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# Structural Impediments Impacting Early-Career Women of Color STEM Faculty Careers

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**Abstract:** Women of Color faculty continue to experience many challenges in their careers, especially in the science, technology, engineering, and mathematics (STEM) fields. As such, more research is needed that considers structural issues inhibiting their success. Using structuration theory and critical race feminism as a conceptual framework, we conducted semi-structured interviews with 19 faculty and administrators in STEM departments at higher education institutions to investigate their perceptions of structural impediments impacting early-career Women of Color STEM faculty careers. Our findings revealed the need to establish policies that are clear, documented, and transparent. Additionally, incremental approaches to tenure and promotion evaluations should be reconsidered, especially when this approach may position Women of Color faculty to appear as if they are underperforming, when the opposite may be true. Furthermore, as higher education institutions endeavor to diversify the professoriate, this study is significant in enabling institutions and STEM departments to be aware of systemic issues confronting them to make significant inroads in retaining and advancing Women of Color faculty in these disciplines.

**Keywords:** early-career faculty; Women of Color; science technology engineering mathematics (STEM); research universities; Critical Race Feminism

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## 1. Introduction

Under-represented Faculty of Color—identified as Alaskan Natives, Asian/Pacific Islanders, Black/African Americans, Latinx/Hispanic Americans, Native Americans, and Native Hawaiians—comprise only 9% of science, technology, engineering, and mathematics (STEM) faculty (National Center for Science and Engineering Statistics [NCSES], 2021). However, they comprise 32% of the United States (U.S.) population [1]. For tenured faculty, according to an NCSES (2018) report on doctorate holders employed by universities and 4-year colleges within the STEM disciplines, the demographics reveal significant details about gender and racial distributions. The data show that approximately 44,050 of the tenured faculty are white women, and about 4250 are tenured under-represented Women of Color faculty. For tenured faculty men, the numbers are also notable, with approximately 79,900 white men and around 7800 under-represented men of color. These figures translate into white men constituting roughly 53.4% of the total tenured faculty population in STEM at these institutions, whereas men of color account for about 5.2%. Among tenured women faculty, white women represent approximately 29.4%, with Women of Color comprising around 2.8% of the total. This distribution highlights the racial and gender disparities among tenured faculty in the STEM fields, which has implications for the trajectories of early-career Women of Color faculty [1].

Furthermore, Faculty of Color encounter many challenges in the STEM fields, such as inequities in service expectations, racial and gender bias, difficulty building networks and collaborations, lack of quality mentoring, and hostile departmental climates [2–6]. Additionally, interventions designed to support under-represented groups in the STEM professoriate often lack an intersectional lens [6]. Because of their dearth of representation and systemic biases, Women of Color faculty report encountering racism, sexism, and the compounded nature of both [3,7–9], resulting in academic bullying, marginalization, imposter syndrome, tokenism, isolation, lack of sense of belonging, and inequities in service expectations [3,10–15]. Women of Color STEM faculty also report concerns with ambiguous promotion guidelines [16] as well as chilly climates and uncivil cultures [17]. These concerns are especially prevalent for Women of Color STEM faculty in white male normative spaces that are usually uncomfortable and non-supportive in allowing them to share their experiences and struggles with others, including their advisors/mentors [15]. Consequently, more research is needed that considers the structural issues inhibiting efforts in diversifying the STEM professoriate, with an intentional attention to Women of Color STEM faculty. Thus, the purpose of this study was to explore how faculty and administrators describe structural impediments (institutional and departmental) impacting the careers of early-career Women of Color STEM faculty. Specifically, we sought to answer the following research question: How do institutional structures inhibit the professional success of Women of Color STEM faculty in research universities? This study is important, because structural issues such as inequitable rules, policies, and procedures, both written and informal, may discourage Women of Color from persisting in STEM departments, higher education institutions, and academia prior to earning tenure and promotion, a marker of professional success [3]. A recent study [18] showed that some of the top reasons why faculty leave are the lack of support, work environment, and lack of departmental diversity and discrimination. Losing Women of Color STEM faculty is a great risk to higher education institutions and society. These groups are more likely to mentor students and engage in innovative teaching practices; they bring unique perspectives to research and innovation; and they reflect the increasing diversity of the U.S. [18–20].

## 2. Literature Review

This literature review is informed by current scholarship that centers on the challenges imposed by systems in academia and how these systems disenfranchise People of Color. However, we focused on faculty careers and narrowed our scope to Women of Color when possible, due to their compounding marginalized identities. In looking at challenges and barriers, we also broadly considered the operational practices and processes in STEM departments and their impacts on faculty careers. As such, our literature review is organized into four sections: (1) recruitment and hiring, (2) tenure and promotion evaluation practices, (3) race–gender disparities in faculty workload, and (4) discretion in policy enactment.

### *2.1. Recruitment and Hiring*

Many higher education institutions espouse an interest in recruiting diverse faculty [20]. Yet, hiring practices that include (1) full advocacy from the president, chancellor, provost, dean, department chair, human resources officer, and board of trustees; (2) prioritization of diverse hiring by the search committees; (3) management of the resistance to diversity and multiculturalism; and (4) implementation of "grow your own programs" do not yield an increase in diverse faculty [20]. The search committee and the institutional culture play a critical role in the recruitment and retention of diverse faculty. For the hiring practices to be effective, the president, chancellor, provost, dean, department chair, human resources officer, and board of trustees must openly advocate for a pool of qualified diverse hires [19]. By promoting inclusivity and valuing diverse perspectives, institutions can create a more equitable hiring process and foster a rich academic culture of diverse faculty. Through targeted interventions and policy reforms, academia can move closer to realizing its aspirations of true diversity, equity, and inclusion [21]. However, researchers [22] found

that faculty search committees were more likely to evade policies designed to create equity in the hiring process than to exercise practices that would support faculty diversity in these procedures.

Despite efforts to recruit Women of Color to STEM disciplines, many institutions struggle with retaining them due to various systemic factors such as discrimination, bias, and lack of support [23–26]. Mentorship, professional development, and institutional policies to support and retain Women of Color in STEM are interventions aimed at "patching the leaky pipeline". A formal mentoring relationship "not only potentially compensates for situations bereft of faculty bonding but also better positions college leaders to meet their goals of retention and success while generating widespread cultural change" ([27], p. 45). By addressing these challenges holistically, institutions can create environments where Women of Color faculty can thrive and contribute meaningfully to academia [19].

### 2.2. Tenure and Promotion Evaluation Practices

Faculty are expected to perform in ways that address tenets of the tripartite of faculty life: teaching, research, and service [28]. Within the research domain, faculty are evaluated on the quality of their work and dissemination outlets (e.g., journals and books) where their research exists [29]. Legitimacy is often determined by their level of productivity and type of research engagement (e.g., traditional vs. newer forms of scholarship) [24]. In order to achieve legitimacy, Griffin et al. [23] noted Faculty of Color being intentional about solely publishing in top-tiered, peer-reviewed journals. However, much of the extant literature discusses how women and Faculty of Color are disproportionately engaged in service and teaching than research, which impacts their productivity in this area and threatens efforts to meet evaluation expectations [24]. Additionally, in a recent study, Nyunt et al. [30] showed that even when minoritized faculty may be meeting or exceeding standards set in tenure and promotion guidelines, tenure and promotions may not be within their reach. Their qualitative study using interviews from 22 participants who were denied tenure, withdrew from the process, or left the institution because of a perceived unlikelihood of earning tenure, elucidated inequities in the tenure and promotion process [30]. Participants reported that it was commonplace for tenure criteria to be "unclear, continuously changing, and/or unevenly applied" ([30], p. 9). There were also instances where senior faculty shared erroneous information resulting in at least one participant not receiving tenure or a promotion. Another issue that arose in this study was research and scholarship not being recognized as valid and legitimate, causing confusion as to why these participants were hired when their research agendas were known.

### 2.3. Race–Gender Disparities in Workload

Women of Color in academia usually step beyond their teaching and research duties and commit to disproportionate service activities that require them to be personally invested; these service activities are usually not reciprocally beneficial to salary or career advancement [24]. Women of Color usually commit to these duties, primarily diversity committee service, requests as agents of change, and to respond to constant requests from their institution, under the premise that Women of Color must be representatives for minoritized groups and responsible parties to address and educate the campus community on diversity issues [27,28]. Moreover, a qualitative meta-analysis conducted by Corneille et al. [3] revealed critical challenges faced by Women of Color in faculty positions. The study showed that Women of Color deal with excessive teaching loads and inadequate support. This demand impacts Women of Color's research productivity, an aspect vastly expected in the STEM fields for tenure and promotion [3]. Additionally, high teaching and service loads for Women of Color are not accompanied with institutional support mechanisms to make their contributions visible, rewarding, and conducive to personal, professional, tenure, and promotion goals [2,26,29]. In fact, Women of Color navigate unseen workloads (e.g., mentoring students, writing letters of recommendation, etc.) with an expected obligation to agree to other demands to evade criticism and stereotyping [27].

These substantial workloads and demands are not only detrimental to Women of Color for career advancement but also their work life balance, contributing to their burnout and increasing the chances of leaving academia [25,31,32].

### 2.4. Discretion in Policy Enactment

In her presidential address, KerryAnn O'Meara [33], a leading voice on faculty experiences and organizational change discussed the intersection of discretion and policy enactment. Using the concept of "discretionary spaces" defined as "places where faculty and academic leaders hold the power and authority to make decisions and take action" (p. 559), O'Meara [33] showed how racial inequities can be reinforced when discretion is left unchecked. She went on to argue that "because discretion is enacted in ways that reproduce racialized organizations, and amplify privilege, we need checks and balances" ([33], p. 575). Ray [29] questioned whether these checks and balances are possible when racial structures continue to be an insidious aspect of organizational life. He advanced a theory of racialized organizations, which demonstrated the ways organizations minimize the agency of racial groups and separate policy from practice, denoting a racial undertone. Consequently, seemingly objective policies and "practices may be enforced in ways that disadvantage" communities of color ([29], p. 42). Nine years prior, Lipsky [21] noted that discretion in policy enactment is often perceived to be neutral and possibly harmless. While O'Meara [33] agreed that discretion can be used to advance or limit "faculty to act as agents to advance full participation" p. 559), Martin et al. [22] illuminated that faculty of color may be constrained in their attempts to disavow policy and may be subject to serious consequences.

Discretion impacts many facets of faculty life. For example, researchers have highlighted how discretion in service activities influences how service is evaluated in formal processes such as annual evaluations and tenure and promotions and found that institutional policies and practices esteemed task-oriented forms of service (e.g., serving on university committees) more than relational work (e.g., recruiting and mentoring students), which women and People of Color tended to disproportionately engage in [23,32]. Using a single case study design of two faculty search committees at a Hispanic-Serving Institution (HSI), Liera and Hernandez [34] uncovered how some faculty on search committees neglected to apply the faculty search guidelines implemented to create more racial equity in the process. These faculty had been known to disproportionately favor white applicants, and they did not particularly see an issue with this approach [34]. They also uncovered that department chairs with dominant identities (e.g., white, man, and/or tenured) undermined efforts to advocate for equity in the search process [34]. Settles et al. [35] advanced the theory of epistemic exclusion, generated from the interviews of 118 Faculty of Color, to illuminate how formal institutional systems evaluate scholarship and the role individual biases play in deciding what is valuable knowledge and a contribution to a given discipline. Discretion is latent in how policies about knowledge and disciplinary contributions are determined as well as individual judgements during annual evaluations and tenure and promotion policies. What is most troubling is that the Faculty of Color must cope with the aftermath of these decisions, which adds to mental stressors and the intentions to depart their institutions or disciplines [19,35].

In another qualitative study applying sensemaking theory as an analytical framework to understand the efforts of ten department chairs and administrators across four different institutions in recruiting and retaining Women of Color faculty in STEM departments, Lane et al. [2] found that discretion contributed to harmful practices in the recruitment, hiring, and tenure and promotion processes. For example, when selecting candidates to interview for faculty positions, some Women of Color were not considered, because they had as little as one less publication than other applicants, though there were no specific criteria about publication requirements. In another institution, a department chair pointed out how a search committee member's likeability of white male candidates overshadowed selecting the "best candidate", who did not identify as a white man [2]. Finally, participants pointed

out how discretion in tenure and promotion processes influenced what was counted as a credible scholarship, even though it contributed to a national reputation for some scholars. Combined, these studies underscore how discretion disenfranchises Women of Color due to power, bias, and agent subjectivity.

## 3. Conceptual Framework

We used structuration theory and Critical Race Feminism (CRF) to design this study and analyze the emergent data. Structuration theory highlights the interplay between organizational structures and organizational agents [36]. Structures entail the organizational context, rules, and norms. Organizational agents are individuals, procedures, decisions, and actions [36]. Giddens [36] contends that structuration theory should be used as a sensitizing concept to interpret findings, because it is useful in asking broad questions of social organization. In the current study, we focused on the structural impediments in STEM departments that restrict or augment the behaviors of Women of Color faculty as they navigate their careers. We show how a combination of organizational actors, decisions, and actions shape how they navigate their careers [36].

While Giddens' framework is useful in understanding the structures that affect how Women of Color faculty pursue professional success, it falls short in explaining the racial and gender oppression they encounter as they navigate organizational life. To this end, we integrated structuration theory with Critical Race Feminism (CRF) to design the study and apply as an analytical framework.

CRF derives from Critical Legal Studies (CLS), Critical Race Theory (CRT), and feminist theory. Drawing upon CLS, CRF disputes that the law is neutral and objective. The law also reinforces social hierarchies across race, class, and gender. However, CLS often left out the viewpoints of People of Color and white women, and their analyses centered on white men elite [35–40]. Consequently, CRT emerged to shift the gaze onto the lived experiences of People of Color, illuminating how the U.S. society upholds whiteness and the subordination of People of Color. CRT has several tenets that CRF incorporates in its application. To this end, CRT foregrounds the permanence of racism in society [37]. CRT also challenges the notion of color blindness. Instead, identity politics are introduced into analyses to unearth historical and contemporary legacies of racism and remedy them. The methodological approach of counter-storytelling is used to illustrate narratives and experiences that challenge dominant narratives about People of Color. Counter-storytelling delves into the power dynamics in U.S. culture and the social, organizational, and economic structures that shape the realities of People of Color [37]. CRT also promotes critical race praxis, which requires moving beyond theory and research and putting CRT principles into action to improve the life chances of subordinated people. Still, early CRT scholarship did not consider the differential experiences of Women of Color [34]. Hence, the pre-eminent CRF scholar, Adrien Wing [38], describes CRF as an "feminist intervention within CRT" and a "race intervention in feminist discourse" ([38], p. 7).

CRF critiques CRT scholarship that presumes women and men of color have essentially the same experiences. It also rejects that there is an "essential female voice", wherein women essentially feel the same way on a subject matter ([38], p. 7). Furthermore, Wing argues that analyses about Women of Color must consider their multiplicative identity such that "women of color are not merely white women plus color or men of color plus gender" ([38], p. 7). As such, scholars applying this framework should multiply one's various identities in order to examine one's unique experiences with discrimination. This also speaks to a prominent concept that is an outgrowth of CRF: intersectionality.

Kimberlé Crenshaw [41,42] coined the term intersectionality to show how Black women's experiences are not fully acknowledged in U.S. contexts, which either sees her as a woman or as Black, and fail to acknowledge the multiplicative identities and how power has clustered around specific categories, fostering social hierarchies. This theory demonstrates how Women of Color are positioned within subordinated groups and exposed to racism and sexism, among other forms of oppression [41,42].

Moreover, we used CRF and the concept of intersectionality specifically to understand how power manifested in the everyday exchanges of Women of Color faculty with institutional actors, policies, practices, and decisions. We were also interested in how race and gender compounded in ways that a race or gender analysis alone would be insufficient to explain how the participants experienced subordination in their STEM departments. We used the storytelling of Women of Color to unearth nuanced aspects of their experiences. In some instances, we also used the accounts of non-Women of Color (another group in the sample) to bring to the forefront how neutrality and color blindness worked against the professional success of Women of Color STEM faculty.

## 4. Methods

We applied a basic qualitative research design to investigate how institutional structures created unique challenges for the career success of Women of Color STEM faculty in research universities [37]. Merriam and Tisdell argued that "qualitative researchers conducting a basic qualitative study [are] interested in (1) how people interpret their experiences, (2) how they construct their worlds, and (3) what meaning they attribute to their experiences" ([43], p. 24). Drawing on the focus of "understanding the meaning a phenomenon has for those involved" ([43], p. 24), we explored how practices, policies, and procedures in STEM departments at six research universities in the United States served as structural impediments and reinforced systems of oppression in the career progression of early-career Women of Color STEM faculty. We intentionally focused on diverse institution types, including Historically Black Universities (HBU), Hispanic-Serving Institutions (HSI), and Historically White Institutions (HWI).

The philosophical underpinnings that guide this study are grounded in critical constructivism. Critical constructivism derives from constructivism and critical theories [44]. Constructivism rejects the notion of one absolute truth [44]. Instead, it values the complex meanings generated from knowledge co-constructed among participants and researchers that also account for social and historical contexts [44]. Critical theory challenges the ways "dominant power operates to manage knowledge" ([44], p. 10). Thus, critical constructivism goes beyond constructivism to consider the role of power in knowledge and actions within context. The critical constructivism approach enabled us to question systemic injustices discussed by Women of Color faculty and actions in the academy that contributed to these injustices. For the latter, we analyzed non-Women of Color participants' data to nuance these (in)actions and elucidate the power dynamics that shape these behaviors.

### *4.1. Participants*

In this study, we draw upon data from interviews with nineteen administrators and faculty members, including ten administrators (i.e., five department chairs/school directors, four diversity administrators, and one dean) and nine Women of Color faculty (i.e., six pre-tenure and three tenured). Table 1 shows the participant's description of their self-identification, including five Black/African Americans, five white participants, four Latinx, two Asians, two mixed-raced participants, and one Alaskan Native. Regarding gender, 13 participants identified as women and 6 as men.

The participants were recruited through purposive and snowball sampling. Purposive sampling enabled us to focus on the target group of the study, in this case, early-career Women of Color faculty, who met the study's criteria and could speak directly to the phenomenon of inquiry [45]. Snowball sampling entails a researcher asking participants who meet the criteria of a study to identify other potential participants [45]. Therefore, based on the suggestions of the early-career Women of Color faculty members, we applied snowball sampling to reach administrators, whom the faculty members considered critical agents of the faculty-career ecosystem. As such, multiple actors, including tenured Women of Color faculty and administrators who identify as men or white women were included in the study.

**Table 1.** Participant descriptions by race, gender, role, and discipline.

| Pseudonym | Gender | Race/Ethnicity | Status/Position | Discipline/Field |
|---|---|---|---|---|
| Ashley | Female | Black | Administrator (ADVANCE Program Director) | Information Technology |
| Christina | Female | Mexican | School Director | Political Science |
| Heather | Female | Asian and White | Administrator (DEI Liaison) | Ecology |
| Mark | Male | Black | Administrator (Associate Dean) | Graduate School and Engineering |
| Sabrina | Female | Latina | Administrator (DEI Liaison) | Psychology |
| Frank | Male | White | Department Chair | Sociology |
| Leonard | Male | White | Department Chair | Earth Sciences |
| William | Male | White | Department Chair | Educational Studies and Psychology |
| Steven | Male | White | Department Chair | Information Technology |
| Reina | Female | Hispanic | Pre-tenure Faculty | Animal Sciences |
| Lisa | Female | Black | Pre-tenure Faculty | Engineering |
| Samantha | Female | Black | Pre-tenure Faculty | Agriculture |
| Whitney | Female | Black | Pre-tenure Faculty | Sociology |
| Vanessa | Female | Mexican | Pre-tenure Faculty | Engineering Education |
| Faye | Female | Puerto Rican | Pre-tenure Faculty | Mathematics |
| Patricia | Female | Native American and White | Tenured Faculty | Environmental Chemistry and Biology |
| Crystal | Female | Black | Tenured Faculty | Mathematics |
| Yasmine | Female | Asian/Chinese | Tenured Faculty | Mathematics |
| Bradley | Male | White | Dean | College Humanities and Sciences |

Drawing on the purpose of our study, we also saw the relevance of including tenured faculty who were also women and Women of Color, as well as administrators (i.e., department chairs/school directors, deans, and diversity administrators/liaisons) who had also undergone the tenure process as key informants, providing an opportunity to gauge the perspectives of diverse stakeholders from a structural dimension on issues of practices, policies, and procedures in their departments, schools, colleges, and institutions.

### *4.2. Data Collection*

Using role-specific (early-career faculty, tenured faculty, and department chair/university administrator) interview protocols for the different participant groups, we conducted virtual semi-structured interviews with each participant during the 2021–2022 academic year via Zoom web conferencing technology. The interviews generally focused on the participants' backgrounds, lived experiences, perceptions of departmental and institutional policies, practices, and procedures, and how they encountered or observed forces of impediments in the careers of early-career Women of Color STEM faculty.

We gathered the information through three different interview protocols for the specific groups in the study. The early-career Women of Color faculty protocol specifically focused on understanding the support structures, climate, and culture in their departments, colleges, and institutions while on the tenure track (e.g., hiring process, start-up funds, mentoring programs, socialization process, tenure requirements–processes/policies, support frameworks, challenges, etc.). The protocol for tenured faculty covered most of the aspects of the early-career faculty protocol and expanded on the journey of tenured faculty members: the challenges and impediments they encountered on the tenure track and their perceptions of their current departments, colleges, and institutions. The tenured faculty protocol also inquired about how tenured faculty socialize, support (i.e., mentoring), and contribute to alleviating the challenges of early-career Women of Color faculty to assure their success. Similarly, the protocol for administrators covered the same topics as in the other two interview protocols, but from a slightly different angle. We began by inquiring about the demographic composition of the department and honed in on actions that alleviate barriers and less supportive practices. Our main goal with the administrators was to understand their policies, procedures, and practices regarding the retention and promotion process and how it supports or inhibits the success of early-career Women of Color faculty.

The interviews were conducted by members of the research team. Each interview lasted 50–60 min and was recorded and transcribed verbatim.

### *4.3. Data Analysis*

Interview data were transcribed using a professional transcription service (TranscibeMe) and imported into Dedoose qualitative software (version 9.0.107, 2023) for analysis.

Two members of our research team conducted independent open coding to establish codes based on emerging patterns in the data that were relevant to our research question [46]. Following this phase, we met to discuss the codes across the data from the independent coding process, especially to identify and agree upon the similar and varied ways participants discussed how they perceived and attributed meaning to structural impediments impacting early-career Women of Color STEM faculty careers [42]. After several rounds of deliberation about the codes and emergent patterns, we applied the thematic analysis approach [47], sorting the codes of related meaning (smaller chunks of the data) according to our developed themes (larger corresponding categories of meaning). Thus, thematic analysis, as a systematic approach to coding, allowed us to use the codes as building blocks in making meaning of our data by organizing them into larger ideas (themes) to interpret and disseminate our research findings in a digestible manner [47]. Table 2 describes our themes and demonstrates our analysis process in determining our codes and themes.

**Table 2.** Meaning making and categorization of the data into emergent themes per codes.

| Themes | Description | Sample Codes | Sample Excerpts |
| --- | --- | --- | --- |
| Nebulous policies | Vague and unclear policies, as well as the imprecise application of policies that were at times nonexistent | Course assignments, teaching loads, T&P guidelines, hiring rubrics, student evaluations, etc. | So part of being that young university and now, I guess, I don't know. I don't know if it's having a more savvy or I hate to say business-like, but administrative approach on the things you have to have sort of a clear policy practice and protocols on implementing those. So there's a rationale for doing things a particular way and allocating resources and procedures. I think that's been more positive than negative, that rooting out the old, the old boys' network and trying to make things more transparent, I guess. And so I think even folks who come in recently have felt that. A few who came in from [other institutions]—and it's like, "Wow, this happens here? I didn't know anything about this, because it was all shrouded in secrecy". |
| Unclear performance expectations | Inconsistent interpretations and practices in the evaluation process of participants' performances and prescribed requirements | Reappointment reviews, performance evaluations, T&P guidelines, grants, etc. | The committee then looks at [T&P dossiers] and gives a ranking in the categories of teaching, service, and research. And most of the faculty, their allotments for the different categories are dominantly research, then teaching, and a small proportion for service. And that gets looked at by the committee. And of course, it's a committee. So you've got opinions that span the whole gamut because people have their own biases and perceptions because it's a biased game, and it's a perception game. There's nothing objective unless you're literally just counting things. But then, well, how do you weight the count? Is it a good journal, or is it a crappy journal? So there's no quantification. We try to fuzz it out as much as possible. |
| Inequitable workload | Perceptions of unequal workload distribution and the urge to take on extra responsibilities | Extra workload, structural barriers, teaching loads, service loads, etc. | Some of the challenges are—even though we try to have policies that give credit for service workloads, the work is still unevenly distributed so that women of color, particularly women of color in STEM, are still carrying an unfair load of the service but not getting enough credit when it comes to tenure promotion and even promotion up to full professor, not just associate professor. I think this is broader, not necessarily just at my institution. |

Overall, the data analysis process, based on the flexibility offered by the thematic analysis [47], ensured that themes emerged out of engaging in a constant comparative method with all data across the various participant groups [48] through an intersectional lens of the CRF theoretical framework [36,42], the existing literature [30], and results of the emergent patterns derived from the opening coding process [46]. The aforementioned process allowed us to identify how structural frameworks (i.e., policies, procedures, and practices) function as a system of oppression and serve as engines of racial and gender discrimination that hinders and impedes the success of early-career Women of Color faculty in STEM departments at research universities.

### *4.4. Trustworthiness*

The methodological choices enacted in this study were meticulously selected to uphold the reliability and robustness of the research outcomes, particularly in scrutinizing the perceptions surrounding the structural barriers affecting the professional trajectories of early-career Women of Color faculty in STEM. Employing multiple coders bolsters the coding practices' trustworthiness and validity, mitigating individual biases while broadening the spectrum of perspectives within the data. Two members of the research cohort independently undertook open coding, delineating codes from emergent data patterns such as barriers to promotion, mentorship practices, and workplace discrimination. Memoing, a fundamental practice, facilitated the transparent documentation of researchers' ruminations, reflections, and analytical decisions throughout the research trajectory, thereby aiding in the organic evolution of interpretations. The researchers were encouraged to meticulously document their cognitive processes and insights by maintaining memos during the coding and analytical phases. Furthermore, the adoption of peer debriefing with the research advisory board epitomizes a commitment to methodological rigor. This collaborative process, involving deliberations with peers and the advisory board to elucidate research procedures, decisions, and interpretative nuances, was crucial in fortifying the study's credibility and validity. Such engagements ensured a harmonization of the coding process, interpretations, and findings with the overarching research objectives and theoretical framework, making everyone feel included and valued in the research process [43].

### *4.5. Researcher Positionality*

Our team of researchers comprises different racial/ethnic identities (Black/African American, Latinx, and Southeast Asian), genders (cis-gender women and men), disciplinary backgrounds (education, sociology, and engineering), and positions (professors, administrators, and doctoral students). We leveraged our backgrounds, lived experiences, and understanding of the inner workings of higher education to probe participants during interviews to elicit thick, rich descriptions of perceived structural impediments that influenced early-career women. These attributes also informed how we interpreted the data and nuanced the experiences and examples shared by the participants. Throughout this process, we made sure to challenge our assumptions and potential biases by comparing our interpretations to the extant literature and remaining close to the data as measures of trustworthiness [45].

## 5. Findings and Discussion

Three themes emerged from our data analysis: (1) nebulous policies, (2) unclear performance expectations, and (3) inequitable workloads. Nebulous policies unearthed how the precarious nature of institutional policies made it difficult for some participants to navigate the academic landscape and caused uncertainty about how to manage different aspects of their roles. Unclear performance expectations highlighted that participants were not given adequate information about annual review evaluation processes and procedures for earning tenure and promotion. Though they were research active, they still faced barriers with receiving accurate appraisals of their work, and they were unsure how

this factored into the probability of earning tenure and promotions at their respective institutions. Finally, participants discussed how inequitable workloads created challenges for early-career Women of Color faculty who were working to establish themselves as productive researchers amid being expected to teach disproportionate numbers of classes and engage in more service than departmental colleagues. In the sections that follow, we unpack these findings using the literature to connect participant data to the larger discourse on structural impediments that complicate the professional experiences of early-career Women of Color faculty at research universities.

### 5.1. Nebulous Policies

Participants discussed how policies applied in their institutional contexts tended to be vague and unclear. In some cases, policies that were being enacted were not written and seemed to be employed haphazardly. For example, some participants indicated that they were being held accountable for tenure and promotion policies that were not equally applied throughout the department. Other issues arose with course assignments and concerns that decisions were being made without the consideration of the needs of early-career faculty. Vanessa, a pre-tenured Mexican woman in Engineering Education, shared

> [Methods] would be my go-to graduate course . . . my course to continue to teach it, which is actually incredibly beneficial for a new assistant professor to teach the same course and not having to do multiple course preps. And I even spoke to the colleague who was actually the one to be teaching that class. . .and she was hands down okay with me taking over the class for the next four years. But what broke down was the graduate chair decided that he was going to remove me from the class the following year. He vaguely said, "I have a plan for everyone teaching everything". And not everyone is qualified to teach that class. I think it has to do with his students complaining about me because they just didn't like my literal tone of voice. They thought that I was an angry person when I was answering questions. I just have a teaching tone that is more assertive. And I guess his students just complained to him about me.

In the previous quote, the participant identified several structural issues that were consistent with other participants' experiences in the study. Oftentimes, policies were changed without notice, or the policy never existed, but institutional actors made decisions as if they did. This speaks to the discretion academic leaders may apply to support their arguments [20,22,31]. Though the participant was trying to teach the same course for several semesters to establish a manageable workload and improve her teaching practice, the graduate chair had other "plans". The graduate chair's discretion created a barrier for the participant to enact plans of her own for strengthening a course that she had unique expertise to teach. While we do not know for sure, because the graduate chair was not a participant in our study, this decision may have been gendered and racialized. Plaut [49] pointed out that though organizational leaders are encouraged to be color evasive in an effort to promote equality, such approaches can exacerbate forms of oppression and inequity [49]. In fact, Fryberg et al. [50] uncovered that in departments where faculty were encouraged to be color evasive, stereotype threat, bias, and a poor climate were more likely to be reported [50].

Student perceptions may have also played a role in why the participant was being removed as an instructor of the course. Countless studies illuminate that teaching evaluations are biased especially toward Women of Color faculty [50–59]. Liu et al. [25] also pointed out that Latina women, as in the case of our participant, may be stigmatized as a "fiery Latina" if they act in a manner that is perceived as hostile. Concerning our participant, because of her age and gender, she was purposefully presenting herself in a way that students would respect her position as the instructor of the course. Unfortunately, this created some tension between her and the students that the participant was still trying to make sense of at the time of the interview. In a supportive academic environment, the graduate chair would have considered the participant's identities, how the students perceived her given

these identities, and what support mechanisms could have been put in place to improve her teaching (as necessary) or work to improve the climate in the department to buttress Women of Color faculty [50]. Vanessa continued with explaining additional failures in the system to invest in her as a faculty member and facilitate what she needed to be successful:

> I'm removed from the class that I had been teaching for a semester. And I did a significant amount of restructuring and course prep for it. So, I emailed him [graduate chair] about that issue of, "Why are you removing me from my class? If your students didn't like me, that's okay. I can learn. I can grow. There should be an opportunity for me to grow in my teaching". But he wouldn't budge. I looped in the director, and I told her, "Removing me from this class and trying to give me another course to prep is not a supportive environment and it's not a way to support new assistant professors". Those were the words that I was using while looping in the director and nothing was done still.

According to Griffin and Newsome [55], institutions can retain diverse faculty if they address factors that inhibit these individuals from traversing the academic environment. They also underscored that individual factors alone cannot explain why Faculty of Color continue to depart higher education institutions, necessitating the importance of exploring institutional elements that complicate the experiences of marginalized faculty. As such, this participant's scenario reflects a critical example of minute but problematic events that occur in academia. It also illuminates why faculty may prematurely depart an institution or academia [18,55]. According to the research, the most common reason faculty leave their positions is due to lack of support [18]. For Women of Color faculty, this may be compounded because of the biases they may experience at the intersection of race and gender [51–66].

Other policy concerns involved what was deemed as legitimate research for faculty to be engaged in. For example, Yasmine, a tenured Chinese woman professor in Mathematics, discussed hierarchies in the valuation of presumed credible research at her institution. At the time of the study, the department was in the midst of changing these policies to be more equitable and inclusive of different methodologies and ways of knowing. However, she questioned the validity of why such policies ever existed at all. She disclosed,

> I used to be a quantitative research person, now I'm learning more, "That's bulls**t". Quantity can only say so much. We need to look at the quality of the research and so on. And once I talked to my colleagues, especially the people who came at the same time or after, they were very open to learn and understand. I shared 'I don't know whether this will count as a publication, but let me tell you how much work it took. It's three processes, the data collection, the transcription, the data analysis . . .' So now, we're changing our unit standards for tenure to include this kind of, what we call, nontraditional areas. Because as a minority, as women, for example, I [desire] to learn more of the human side of STEM education rather than the traditional laboratory, experimental, or statistical modeling side of the research. And we should be inclusive of those, especially for minority people who have more experience and more motivation, more interest in drawing this kind of work. Right?

While Yasmine was a mathematician by training, throughout her interview, she argued that traditional mathematics was not enough to explain why she continued to see an under-representation of People of Color in this discipline. She wanted to use qualitative methods to understand such phenomena to increase representation in her field. However, up until this point, this type of scholarship would not have been counted toward tenure and promotion, despite the rigorous methodological activity it required of a researcher. Settles et al. [35] noted that perceived non-traditional forms of scholarship tend to be evaluated more harshly, and some scholars may believe this work is self-indulgent and lacks objectivity. However, they argued that white faculty may make a judgment call when they presume their work is objective, and scholarship produced by People of Color is not.

As such, epistemic exclusion operates as a system of oppression, because the same biases that consider some types of research less credible are the same systems that exist in journals and funding agencies [35,56]. If universities become open to other ways of knowing, such as Yasmine's colleagues, faculty may be able to produce research that is motivating and impactful to society.

### 5.2. Unclear Performance Expectations

Early-career faculty participants exposed inconsistencies in how individual performance was evaluated in relation to expressed tenure and promotion guidelines. For some participants, this caused a great deal of psychological stress, because they found themselves having to advocate for higher ratings on evaluation rubrics, even though it was warranted based on their achievements in a given year. While all the early-career faculty participants in the study were exceeding tenure and promotion expectations, some were met with average or satisfactory ratings when being evaluated. Three out of the five department chairs revealed that these behaviors were related to a tendency to demonstrate a "trajectory towards excellence" to support the narrative of an upward trend and potential for a successful long-term career. Frank, a department chair in Sociology, who identified as a white man, explained,

> When I had that first conversation with them about promotion and tenure after the hire, I have a conversation that the chair had with me when I came. And that is we want to show a trajectory towards excellence. And the way our evaluations go each year for untenured faculty is you can get an excellent, a commendable, a satisfactory, or an unsatisfactory [in teaching, research, and service]. And so, I really talk about ways to strategize moving towards excellence in all those categories, and it doesn't have to be next year or the year before or the year after in all the categories, because once you get to excellent, there's nowhere to go but down, if something happened, right. While this mindset may seem helpful for an early-career faculty member, this approach may have unforeseen consequences.

The department chair's approach may appear neutral or unbiased; however, CRF shows that seemingly gender and race-neutral practices negatively impact Women of Color [38]. Specific to early-career Women of Color faculty, it could create a false narrative that they are performing at or below the level of their departmental counterparts. In turn, this may suggest they are not adequately trending toward tenure and promotion or longevity in an academic career [20]. Evaluation practices that focus on trajectories and upward trends without rating the performance as excellent when warranted also undermines the feedback mechanism that is embedded within the tenure and promotion evaluation process, if people are being evaluated below what they have achieved. For example, Samantha, a pre-tenured, Black woman faculty member in Agriculture reported the following:

> Because I'm telling you, that first year I pulled two grants, and he gave me "good". And I'm like, "Bro, what would be exemplary? We're supposed to get two for tenure, and I did it in my first year." And he's like, "Well, I just never feel comfortable giving anybody exemplary, because if I called that great, what if something even better happens? So, I just always hold exemplary in my back pocket." And I'm just like—so this May—last month I got my first exemplary, and every year I have exceeded the expectation. And it's like, "Really?" But he just really was adamant about it. And even my white colleagues [were confused]—we brought in [a] big [grant]—during 2020 we got an NSF Rapid grant—200,000. [The department chair rated me] Good. Like, "How's this good?"

This example not only points to the unfair expectations about what an evaluator, in this case the department chair, may hold for early career faculty who appear to be surpassing tenure and promotion policy guidelines, but it demonstrates that an unwillingness to evaluate Women of Color appropriately may be a form of resistance to invest in Faculty

of Color [26]. Griffin et al. [23] highlighted that Black faculty are often overwhelmed with the demands of the academy and not appropriately compensated for their labor. While this is consistent with the extant literature [27,56–59], most examples focused on teaching; diversity, equity, and inclusion (DEI) work; mentoring and advising; and other forms of service. However, no known studies have illuminated the labor associated with grant activity that may go unrewarded internally. As the early-career faculty member pointed out at the end of the quote, the department chair seemed to be "adamant" about rating the faculty member as "good" even though she was demonstrating exemplary performance, specifically in the form of grant activity. Because the participant was told she only needed to receive two grants to be eligible for tenure and promotion for this metric, and by the time of this interview, she had received three, the participant was perplexed about what constituted exemplary performance. Furthermore, these structural issues also point to a need to create agreed-upon rubrics and well-defined measures of performance that set clear expectations and parameters for success [57]. Fortunately, at the time of the study, many of the institutions included in the study were working on such efforts.

### *5.3. Inequitable Workloads*

Participants discussed inequitable workloads as unequal labor distribution driven by systemic inequities that early-career Women of Color faculty must undertake to exemplify their productivity for tenure. Early-career Women of Color faculty explained how inequities in their departmental structures and operations facilitated extra workloads for them as compared to their counterparts. They demonstrated that they had to proactively involve themselves in extra responsibilities that were essential to improve the conditions in their departments to enable them to succeed in their careers. Vanessa explained,

> Our growth capability has been slow. And I think it has a lot to do with the structure of the program. Everything is on the shoulders of the faculty. . . And so, that's when new people like me and [Colleague], we had to take up the charge of creating this open house to try to attract more students because it was our asses on the line. We are the ones that need to graduate a student. Whereas, my [senior] colleagues—and when I say [senior], I mean associate professors—they didn't have to graduate a student for tenure. That expectation did not exist for them. So, maybe they don't see the need to be so aggressive. I don't know. Or it doesn't matter to them because it doesn't affect them. That's probably the better way of putting it. But yeah. So, this whole recruitment was on our shoulders, and we had to try to attract students because we needed the students for our tenure and promotion cases. And for research as well. It's difficult to do research without support from students. So, I would say the structure here is just sad, completely sad given the amount of years we've been in existence, so. And it's just disappointing.

Although early-career Women of Color faculty felt it was important to take on extra workloads to address challenges with recruiting students who could support departmental goals of timely degree completion, which was necessary to assist them to meet tenure requirements, it should be incumbent upon all stakeholders to engage in these practices. It is especially concerning when departmental and institutional leadership fail to promote a climate that not only attracts new students but does not resist patriarchal and racist oppression [33] in offering Women of Color faculty the appropriate tools and support that they need to progress in their work. As Vanessa disclosed, early-career Women of Color faculty taking on extra responsibilities such as planning open houses without the involvement of senior scholars and adequate program support is inequitable, "sad. . .and it's just disappointing", because inequitable and high workloads impact faculty morale, retention, and well-being [60].

Our findings are also consistent with the literature that shows Women of Color go beyond their core teaching and research functions to undertake an inordinate amount of service that can be counterproductive to their careers as researchers and scholars [25]. As

evident in our data, participants expressed concerns with early-career Women of Color being requested to perform disproportionate service as compared to their counterparts. For example, Patricia, a Native American and white woman, tenured faculty member in Environmental Chemistry and Biology, explained,

> What I think is somewhat inequitable, not equitable, is the types of workloads and microaggressions, and inequities that impact faculty of color before they get to [tenure]. So, they may or may not be successful when they go up for promotion, [though] they follow that process. For example, maybe being asked to teach a higher teaching load. . . Maybe being asked to sit on a zillion different committees because you're the only woman of color in the school. So, you're spending 10 h a week doing your duty on the Diversity, Equity, and Inclusion Committee, or going to talk to other incoming faculty of color about the process or about the school. You're being constantly asked to do extra stuff, for better or for worse. That time away from, maybe, what you could be doing to improve your chances of getting tenure. Of actually doing your research, publishing those papers, writing those grants. I think the workload can be inequitable. And so, therefore, you have trouble showing as much productivity because you're being pulled in so many different directions.

The aforementioned quote corresponds with recent findings from a study conducted at a research intensive, minority-serving institution (MSI). The researchers found that service was inequitably distributed without reward for said service [60]. They also found that there was a "lack of clarity and consistency about the role of service in the retention, tenure, and promotion (RTP) process" ([60], p. 365). Similar to the current study, race and gender-related biases influenced these actions. If higher education institutions desire to retain and advance Women of Color, faculty inequities in labor distribution need to be made transparent, so that they can be addressed. Additionally, if there is an expectation for women and Women of Color to disproportionately engage in certain types of service (e.g., committee work, advising and mentoring students of color), such service should be recognized in tenure and promotion processes [54–56,60].

## 6. Implications

As higher education institutions endeavor to diversify the professoriate, this study is significant in aiding higher education institutions and STEM departments to be aware of systemic issues confronting them to make significant inroads in retaining and advancing Women of Color faculty. Institutions and STEM departments may take a deeper look at their policies, practices, and structures and reorganize them to alleviate systemic barriers that make it challenging for Women of Color to access and thrive in the STEM professoriate. Institutions can improve their climates and create an affirming environment that better supports the recruitment, retention, and advancement of Women of Color faculty, thus, increasing the representation of Women of Color faculty in the professoriate. Additionally, this study is essential to expanding the national diversity of faculty at higher education institutions and in STEM departments. To this end, our data showed that policies about course assignments should be clear, documented, and transparent. Department leaders and faculty should also work with early-career Women of Color to contextualize teaching evaluations and make decisions about course assignments that will contribute to their growth and development [59,65]. Additionally, while showing incremental progression in faculty evaluations may perceivably demonstrate equity, department chairs should consider the implications for Women of Color who have historically been presumed as incompetent [61]. To counteract such perceptions, interventions like the University of Michigan STRIDE program (University of Michigan, 2023) provides training for tenure and promotion committees to minimize bias against candidates who engage in topics, methods, and epistemologies that may not be central to some disciplines [64]. O'Meara [33] purported "such efforts to leverage faculty judgment are critical to improving the integrity and legitimacy of faculty evaluation" (p. 573). Lastly, inequitable workloads prevent

Women of Color from excelling in their careers at the same rate as their counterparts [61]. They also illuminate power differentials that help some to advance their careers while others are exploited for their labor.

## 7. Conclusions

The current study explored institutional structures that inhibit the career success of early-career Women of Color STEM faculty. Using structuration theory and Critical Race Feminism as conceptual framework, we focused our conversations with participants on policies, practices, and procedures and their impacts on the retention, tenure, and promotion of early-career Women of Color faculty in STEM. Although research on Women of Color faculty in STEM accounts for chilly climates due to systemic oppression, this qualitative study specifically unearthed three ways (i.e., nebulous policies, unclear performance expectations, and inequitable workloads) the career success (retention, tenure, and promotion) of early-career Women of Color faculty in STEM is threatened. Consequently, our study's findings revealed the need to establish clear, documented, and transparent policies. As such, incremental approaches to tenure and promotion evaluations should be reconsidered, especially when there is an incongruence between policies and performance expectations, or lack thereof, that may position early-career Women of Color faculty to appear as underperforming, when the opposite may be true. Finally, inequitable workloads are not a new phenomenon. Still, the pervasiveness of such practices is contributing to Women of Color faculty being overburdened and possibly departing the academy. If this issue is not addressed soon, we may lose the diverse professoriate we espouse to value. Moreover, our study improves the understanding of structural impediments in the retention, tenure, and promotion processes of early-career Women of Color faculty in STEM and sheds light on unique features that should be critically assessed and recalibrated to ensure the success of Women of Color faculty and improve the climate and culture in STEM departments and the institutions.

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