture and Black racial pride) and intersectionally challenging spaces (i.e., engaging STEM spaces that have a dearth of representation among the faculty, content, and curriculum) at historically Black colleges and universities (Morton, 2020; Johnson et al., 2019).

To appropriately name the experiences of Black women in STEM, implicating the culture of whiteness manifesting through STEM, scholars have leveraged various theoretical and conceptual frameworks rooted in Black feminist ideologies. In applying these frameworks to unpack Black women's experiences in ways that authentically recognize and honor their voices and ontological realities, scholars demonstrate the power of these frameworks to provide a more accurate truth of what is occurring in and through STEM (e.g., Berry and Roby, 2020; King and Pringle, 2019; Rankin and Thomas, 2020). Leaning into the power offered by Black feminist ideologies, specifically critical race feminism, intersectionality, and Black feminist thought, we take to task the sociopolitical position offered by these frameworks regarding Black women to critically reimagine postsecondary STEM education. Through these frameworks, we can explore the existing counternarratives of Black women in STEM and present them as legitimate epistemological and ontological conceptions. In doing so, we can root out the culture of whiteness that attempts to dictate and control all of existence, centering the perspectives and understandings of Black feminists at the foundation of STEM as we radically dream and build a new culture for STEM education.

3.3 An Ode to Black Women's Ideologies: Black Feminist Thought, Critical Race Feminism, and Intersectionality

Employing frameworks that critically center the ideological conceptions of Black women is central to this work. As such, Black feminist thought (BFT), critical race feminism (CRF), and intersectionality go hand in hand in aiding in the illustration of

the historical, current, and future positions of Black women, particularly within STEM. Within this section, we describe these separate ideologies and their specific components to articulate their necessity and applicability for exploring the lives of Black women while promoting critical praxes. It is worth noting that, through this work, we entangle the frameworks to offer a critical reimagined postsecondary STEM education.

Seen as a movement and practice within academia, BFT is an articulation of Black women's response to society and is intended to be a site for empowering Black women through self-definition and valuation (Collins, 2000). Engaging the dissatisfaction with the women's liberation movement, which views race and gender as separate issues, BFT deals with the sociocultural complexity of Black womanhood (hooks, 2015). Directly pushing back on the controlling images created by white men and projected onto Black women, BFT creates a space where Black women's lived experiences and knowledge are deemed valuable (Collins, 2000; hooks, 2015). BFT was created not only as a movement and praxis for Black women within the United States context but also abroad. BFT counters the images of Black women as "mules of society," quieting their desires and needs, and instead exposes white, Eurocentric patriarchy's attempt to distance them from womanhood and assign them roles that would leave them disrespected, devalued, and unprotected. Within the context of postsecondary STEM, many Black women are at odds with the white, Eurocentric patriarchal values that work to diminish their livelihoods. BFT provides a space to imagine how the sociocultural norms and values of STEM can embrace and centralize the thoughts, perspectives, and beings of Black women.

In similar ways, CRF works to decenter whiteness by looking at the history and social-structural position of Black women. At its core CRF attempts to answer two questions: What is the legal status of women of color, and How can theorizing their position improve their condition? As such, CRF asserts that mainstream feminism takes an essentialist approach, rendering women of color voiceless and invisible in legal discourses instead of relying on a multiplicative view of identity for women of color (Wing, 1999, 2014). In essence CRF considers the multiple forms of oppression women of color face given race, gender, and class among other multiplicative identities, attending to the lived experiences of women of color in ways that authentically feature and emphasize their voices in a nonessentialist manner. CRF challenges the espoused neutrality, objectiveness, and the determinative nature of the law—and within the context of this work, procedures and practices within postsecondary STEM. Further, CRF offers a lens to look at educational issues affecting Black women and girls (Evans-Winters and Esposito, 2010). Given Black women are regarded as one of the most educated groups in the United States (de Brey et al., 2019), employing this framework provides unique insight on how to learn from Black women's narratives while also prompting a critical reflection as to how Black women are read and engaged with in the social-structural context of postsecondary STEM procedures and practices.

Intersectionality is a framework (and oftentimes a tenet of critical race theory) that spans multiple disciplinary perspectives to acknowledge the unique, lived experiences of Black women given structural and sociocultural considerations of identity and ex-

perience (Collins and Blige, 2016; Crenshaw, 1989; hooks, 2015). While we acknowledge the various disciplinary approaches to examining intersectionality, we specifically leverage the structural-legal perspective within this analysis. Intersectionality, as a coined term, stems from critical legal studies and was leveraged to explain the lack of legal protection and inclusion for Black women in the feminist and anti-racist movements (Crenshaw, 1989). Kimberlé Crenshaw presents intersectionality as a contention with white supremacy and patriarchy attempting to regulate the experiences of Black women—pushing them to the margins of anti-racist and feminist doctrine, theory, and politics—ultimately leaving them vulnerable and in a unique position given insular-identity structural examinations (Crenshaw, 1989). Intersectionality, from a structural-legal perspective, is often associated with CRF due to the fact that CRF was borne out of the amalgamation of scholarship generated by women of color in the critical race theory movement that focused on women of color (Wing, 1999).

Further, intersectionality explores the impact of race, gender, and class on shaping cultural, political, and representational aspects of violence enacted against Black women and can be analyzed through three lenses: (a) structural, (b) political, and (c) representational (Crenshaw, 1991). Structural intersectionality examines Black women's experiences in ways that facilitate an understanding of how the actual experiences of Black women are markedly different than those of white women. Political intersectionality critiques the marginalization of Black women in political movements, such as the feminist and anti-racist movements, that tend to ascribe to a politics of equality. Finally, representational intersectionality addresses the cultural construction of Black women and their representation, and how the cultural construction of Black women has historically been utilized to undermine and disempower Black women (Crenshaw, 1991). Intersectionality thus supports the reimagining of postsecondary STEM structures and policies.

To demonstrate our integrated approach, we provide a model that outlines the connections and splits between CRF, Black feminism, and intersectionality. Intersectionality offers a perspective on the structural, representational, and political shaping of Black women's positioning within society—an approach that supports the reimagining of STEM policy. CRF offers insight into the *de facto* legal status of Black women—a perspective that attends to procedures and practices of STEM. Black feminism provides a sociological understanding of Black women in STEM, accounting for the underlying sociocultural norms and epistemological roots of STEM (see Fig. 1).

Taken together, these frameworks offer a perspective that not only centers the experiences of Black women in STEM but also prompts critical action that can foster a critically reimagined postsecondary STEM education. When imagining new possibilities for and by Black women, it is integral to build upon frameworks that not only problematize the former and current context that Black women occupy but also work intentionally to dismantle the structures with a goal of liberation, justice, and freedom on the part of Black women. Seeing how these frameworks make room for the continued critique of spaces and places that do not fully see or value Black women for who they are, we leverage this opportunity to engage a praxis that envisions new structures and possibili-

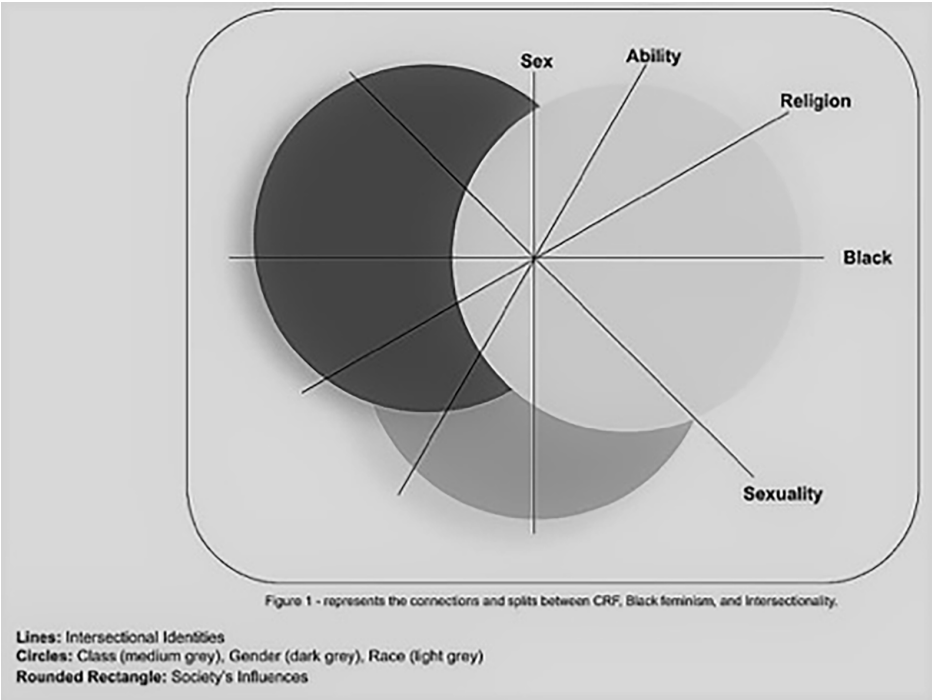

FIG. 1: Amalgamation of three frameworks leveraging critical race feminism, Black feminism, and intersectionality, which symbolizes how we theorize them collectively and separately as we rethink the structures and norms within higher education

ties that center Black women's ideologies in STEM and the larger society. By centering Black women's ideologies, and building from their perspectives, dreams, and needs, we argue and believe that postsecondary STEM education will be transformed in a way that brings about a truly equitable and inclusive approach for all.

4. CRITICALLY REIMAGINING POSTSECONDARY STEM WITH BLACK WOMEN AT THE CENTER

We propose a critically reimagined perspective of postsecondary STEM by leveraging Black feminist thought, intersectionality, and critical race feminism. In doing so, we believe that efforts put in place to embrace, embolden, celebrate, and promote Black women in STEM will do the same for everyone else in a truly equitable, inclusive, and diverse fashion. In advocating that postsecondary STEM be made "anew" by grounding its undergirding ideologies in a combined BFT, CRF, intersectionality approach, we offer insight into how these perspectives can help STEM education scholars, policymakers, and practitioners (re)think, (re)analyze, and (re)define postsecondary STEM.

Foundational to the Black feminist ideologies presented is the concept of focusing on Black women's conceptions of reality in ways that honor and acknowledge them

as legitimate and normal in their own right (Berry, 2010). Leveraging this perspective to critically reimagine postsecondary STEM education requires a paradigm shift where Black feminist ideologies—conceptions of reality, knowledge, and ethics—become the standard. Positioning Black feminist ideologies as the standard shifts the nature of epistemological understandings of STEM declarative, procedural, and conditional knowledge in ways that disrupt its current commodification and racialized political nature (hooks, 2000). This disruption refutes the Western, Eurocentric notion of STEM's power to universally dictate and control existence, while also shifting its conception from being the *only* conception of STEM to *one of many* conceptions of STEM that is legitimated, taught, and socially, politically, and economically supported across all institutions. Honoring the multiplicative nature of identity—structurally, socioculturally, and personally defined—requires an honoring of the vast ways in which investigations of and innovations for and from the natural world are honored in postsecondary policies, procedures, and content in meaningful ways that do not perpetuate oppression.

4.1 Implications for Policy

From a policy perspective, this disruption refutes the existing standards that dictate how STEM knowledge and innovations are authored. It also changes the rules and regulations that control the knowledge construction or learning processes within STEM courses given the need to produce a grade that can socially communicate one's successful understanding of STEM to meet accreditation purposes. Tangible examples that match this approach include changes to departmental, college, and campus-wide course offerings and curricula, where STEM courses rooted in Afrocentric, Indigenous, feminist, and intersectional ways of knowing and being are not only available to students but expected of students for degree completion. These shifts would also include a balanced approach to student development, integrating and equally weighting humanities, social sciences, and arts-based courses within the curricula.

The core focus that drives this shift would be a holistic approach to the learning and development process. Such processes would consider community-centric learning opportunities (i.e., what may be currently recognized as service learning on some campuses) as critical to the STEM learning experience. These learning spaces, rather than serving as sites to reify white saviorism, would have students learn from community experts (i.e., resident experts by right of the communities' self-defined standards) ways to engage and understand the natural world that advance the perspectives and address the needs of the people. In these instances, Black community and neighborhood grandmothers, mothers, and othermothers would be positioned as "STEM experts" and provided the platform, resources, and opportunities to provide knowledge that advances students' understanding and engagements.

This disruption also challenges policies that constrain access to opportunities (i.e., upper-level courses, research opportunities, scholarships, internships, etc.) that privilege and favor the aforementioned metrics over metrics that are attentive to the vast ways in

which people can understand, communicate, and engage STEM knowledge and innovation. Examples that coincide with this idea include removing gatekeeping structures like GPA and/or other merit-based requirements for obtaining scholarships, internships, research experiences, or other noted resources that are necessary for student success in STEM. Removing these merit-based performance indicators acknowledge that such structures constrain access for Black women and others who have been historically excluded, given measures of merit are intimately connected to students' performance in "weed-out" courses—spaces that intentionally try to remove Black women. These perspectives would disrupt single-identity axes approaches to offering resources, support to students (i.e., race-based or gender-based opportunities) but would rather acknowledge the multiplicative nature of identity and offer resources and opportunities that distinctly meet the needs of Black women.

Likewise, this disruption challenges the racialized political and economic nature of STEM that is reflected in national STEM policies that attempt to push everyone into STEM as a way to advance US world economic dominance. Instead, it would recognize that STEM, despite its affordances, should not be the only educational endeavor appropriately funded and elevated (McGee, 2021) and that investments in the humanities, the arts, and social sciences produce innovative, well-rounded individuals capable of advancing society in a plethora of different ways. These changes, at a funding level, would include equal investments in these other areas of study in addition to requiring more interdisciplinary partnerships among these groups for funding.

4.2 Implications for Curriculum and Classrooms

From a curriculum and content perspective, leveraging Black feminist ideologies disrupts generalist assumptions regarding which problems, strategies for addressing them, and actual solutions are taught within STEM courses, research experiences, and internships. For example, instead of presuming a generalist approach to content (i.e., leveraging examples that are presumed to be beneficial for everyone as the anchor phenomenon in STEM teaching and learning), a Black feminist ideological stance would acknowledge the vast nature of life positions at different standpoints, thus requiring a variety of anchor phenomena to situate STEM teaching and learning. This approach includes a diversity of real-world problems used to teach specific STEM content that reflects the lived experiences of Black women and others within the course. For example, instead of using bridges as a general anchor phenomenon for engineering, educators may discuss examples that connect to an array of lived experiences (i.e., water infrastructure, lack of green space in urban areas, etc.). Instead of spotlighting Black women STEM innovators in essentialist notions to galvanize STEM interests and engagement, STEM content would attend to the needs and perspectives of Black women in ways that are relevant and meaningful to their lives. This content could include leveraging preeclampsia, uterine fibroids, etc., as the impetus for examining and understanding the physical and life sciences, facilitating the connection between content learned to plausible innovations that intentionally benefit Black women.

Content and curriculum disruptions also challenge classroom management practices or the general classroom ethos, where standards and norms of professionalism are addressed to account for one's full, authentic, presentation of the self, absent from the demands of assimilating or accommodating one's dress, hair, language, or style to meet a presumed notion of professionalism (Cooper, 2018; Hines-Datiri and Carter Andrews, 2020). Shifts in these perspectives would acknowledge the various ways in which Black women show up in the world, separate from the stereotypical images portrayed of them (Harris-Perry, 2011), treating them with the respect, dignity, empathy, care, and concern that mirror their explicit needs and requests over assuming that their presentation of self indicates disinterest or disengagement (Gholson and Martin, 2019). This change would reflect how instructors engage their students in the knowledge construction process, cultivating ideas and building on students' cultural funds of knowledge over attempts to correct them and prove them wrong.

5. CONCLUSION

> *Grandmother, the alchemist. You spun gold out of this hard life. Conjured beauty from the things left behind. Found healing where it did not live. Discovered the antidote in your own kitchen. Broke the curse with your own two hands. You passed the instructions down to your own daughter. Then she passed it down to her daughter. –Warsan Shire*

We draw on the powerful literary devices of Warsan Shire, a Black woman poet from the United Kingdom, whose poem was used in Beyoncé Knowles' 2016 album, *Lemonade*, to demonstrate how the Grammy award–winning artist positioned her grandmother, Agnéz, as one of the oldest types of scientists, an alchemist. Alchemy has a history of being associated with the practice of using heat and liquids to develop other materials, and it is rooted in modern-day pharmacology and chemistry (Menon, 2021). However, earlier alchemy was considered much more elusive and experimental in its practice (Barksdale, 2007). The use of naming a grandmother as an alchemist is a powerful representation of positioning a grandmother as a scientist. As an ancient science, alchemy has received a number of mixed reviews and critiques of its legitimacy and its contributions to science, primarily given its historical connection to Afrocentricity and Indigeneity (Menon, 2021). This practice of delegitimization is also present within the lives of Black women who navigate the disciplines of science, technology, engineering, and mathematics, which are essentially positioned as antithetical to their existence and understanding.

In unpacking Warsan's statement, we highlight how the practices of science, technology, engineering, and mathematics (STEM) are rooted in Western, Eurocentric ideologies that reject Afrocentric and Indigenous ways of knowing and being (Menon, 2021; Harding, 1991). We pay close attention to how STEM, given its undergirding ideologies, attempts to reject and eject Black women—their epistemo-

logical, ontological, and phenomenological beings (Prescod-Weinstein, 2020). These practices disregard the unique perspectives Black women offer or could contribute to the conceptions of STEM and the generation of STEM innovations. These practices also reify the social roles of Black women within the larger society and constrain the possibilities of other marginalized groups to fully see themselves operating within STEM and generating STEM innovations that truly benefit their self-determined communities.

It is worth noting that what we propose is challenging, in part due to the long-time conditioning scholars and educators have experienced while being institutionalized by academia. Even for us, as authors across generations with varied schooling and life experiences, imagining and naming what might be most needed or desired was a task within itself. However, it is with the spirit of Black women from academic and social context like Anna Julia Cooper and Fannie Lou Hamer that we pursue something better, as the current conditions do not serve Black women collectively in meaningful, sustaining ways. As we continue to witness the disenfranchisement and disregard of Black women within society, we boldly take up the mantle of engaging in this work as graduate students and early career scholars adjacent to STEM.

Using STEM higher education as a context is one medium for this kind of thought work, but it is not without understanding that such should and must take place across disciplines and institutions rooted in anti-Blackness and misogynoir. To that end, while we present this text as a statement on our current theorizing and positioning of postsecondary STEM, it is with the desire of prompting continued discussion and radical praxis geared toward the liberation needed for Black women to navigate and live freely, and by extension any and all other minoritized communities.

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