Supporting Structures: Innovative Collaborations to Enhance STEM Research at CCCU Member Institutions

Report on Supporting Diversity in STEM Faculty Hiring and Retention at CCCU Institutions

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This report provides a brief overview of some of the literature that describes the unique challenges that underrepresented faculty in STEM face, and it summarizes some recommendations for creating departmental and campus climates that are more amenable to the flourishing and retention of diverse faculty. Some of the difficulties presented by the climates in many STEM departments impact nearly all underrepresented faculty, some are specific to women, some are specific to people of color, and as discussed below, women of color can find themselves in a "double-bind" situation in which they face hardships related to both race and gender. Addressing the disparities in representation within STEM disciplines will be a long and complex process involving both individual and institutional learning, and this process can only be initiated once the reality of the difficulties facing underrepresented faculty are recognized.

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1. Recognizing the Challenges and Opportunities

STEM disciplines present unique challenges for both female faculty and faculty of color, especially in predominantly white institutions (PWIs), and this can negatively impact the retention of people within these groups in colleges and universities. The National Science Foundation reported in 2016 that women constitute "only twenty-one percent of full professors in science fields and five percent of full professors in engineering despite earning about half the doctorates in science and engineering in the nation."[1] In terms of faculty of color, the National Center for Science and Engineering Statistics reported in 2017 that "African Americans, Hispanic Americans, Native Americans, Alaska Natives, Native Hawaiians, and Native Pacific Islanders constitute 30 percent of the US population, yet account for only 9 percent of STEM faculty at US colleges and universities."[2] And finally, Ginther and Kahn report that women of color make up only 2.3 percent of tenured or tenure track faculty and 5.1 percent of non-tenure-track faculty, "despite the fact that they make up 12.5 percent of the US population."[3] Previously existing disparities for women and people of color in STEM have only been exacerbated by the conditions brought on by the Covid-19 pandemic, and so this is an important time for staging interventions to support the flourishing of underrepresented groups in STEM.[4]

In addition to acknowledging the challenges facing STEM fields in terms of attracting and retaining people from under-represented groups, it is important to acknowledge that key opportunities also exist for universities to increase their economic viability through hiring more

[1] Lori Harwood, "Want More Female STEM Professors? Here's How," https://www.futurity.org/stem-women-gender-1137062-2/, retrieved on 15 June 2020.
[2] Mohammed A. Qazi and Martha Escobar, "Fostering the Professional Advancement of Minority STEM Faculty at HBCUs," https://www.aacu.org/peerreview/2019/winter-spring/Qazi, retrieved on 1 July 2020.
[3] D.K. Ginther and S. Kahn, "Education and academic career outcomes for women of color in science and engineering," paper presented at the conference for the Committee on Women in Science, Engineering, and Medicine, Washington DC, June 7, 2012, retrieved from https://www.nap.edu/read/18556/chapter/12#105 on 27 June 2020.
[4] As Merin Oleschuk reports, "Rising care demands created by COVID-19—specifically those brought on by remote working, a lack of childcare, and the virus' particular risk to aging populations—are disproportionately incurred by women and impede their ability to work," in "Gender equity considerations for tenure and promotion during Covid-19," *The Canadian Review of Sociology*, Vol 57 (2020), p. 503. See also Anna Maria Górska, Karolina Kulicka, Zuzanna Staniszewska, Dorota Dobija, "Deepening inequalities: what did Covid-19 revela about the gendered nature of academic work?", *Gender, Work, Organization*, Vol. 28 (2021).

diverse faculty. Promoting greater diversity and inclusion in hiring practices should be regular practice for ethical reasons in terms of addressing historic racial and gender disparities in academia, but new research is also helping to reveal the extent to which a more diverse faculty is good *financially* for universities as well. Demographic trends in the US show that children of color currently comprise the majority of public school students under the age of 18, and these numbers are only expected to increase in the coming years.[5] The increasingly diverse student population expects to see diversity reflected in the faculties at their universities, and this expectation is reflected in student satisfaction surveys.[6] Universities ignore this to their own peril. According to Donathan Brown, assistant provost and assistant vice-president for faculty diversity and recruitment at the Rochester Institute of Technology, "When thinking about the benefits students receive, some of our earliest studies indicated that when universities foster diverse and inclusive environments by way of having diverse faculty, students report higher satisfaction rates with their overall experience along with developing greater familiarity with cultural awareness and promoting racial understanding."[7] With all of the economic challenges facing colleges and universities, particularly in the Covid-era, increasing faculty diversity is one way for institutions to remain competitive in terms of attracting students.

In addition to aiding the process of attracting students, a diverse faculty can also help to retain students of color, and to close the achievement gap between white students and students of color.[8] As Llamas, Nguyen, and Tran report,

> Among Black college students, persistence in STEM fields is positively correlated with the number of STEM courses taught by Black instructors, with students more likely to persist if they took a course taught by a Black instructor. Additionally, students of color

[5] A.W. Geiger, "6 Facts about America's Students," https://www.pewresearch.org/fact-tank/2018/09/07/6-facts-about-americas-students/.
[6] Jo Ann Lee, "Students' perceptions of and satisfaction with faculty diversity," *College Student Journal* 44 (2010).
[7] Josh Moody, "Consider Faculty Diversity When Applying to College," https://www.usnews.com/education/best-colleges/articles/consider-faculty-diversity-when-applying-to-college.
[8] Jasmin D. Llamas, Khoa Nguyen, Alisia G.T.T. Tran, "The case for greater faculty diversity: examining the educational impacts of student-faculty racial/ethnic match," Race, Ethnicity and Education, Vol 24 (2021), p. 377.

are less likely to drop a course and more likely to pass a course when having a racially/ethnically matched faculty instructor.[9]

A diverse faculty is therefore not only an admirable goal for ethical reasons, it is also in the best interest of the institution from a financial point of view to have a diverse faculty as this can contribute positively to attracting and retaining students of color (who now comprise the majority of students in the United States).[10]

This report provides a brief overview of some of the literature that describes the unique challenges that female faculty and faculty of color face, and in the second part, it summarizes some recommendations for creating departmental and campus climates that are more amenable to the flourishing and retention of diverse faculty. Some of the difficulties presented by the climates in many STEM departments impact nearly all underrepresented faculty, some are specific to women, some are specific to people of color, and as discussed below, women of color can find themselves in a "double-bind" situation in which they face hardships related to both race and gender.[11] Addressing the disparities in representation within STEM disciplines will be a long and complex process involving both individual and institutional learning, and this process can only be initiated once the reality of the difficulties facing underrepresented faculty are recognized.

1.a. Challenges common to all underrepresented faculty in STEM

The fact that STEM disciplines are nearly always dominated by white males facilitates the development of departmental cultures that are often experienced as uncomfortable or oppressive by female faculty and faculty of color. Sometimes this is due to overt racism or

[9] Ibid.
[10] Leslie Davis and Richard Fry, "College faculty have become more racially and ethnically diverse, but remain far less so than students," Pew Research Center, https://www.pewresearch.org/fact-tank/2019/07/31/us-college-faculty-student-diversity/.
[11] As Williams, Phillips, and Hall note, "A common, and indisputable, point is that women of color often are affected by racial as well as gender bias" (Joan Williams, Katherine Phillips, Erika Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," *Journal of Research in Gender Studies Vol 6*, 2016, p. 14).

harassment, but more often, it results from dominant but subtle social norms that influence day-to-day life within departments. For example, many female faculty and faculty of color report that they have received "very little or no mentoring from senior faculty colleagues."[12] Without formal mentoring structures in place within departments, informal mentoring or camaraderie often emerges, which can be beneficial, but this can also tend to privilege younger white males who senior faculty may feel more of a natural affinity towards.[13] Part of the problem also stems from the self-perception of scientific disciplines as a whole. For example, one study by Castilla and Benard shows that bias is more frequently manifest within disciplines like scientific ones that view themselves as pure meritocracies.[14] Additionally, according to the National Academies of Science, Engineering, and Medicine, scientific and mathematical cultures often emphasize and celebrate "innate talent" or genius, and "as such, negative racial and gender stereotypes around ability are particularly likely to be salient in STEM."[15]

An additional issue facing all minorities in STEM is that of "tokenism." Tokenism occurs when there are few persons of color or females within a department and thus underrepresented candidates are placed in competition with one another to be the "diversity hire."[16] Tokenism can fuel conflict between faculty of different ethnic backgrounds, and it can also contribute to generational conflict between older female faculty and younger female faculty who may be perceived as threatening. Another unfortunate effect of tokenism reported in the literature is a perception on the part of the underrepresented faculty member in a predominantly white and male department that other (white, male) members of the department view them as an "affirmative action hire," and thus as less qualified and competent. This leads to a common

[12] Christine Stanley, "Coloring the Academic Landscape: Faculty of Color Breaking the Silence in Predominantly White Colleges and Universities," *American Educational Research Journal* 43 (2006), p. 705.
[13] As Cheryl B. Leggon notes, "Some of the literature on mentoring indicates that often mentors choose as their protégés people who are of the same race and gender because they identify with these protégés and want to help them overcome barriers to advancement," "Diversifying Science and Engineering Faculties: Intersections of Race, Ethnicity, and Gender," *American Behavioral Scientist* 53 (2010), p. 1015.
[14] E. Castilla and S. Bernard, "The Paradox of Meritocracy in Organizations," *Administrative Science Quarterly* 55 (2010), p. 543.
[15] National Academies of Science, Engineering, and Medicine, "Barriers and opportunities for 2-year and 4-year STEM degrees: SySTEMic change to support students' diverse pathways," Washington, DC: The National Academies Press, 2016. See also Seanna Leath and Tabbye Chavous, "Black Women's Experiences of Campus Racial Climate and Stigma at Predominantly White Institutions: Insights from a Comparative and Within-Group Approach for STEM and Non-STEM Majors," *The Journal of Negro Education* 87, 2018, p.127.
[16] Williams, Phillips, Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," p. 48.

expression of racism and/or sexism described in the literature by the phrase "prove it again." This phrase describes the dynamic experienced by women and faculty of color of having to continually provide a greater amount of evidence of competence than white males in order to be seen as equally competent. According to Williams, Phillips, and Hall, "Black women (76.9%) were more likely than other women to report having to provide more evidence of competence than others to prove themselves to colleagues (Latinas: 64.5%; Asian-Americans: 63.6%; White women: 62.7%)."[17]

Underrepresented faculty also often carry a greater load than white male faculty members in terms of emotional labor, student mentoring, and extra committee work. Sometimes there is an expectation on the part of students or staff and faculty that a female will provide more emotional support or informal counselling to students based on assumptions about the nature of women as "nurturing." Additionally, there is often an unspoken expectation that underrepresented faculty will provide mentoring and emotional support to underrepresented students, over and above regular advising responsibilities.[18] Female faculty and faculty of color also experience extra labor in the form of being tapped as "diversity experts" simply because of being underrepresented and regardless of whether or not diversity is an area within their research expertise. They are often asked to sit on committees or panels in order to provide much needed diversity on the panel or committee, but this extra labor is also not always rewarded in tenure and promotion considerations, and it is often unpaid.[19]

Finally, both female faculty and faculty of color report dealing with a greater percentage of student challenges to their authority and competence than white male colleagues, and several studies show that faculty of color and women are negatively impacted by student evaluations

[17] Ibid., p. 17.
[18] John J. Thatamanil, Anthony B. Pinn, Rosetta Ross, "Chapter 4: Working Towards Tenure," *AAR Career Guide for Racial and Ethnic Minorities in the Profession*, https://www.aarweb.org/AARMBR/Publications-and-News-/Guides-and-Best-Practices-/Guides-for-Scholars-/Contents/Chapter-4-Working-Toward-Tenure.aspx, retrieved on 27 June 2020. See also Stanley, "Coloring the Academic Landscape: Faculty of Color Breaking the Silence in Predominantly White Colleges and Universities," *American Educational Research Journal* 43, 2006.
[19] Stanley, "Coloring the Academic Landscape," p. 704.

of their teaching. Students are often particularly resistant to efforts on the part of underrepresented instructors to include more diverse voices in syllabi.[20]

1.b. Challenges for Female Faculty in STEM

In addition to the issues raised in the previous section that impact all underrepresented faculty in STEM, there are other difficulties specific to female faculty working in scientific disciplines. Sexual harassment is a major factor impacting negatively upon women working in STEM fields. In one study, over one-third (34.5%) of female scientists who were surveyed reported having experienced sexual harassment in the workplace.[21] It is worth noting here that this statistic is more alarming when read with the knowledge that a large percentage of harassment is never reported.

Additionally, some of the literature describes the difficulties for women in STEM in terms of a "tightrope" metaphor. As Williams, Phillips, and Hall summarize, "Due to prescriptive gender bias, women walk a tightrope between being seen as too feminine, and so liked but not respected – or too masculine, and so respected but disliked."[22] The norms of STEM cultures often reward more stereotypical "male" qualities, but women may still be socially penalized for not being feminine enough if they display these male qualities. These types of pressures are also racialized in different ways, which Williams, Phillips, and Hall discuss at length. Other dynamics affecting women in STEM reported by Williams, Phillips, and Hall include the following:

- Women are presumed incompetent (Gutiérrez y Muhs, Flores Neimann, González, & Harris, 2012); men are presumed competent (double standards) (Foschi, 2000).
- Women's mistakes tend to be noticed more, and remembered longer, than men's (recall bias) (Heilman, 1995).

[20] Ibid., p. 706.
[21] Williams, Phillips, Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," p. 17.
[22] Ibid., p. 26. See also A.J. Cuddy, S.T. Fiske, and P. Glick, "When Professionals Become Mothers, Warmth Doesn't Cut the Ice," *Journal of Social Issues* 60 (2004).

- Women's successes often are attributed to luck or other outside causes: he's skilled; she's lucky (attribution bias) (Swim & Sanna, 1996).
- Objective rules tend to be applied rigorously to women, leniently to men (leniency bias) (Brewer, 1996).
- Superstar women tend to receive even higher evaluations than superstar men, but women who are merely excellent tend to get much lower evaluations (shifting standards; polarized evaluations) (Biernet & Manis, 1994; Linville & Jones, 1980).[23]

Furthermore, Glass et al report that at key early career stages, "men are assessed by employers as being more capable, worthy of career mentoring, and deserving of higher salaries than equivalent women (Moss-Racusin et al. 2012), and with increasing duration in the job are also more likely to be promoted rapidly and enter supervisory positions than women with similar characteristics (Robinson and Mcllwee 1991)."[24] They note as well that the organization of STEM work "may be designed in ways that stimulate men's but not women's productivity, particularly women with family care responsibilities (Stone 2007)."[25] It is worth mentioning here as well that female faculty are more impacted by parenthood, long work hours, and required residential moves than male faculty.[26] Even when there are appropriate family leave policies in place, or formal accommodations available for women with family responsibilities (such as an option to work remotely), there are also often informal pressures placed upon female faculty to not use these accommodations. Male faculty use these accommodations less often than women, and women who use them report feeling that they "are seen as less committed, receive less rewarding work, and face continued pressure to increase work hours."[27] There is often a distinction then between official departmental or institutional policies and the ability of employees to actually take advantage of family-friendly policies without hurting their careers or professional reputations.

[23] Williams, Phillips, Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," p. 19.
[24] Jennifer L Glass, Sharon Sassler, Yael Levitte, Katherine M Michelmore, "What's So Special About STEM? A comparison of women's retention in STEM and Professional Occupations," *Social Forces* 92 (2013) p. 727.
[25] Ibid.
[26] Ibid., p. 724.
[27] Ibid., 727.

The impact of family life on female faculty in STEM contributes to another dynamic referred to in the literature as "the maternal wall." According to Williams, Phillips, and Hall, "Maternal wall bias includes descriptive stereotyping that results in strong assumptions that women lose their work commitment and competence after they have children, as well as prescriptive stereotyping that penalizes mothers who remain indisputably committed."[28] In other words, mothers are perceived as being less committed to their work, and yet if they show themselves to be as committed to their work as ever, they are perceived as being bad mothers. Correll, Benard, and Paik report that "mothers were 79% less likely to be hired, only half as likely to be promoted, offered an average of $11,000 less in salary, and held to higher performance and punctuality standards."[29] Bias related to motherhood also impacts female faculty who do not have children. Female faculty without children reported being expected to work longer hours to accommodate the schedules of faculty with children, and female faculty without children are also the most likely out of any group to experience workplace sexual harassment.[30]

1.c. Challenges for Faculty of Color in STEM

Faculty of color working in STEM disciplines face all of the issues described in the first section of this paper, but they also face difficulties specific to race and ethnicity. Studies reveal that, in general, faculty of color experience higher levels of workplace stress than white faculty.[31] Faculty of color often describe their experiences as minorities working in PWIs in terms of "living in two worlds."[32] This phrase captures their experiences of feeling tension between their home communities or ethnic backgrounds and the predominantly white cultures in which they work. Many faculty of color develop coping strategies such as "code-switching," which refers to their "ability to apply parts of their separate value systems to different situations as appropriate."[33]

[28] Williams, Phillips, Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," p. 15.
[29] S. Benard, I. Paik, S. Correll, "Cognitive Bias and the Motherhood Penalty," *Hastings Law Journal* 59 (2008).
[30] J. Berdahl and S. Moon, "Workplace Mistreatment of Middle Class Workers Based on Sex, Parenthood, and Caregiving," *Journal of Social Issues* 69 (2013).
[31] Stanley, "Coloring the Academic Landscape," p. 704.
[32] Ibid.
[33] Ibid.

Often faculty of color engage in research that is relevant for their communities of color, but sometimes this research is not viewed as "rigorous" or "mainstream" enough to benefit them in processes of applying for tenure or promotions.[34] According to Stanley, "Affirmative action, diversity and student outcomes, institutional climate, and culture and ethnicity are just a few of the areas that, without a doubt, benefit most higher education institutions, but research on these topics is not always rewarded in the academy."[35] Furthermore, faculty of color are frequently the ones to explicitly address issues of race, racial bias, and inclusivity in their classroom teaching contexts, and this can sometimes result in pushback from white students and an increase of negative comments on student evaluations.[36]

Explicit and subtle forms of racism on both the individual and institutional levels contribute to increased workplace stress and psychological distress for faculty of color, especially at PWIs. For some PWIs, racism runs deep in the history of the institution. Sometimes racism manifests in institutional policies or practices that disadvantage faculty of color, while at other times it manifests in inappropriate or oppressive interactions with students or colleagues.[37] One example of how racism can function at the institutional level is when administrators do not speak out to defend faculty members of color when their academic credentials are called into question by students or parents (this is not an uncommon experience, according to reports from faculty of color).[38] Additionally, faculty of color report experiencing overtly racist comments from colleagues and students, as well as dealing with the regular occurrence of microaggressions. Wing Sue et al define microaggressions as "brief and commonplace daily verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative racial slights and insults towards people of

[34] Ibid., p. 705.
[35] Ibid.
[36] Ibid., p. 706. See also J.M. McGowan, "African-American faculty classroom teaching experiences in predominantly White colleges and universities," *Multicultural Education*, 2000; and, L. Vargas, *Women faculty of color in the White classroom*, New York: Peter Lang (2002).
[37] Ibid., p. 721.
[38] Ibid., p. 724.

color."[39] Microaggressions are often unintentional on the part of the people perpetrating them, and they may be a result of the ways in which white people have inherited racial biases or prejudices from their own cultural contexts and families. Furthermore, microaggressions can also be "environmental," for example when decorations or artwork within an institutional culture depict only (or primarily) white males. This works at an unconscious level to minimize and exclude faculty and students of color within institutions.[40]

Finally, social norms within STEM fields and PWIs typically reflect the preferences of the dominant culture (white males), and so they further exclude and disadvantage faculty of color. One factor reflected in the literature that positively impacts retention of faculty of color is a sense of belonging, and social norms that exclude actively work against the cultivation of feelings of belonging for people of color that are so necessary to their thriving in institutions and departments. Unspoken expectations about faculty "collegiality" also provide another way in which social norms can disadvantage faculty of color.[41] As Stanley notes, "faculty are often held to certain expectations concerning what the requirements are for collegiality. These expectations are sometimes stated; in other instances they are not, leaving many faculty to figure them out on their own, sometimes at great cost."[42] Faculty of color report feeling that they are held to higher standards of collegiality, but also that their efforts at cultivating collegiality are often not acknowledged.

1.d. The "Double-Bind" Problem for Women of Color in STEM

Leath and Chavous report that women of color are "likely to experience stigma such as disrespect and harassment-related to both their race and gender-relative to men, and these

[39] Derald Wing Sue, Christina M. Capodilupo, Gina C Torino, Jennifer M. Bucceri, Aisha M.B. Holder, Kevin L. Nadal, Marta Esquilin, "Racial microaggressions in everyday life: implications for clinical practice," *The American Psychologist* 62 (2007), p. 271.
[40] Ibid., p. 274.
[41] Stanley, "Coloring the Academic Landscape," p. 716.
[42] Ibid.

experiences lead to academic and occupational departure from STEM fields."[43] This results in the "double-bind" problem mentioned in the first section of this paper. Women of color will likely experience difficulties related to both race and gender, although how these differences manifest appears to vary depending on race. For example, according to Williams, Phillips, and Hall,

> Black women scientists were more likely than other women to report that they had to prove themselves more than their colleagues, Asian-American women scientists reported more pressure to behave in feminine ways (and more push-back if they didn't), and Latina scientists were more likely to be called "angry" or "too emotional" if they behaved assertively.[44]

They note as well that white women tend to report experiencing higher levels of influence within their departments and institutions than women of color. In contrast, Black women more commonly reported feelings of "bleak isolation."[45] Both Latina and Black women also reported experiences of being mistaken for janitors on campus.[46] Female faculty of color face significant challenges in terms of grappling with inequalities associated with power and authority within STEM disciplines and institutions of higher education as a whole.

2. Recommendations

There exists a wealth of resources available from a variety of sources to help departments and institutions address the disparities in representation and the difficulties with retention of diverse faculty. A few of these are summarized here.

2.a. Tools for Change

[43] Leath and Chavous, "Black Women's Experiences of Campus Racial Climate and Stigma at Predominantly White Institutions: Insights from a Comparative and Within-Group Approach for STEM and Non-STEM Majors," p.127.
[44] Williams, Phillips, Hall, "Tools for Change: Boosting the Retention of Women in the STEM Pipeline," p. 11.
[45] Ibid., p. 14.
[46] Ibid.

Mary Ann Mason and Joan C. Williams have partnered with AWIS (Association for Women in Science) to create a website devoted to providing tools to help departments and institutions promote greater flourishing and retention of women in STEM. The website includes a series of workshops specifically tailored to four groups: deans and department chairs, women in STEM, postdocs and graduate students, and legal counsel and compliance officers. These workshops address topics like "Building a Department in an Era of Tight Budgets: It's Cheaper to Keep Her," "The Competitive Edge: Best Practices for Family Friendly Policies," "Do Babies Matter?", and many more. The website also offers a "cost simulator" tool that helps deans and department chairs to analyse the economic impact of family friendly policies. The link to this resource is included here: https://toolsforchangeinstem.org/.

2.b. Metrics-Driven Bias Interrupters

Williams, Phillips, and Hall suggest that institutions use a model of organizational change called "Metrics-Driven Bias Interrupters" to address racial and gendered inequalities in the workplace.[47] This model has four steps:

1) ASSESS. Use interview or focus groups to investigate how subtle bias may be playing out in institutional hiring, tenure and promotion processes, and elsewhere. For example, measure start-up packages of men and women in your department. Is there a patterned difference? While you are at it, compare the start-up packages of different racial groups. If bias is suspected, identify an objective metric that will measure whether the bias exists.

2) IMPLEMENT A BIAS INTERRUPTER. Change procedures to interrupt bias. You might start with a gentle interrupter, say by assigning each professor a mentor as soon as a job offer is made, with a mandate to help the candidate successfully negotiate a fair start-up package.

3) MEASURE. Measure to see the intervention interrupted the bias and improved the metric.

[47] Ibid., pp. 63-64.

4) RATCHET UP IF NECESSARY. If the metric did not show improvement, strengthen or modify the Interrupters until it does. For example, a stronger interrupter might be to have the department chair negotiate all start-up packages.

Williams, Phillips, and Hall also provide a lengthy list of suggestions for best practices related to recruitment, hiring, committee assignments and office housework, promotion and tenure, climate, trainings, and parenthood and family caregiving.[48] For example, they suggest ways to draft job announcements that avoid masculine-gendered words, and they argue that institutions should be open to dual-career hiring (also hiring an applicant's spouse). In terms of best practices for STEM climates, they argue that departments should impose structures to regulate bullying and displays of anger, which disadvantage both women and faculty of color disproportionately.

2.c. Anti-racist change within institutions

Welton, Owens, and Zamani-Gallaher propose a framework for developing anti-racist change within institutions.[49] They argue that this type of institutional change should be intentionally planned, rather than initiated in reaction to a racist event on campus. Often this type of broad-scale change involves bringing in an expert from either inside or outside the institution who can help to guide the process.[50] Special attention should be paid to the specific contextual factors of the institution that will impact upon its ability to change. Anti-racist leaders should expect and plan for pushback from white stakeholders such as alumni, donors, faculty, the board, community members, and students.[51] They also suggest that leaders should determine if the change needing to be made is structural, a process, or attitudinal. As they note, "structural changes are institutional policies, procedures, and even changes to an organizational chart or reward system. Processes refer to how members interact with the structures, and attitudes are members' belief systems or how they feel when working within the organizational structures

[48] Ibid., pp. 65-69.
[49] ANJALÉ D. WELTON, DEVEAN R. OWENS, EBONI M. ZAMANI-GALLAHER, "Anti-Racist Change: A Conceptual Framework for Educational Institutions to Take Systemic Action," *Teachers College Record* 120 (2018).
[50] Ibid., p. 8.
[51] Ibid., p. 9.

and processes."[52] Courageous leadership will be key to the success of the process, and leaders must be especially willing to directly address challenges that lie under the surface and to face significant resistance from various elements of the community. Spreading out the leadership responsibilities for this process will be crucial, as one leader will not be able to effect institutional change on their own.

2.d. Building Anti-Racist Labs

V. Bala Chaudhary and Asmeret Asefaw Berhe have developed ten "rules" for building anti-racist labs. The rules are included here, and more discussion about the development of their thinking can be found here.

Rule 1: Lead informed discussions about anti-racism in your lab regularly
Rule 2: Address racism in your lab and field safety guidelines
Rule 3: Publish papers and write grants with BIPOC colleagues
Rule 4: Evaluate your lab's mentoring practices
Rule 5: Amplify voices of BIPOC scientists in your field
Rule 6: Support POC in their efforts to organize
Rule 7: Intentionally recruit BIPOC students and staff
Rule 8: Adopt a dynamic research agenda
Rule 9: Advocate for racially diverse leadership in science
Rule 10: Hold the powerful accountable and don't expect gratitude

2.e. Mentoring

One of the most consistent themes in the literature about supporting women and faculty of color in STEM is the importance of mentoring. While many underrepresented faculty report that they do not feel satisfied with the amount of mentoring they receive from more senior faculty, for those who do receive significant mentoring, this plays a large role in their happiness in STEM and their willingness and ability to stay in these fields.[53] Mentoring (both across

[52] Ibid., p. 10.
[53] Stanley, "Coloring the Academic Landscape," p. 705.

races/gender and same race-gender mentoring) is key for both recruitment and retention of diverse faculty. Formal mentoring structures within STEM departments that ensure that all early career faculty have access to a mentor can help to mitigate the negative impact of informal social networks that typically cater to white males.

2.f. Interdisciplinary training for STEM faculty

In a live webinar given on 23 June 2020, Angela Saini discussed her recently released book on scientific racism entitled *Superior: The Return of Race Science*.[54] After discussing the history of racism within STEM fields and its ongoing manifestations, Saini was asked by an attendee of the webinar about what should be done to fight against racism in the fields of science. She responded by advocating for the importance of including interdisciplinary training in the humanities in the formation of scientists. Recalling her own training as an engineer, Saini commented that she was never taught to think about the production of knowledge, the historically contingent nature of all knowledge, and the role of the human in the scientific process. She later discovered in a graduate degree programme in the humanities that this type of meta-thinking about epistemology was "second nature for people in the humanities." According to Saini, because people trained in the humanities are equipped to think through the dynamics of bias and historical contingency that impinge upon all knowledge production, they have an easier time accepting the fact that bias will exist in their own disciplines in comparison with those trained only in the sciences. It is therefore imperative to promote the training of scientists in the humanities.

3. Conclusion

If we extend Saini's insights to take into consideration of the production of knowledge from the perspective of not just the humanities, but also, in the context of the CCCU, Christian theology, we can suggest that Christian institutions should be at the vanguard of addressing issues of systemic racism and misogyny. In light of Christian insights about the pernicious nature of sin in human life, and the continual calling on all Christians to humility and

[54] Angela Saini, *Superior: The Return of Race Science,* London: 4th Estate (2019).

repentance, Christian institutions are uniquely equipped with a variety of resources to assist them with the daunting process of facing histories of racism and sexism. Most important of all, of course, is the knowledge that though sin overwhelms, grace abounds "all the more."