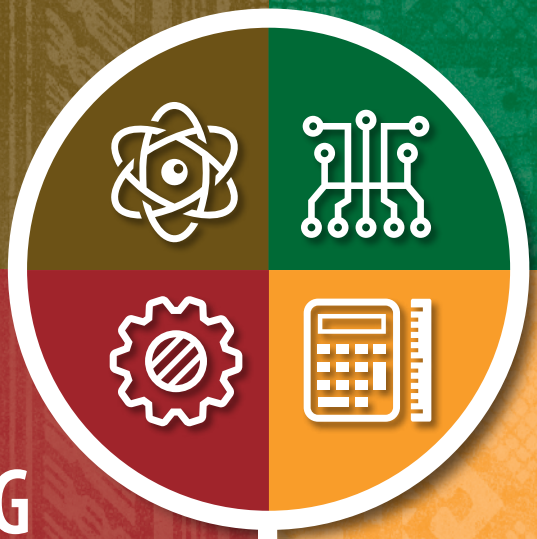
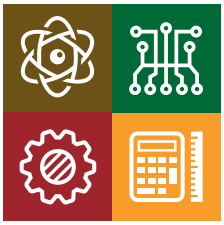


PREPARING CRITICAL FACULTY FOR THE FUTURE

Enlisting the Voices of STEM Women Faculty of Color

By Alma R. Clayton-Pedersen, Terrel L. Rhodes, Patricia M. Lowrie, and Jennifer M. Blaney

Association of American Colleges and Universities



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Foreword

The Association of American Colleges and Universities (AAC&U) is committed by mission to the advancement of both liberal education and inclusive excellence, and to the braiding of strong connections between college learning and the needs of a diverse democracy. In this context, AAC&U has focused strongly, both through its continuing programs and through its major funded initiatives, on the important role of faculty in fostering liberal learning—learning made rich through study of the arts and sciences—so that students can thrive and contribute in their lives, their work, and their roles in a globally engaged democracy. Similarly, AAC&U is working intensively on supporting new levels of scientific fluency and success for all students, with particular attention to students underrepresented in science and closely related fields of study.

This report turns a spotlight on a major site for liberal learning and Science, Technology, Engineering, and Mathematics (STEM) fluency: the work of Historically Black Colleges and Universities (HBCUs) as leaders in the education and graduation of STEM students. The report focuses in particular on the underexplored role of STEM women faculty of color, both in supporting student success in STEM fields, and, over time, in driving campus changes that can make any college more effective in supporting student success in these fields.

With generous support from the National Science Foundation's Office of HBCU–Undergraduate Program, AAC&U launched in 2011 the Preparing Critical Faculty for the Future (PCFF) project involving thirty-six HBCUs and seventy-two STEM women faculty of color and their colleagues. PCFF addressed both the adoption and the implementation of engaged practices and pedagogies particularly linked to persistence and success for underserved students and the need to strengthen leadership paths for STEM women faculty of color at HBCUs.

Each selected HBCU nominated two STEM women of color to lead its campus involvement in PCFF. It was clear across the entirety of the project that the STEM women's top interest was their students' retention and success. The PCFF leaders already were using active pedagogies, which research shows work best for STEM persistence and learning. But in the main, they had not seen themselves explicitly as leaders in driving broad educational change and reform, either on their campuses or in their disciplines. They had sought to be—and were—good teachers and supportive mentors to their students.

The PCFF project worked to position the STEM women faculty of color as change agents to make the use of evidence-based pedagogies in STEM more pervasive and more systemic. The project was designed to help these faculty place their knowledge within the context of the larger national STEM and liberal learning reform movements as well as mobilize their leadership to advance the use of effective STEM pedagogies within their own disciplines and institutions. PCFF also engaged participating faculty with new pedagogies—for example, culturally relevant ways of teaching science—toward which this group has a powerful orientation. Their experiences are applicable and transferrable to the experiences of STEM faculty on any type of campus.

As PCFF broadened participants' horizons and positioned them for advancement, the project surfaced and had to confront a host of systemic issues that effectively block women of color, both as change agents and as leaders. These included instances where departmental and institutional leaders see the PCFF leaders' race and gender

as deficits rather than as assets, as well as unrealistic demands frequently placed on women of color leaders to perform all the traditional faculty roles at high levels in addition to carrying oversized mentoring and advising loads with minimal support.

PCFF and its efforts to advance engaged pedagogical practices and institutional support for STEM women faculty of color leadership brought to the fore all the unresolved issues related to race and gender that still pervade the academy, even at HBCUs. Faculty of color cannot, and should not, face these leadership challenges on their own. Departmental and institutional leaders have a responsibility to open the doors, to appropriately support the multiple roles that STEM women of color fulfill in their professional development as scholars and teachers and as primary mentors for students of color in STEM higher education. "Making excellence inclusive" is everyone's work.[1] It cannot be the work solely of selected faculty, no matter how talented and dedicated.

This report calls attention to STEM women of color as a critical force in advancing needed educational change. But it also underscores the role of leaders at all levels in creating an environment that supports, rewards, and advances educational changes focused on underserved student success.

As AAC&U noted in *Committing to Equity and Inclusive Excellence: A Campus Guide for Self-Study and Planning*, by 2027, 49 percent of high school seniors will be students of color (2015, 3). Yet students of color are less likely than students from other racial and ethnic groups to enter and complete college (Witham et al. 2015). As stated in *Committing to Equity and Inclusive Excellence*, "to serve students and society well, higher education will need to make a pervasive commitment to equity and inclusive excellence—both preparing students for and providing them with access to high-quality learning opportunities, and ensuring that students of color and low-income students participate in the most empowering forms of college learning" (AAC&U 2015, 4).

Committing to Equity and Inclusive Excellence provides a framework for self-assessment, dialogue, and action to create an equity-minded environment on all campuses. It encourages educational leaders to pose questions that emanate from the PCFF initiative, for example: How are your faculty and staff developing cultural competence so that they are prepared to teach all of today's diverse students? How is your institution investing in leadership for equity?

As this report goes to press, college, university, and community college campuses of all kinds are alive with "new demands"—or, to be more accurate, old concerns that are rightly being raised once again across higher education—that institutions must create more hospitable and supportive environments for students from diverse backgrounds and from often dramatically underserved communities. The PCFF initiative reminds us that we already have talented leaders, on every kind of campus, who can help in that work. But equally important, this report reminds us that making excellence inclusive is everyone's responsibility. Succeeding in that long-term change agenda is the necessary key to our diverse democracy's shared future.

— CAROL GEARY SCHNEIDER
President, Association of American Colleges and Universities

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1 Making Excellence Inclusive is AAC&U's guiding principle for access, student success, and high-quality learning. It is designed to help colleges and universities integrate diversity, equity, and educational quality efforts into their missions and institutional operations. For more information, see http://www.aacu.org/making-excellence-inclusive.

Acknowledgments

The success of the Preparing Critical Faculty for the Future (PCFF) project rests first and foremost with the STEM women faculty of color participants. They all had the courage to engage in this work because they care deeply about the success of their students. They learned quickly that their students' success not only was related to enhancing their teaching strategies for greater student engagement, but also was intertwined with their own success as academic and institutional leaders.

The commitment, vision, and moral support of Dr. Claudia Rankins, program officer, and the financial support of the National Science Foundation's Office of Historically Black Colleges and Universities–Undergraduate Program (HBCU–UP) were instrumental in extending the project's benefits to the STEM women faculty of color participants and formulating lessons learned related to their own and their students' success. Dr. Rankins encouraged project leaders to pursue new questions and sustainable strategies that advanced STEM student success and the success of STEM women faculty of color at HBCUs. A special thanks goes to Dr. Kelly Mack, vice president for undergraduate STEM education at the Association of American Colleges and Universities (AAC&U) and executive director of Project Kaleidoscope (PKAL), for the insights and feedback she offered throughout the project as a colleague and advisory board member.

PCFF advisory board members had exceptional impact and influence on the project's ability to provide a space for participants to explore and further develop their teaching and leadership acumen. These board members' service helped the project establish mentor–mentee relationships that promise to benefit PCFF faculty for a lifetime. Current and former PCFF advisory board members include Dr. Juliette Bell, president of the University of Maryland Eastern Shore; Dr. Goldie S. Byrd, dean of the College of Arts and Sciences at North Carolina A&T State University; Dr. Phyllis Worthy Dawkins, vice president for Academic Affairs and Provost at Cheyney University of Pennsylvania; Dr. Susan Elrod, provost and executive vice chancellor for academic affairs at the University of Wisconsin–Whitewater; Dr. Wanda Fleming Lester, associate vice chancellor for academic affairs at North Carolina A&T State University; Patricia M. Lowrie, director of the Women's Resource Center and assistant to the dean of the College of Veterinary Medicine (retired) at Michigan State University; Dr. Kelly Mack, vice president for undergraduate STEM education at AAC&U and executive director of PKAL; Dr. Harold Martin, chancellor of Winston Salem State University; and Dr. Orlando Taylor, vice president for strategic initiatives and research at Fielding Graduate University.

The PCFF staff was stellar in ensuring that support systems ran like clockwork—and there were many marketing, communication, logistical, and data-gathering and -summarizing systems to maintain. We are deeply grateful for the enthusiastic service provided by Kathryn Angeles, Janet Barber, Lucia Cruz, Nina Daoud, Zoeann Finzi-Smith, Alexis Krivian, and Mankaa Ngwa-Suh.

Finally, but not least, we thank AAC&U's editorial and publications staff for their unswerving patience and good counsel in seeing this report through to publication.

We hope that our readers will learn from this publication, not only about how to support STEM student success, but also about how to ensure that STEM women faculty of color have equitable opportunities to advance their academic careers as teachers and scholars in STEM, and at other levels of leadership in the academy.

Introduction

In the fall of 2010, the Association of American Colleges and Universities (AAC&U) received a generous grant from the National Science Foundation's Office of Historically Black Colleges and Universities–Undergraduate Program (HBCU–UP). The grant funded AAC&U's Preparing Critical Faculty for the Future (PCFF) project. The PCFF project had two components: (1) to expand, sustain, and evolve practices that increase the number of underrepresented students who enroll in college, persist, and complete science, technology, engineering, and mathematics (STEM) degrees, and who then become STEM professionals; and (2) to support the advancement of STEM women faculty of color to and through academic leadership positions, because these faculty are central to the success of STEM students at HBCUs. PCFF addressed both the adoption and the implementation of engaged practices and pedagogies particularly linked to persistence and success for underserved students, as well as the need to strengthen leadership paths for STEM women faculty of color at HBCUs.

There is a powerful story to share with the higher education community based on engagement among participants at PCFF's thirty-six HBCUs: the seventy-two STEM women faculty of color and more than one hundred of their male and female colleagues who participated over the five years of the project (2010 to 2015). The lessons learned from this project demonstrate broad applicability and are not for HBCUs only. As participants used strategic approaches to overcome difficult challenges, project leaders saw that the lessons being generated applied to nonparticipating HBCUs and other minority-serving institutions (MSIs), as well as all types of higher education institutions. It is important for all higher education institutions to consider these PCFF lessons because most students of color—a critical pool of future STEM professionals—attend the nation's traditionally white institutions (TWIs). As key launching pads for the careers of these future STEM professionals, these institutions should be attuned to all strategies that increase student success in STEM.

The undergirding premises of PCFF are similar to those of its precursor, the Preparing Future Faculty (PFF) program, which was co-led by AAC&U and the Council of Graduate Schools for nearly a decade (from 1993 to 2002). PFF helped leaders at research institutions take seriously the preparation of future faculty so they might become effective teachers as well as scholars in their new roles across disciplines and in all higher education sectors. PCFF builds on PFF (see sidebar on p. 2) and focuses specifically on a subset of the faculty, namely STEM women faculty of color at HBCUs, to enhance their experiences and professional development and encourage their transition to formal academic leadership positions.

The PCFF Project

Building on PFF, the PCFF project was guided by two critical areas of research and observation: (1) research on pedagogies that enhance student learning outcomes, and (2) observation and research about the characteristics of role models and mentors who enhance underrepresented students' persistence, retention, and graduation. Additionally, the observation that STEM women faculty of color at HBCUs disproportionately serve as mentors to both male and female STEM students of color also contributed to project leaders' desire to better understand the experiences of STEM women faculty of color as a key to bridging the project's two research areas, enhancing STEM student success in conjunction with the leadership success of STEM women of color.

Today's higher education environment requires that existing faculty develop teaching skills that effectively engage undergraduate students in the pursuit of STEM careers in industry and government as well as in the academy. The need has never been greater for the United States to produce graduates in STEM disciplines, which requires faculty with strong teaching acumen in STEM. Current faculty need to develop and use educational practices that have been shown to have a positive influence on student learning (Kuh 2008; Brownell and Swaner 2010). These practices have been referred to as "high impact" because of the effect they have, when done well, on student engagement and learning outcomes. Across all racial and ethnic groups, students who participate in these practices report greater engagement in their learning; even more positive learning outcomes have been shown for African American and Latino/a students than for their white peers (Kuh 2008; Finley and McNair 2013). These larger effects for students of color are particularly critical because by the 2026–27 school year, these students will make up 49 percent of graduating high-school seniors, many of whom may go on to enroll in colleges and universities (see fig. 1) (Prescott and Bransberger 2012, cited in Witham et al. 2015, 8).

The PCFF Precursor: Preparing Future Faculty

The Preparing Future Faculty (PFF) program sought to address the fact that teachers most often teach as they have been taught, and college faculty receive little or no preparation for the role. Thus, PFF sought to raise awareness that 70 percent of new faculty would have their first position at colleges and universities other than research institutions where they completed their doctoral studies (Pruitt-Logan, Gaff, and Jentoft 2002). In doing so, PFF aimed to cultivate the development of a new vision for the preparation of college and university faculty. That vision asserted that doctoral students and postdocs who planned to join higher education faculty should learn about the academic profession and develop expertise in teaching, research, and institutional service. The latter three are expectations of the majority of faculty at most colleges and universities. In PFF, clusters of colleges and universities were established across the country. Each participating research institution served as a nerve center and partnered with comprehensive, masters-degree-granting liberal arts and two-year institutions to offer graduate students instruction and first-hand experiences to improve the quality of their undergraduate teaching in their disciplines.

PFF was successful in helping graduate students and postdocs learn about faculty careers and gain personal experience with faculty roles at a variety of institutional types. The program consistently emphasized active forms of teaching, especially practices that move students' own critical inquiry to the center of the teaching and learning experience. Those leaders who continue the PFF work at their institutions provide institutional support for this work because it is important both for their institutions' success and for sustaining the vitality and viability of higher education in the United States.

FIGURE 1. High school graduates by race/ethnicity, 1996-97 to 2010-11; projection through 2026-27

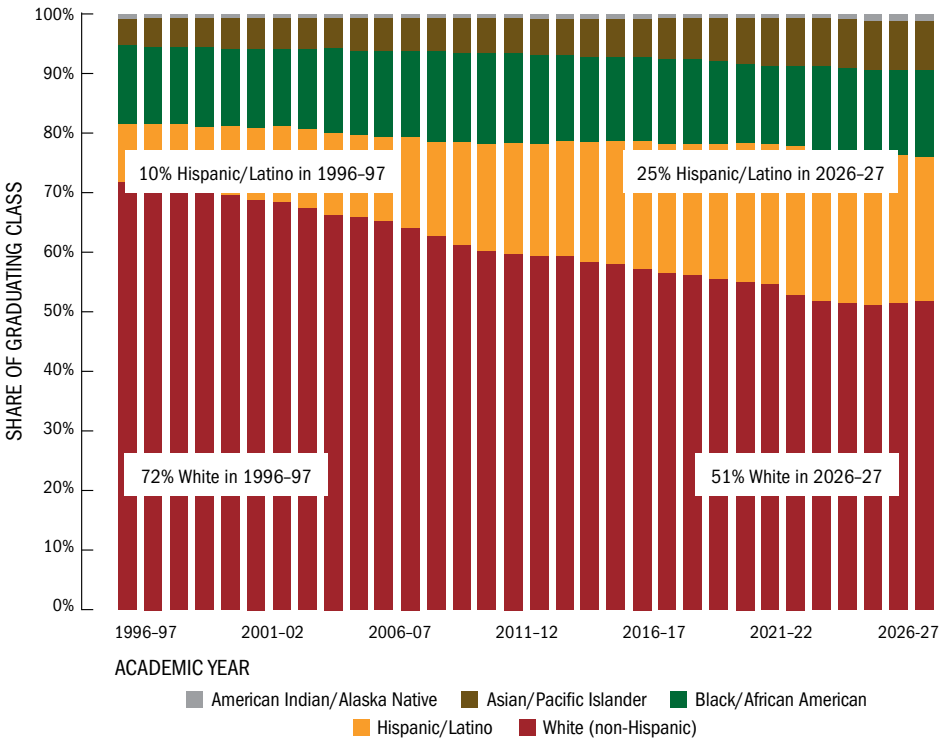

Figure adapted from Witham et al. 2015, page 4, citing data from Prescott and Bransberger 2012. Reprinted with permission.

PCFF focused on current STEM women faculty of color because these are the individuals who are teaching and mentoring current students. Connecting these faculty to larger national conversations and evidence about making high-impact practices foundational to academic leadership would provide advantages both for their leadership at HBCUs and for their students' advancement. PCFF also focused on STEM women faculty of color because research has shown that African American women and Latinas have outpaced their male counterparts in undergraduate degree attainment. More specifically, as of 2009, 22 percent of African American women ages 25 to 29 had received bachelor's degrees, compared to 14 percent of African American men. Similarly, 16 percent of Latina women in the same age group were undergraduate degree holders, compared to 10 percent of Latino men (Kim 2011, 6). Other research indicates that having faculty of color as role models and mentors can positively influence underrepresented students' attainment (Chang et al. 2008).

Using networking and professional development strategies successfully demonstrated through the PFF program, PCFF built a leadership development model for STEM women faculty of color that benefited project participants. While the project tested its professional development strategies at HBCUs, evidence is emerging that PCFF strategies hold promise for addressing the challenges women faculty of color face in the male-dominated STEM disciplines at all types of higher education institutions. Evidence is also emerging to support the idea that the women's professional development activities have positive effects on the student learning outcomes and academic advancement of PCFF participants.

The PCFF initiative also addressed the issue of bringing women of color with STEM expertise into senior leadership roles at HBCUs. The need for this particular emphasis is underscored by studies of leadership in higher education that bring into sharp focus the absence of women in leadership positions generally, and more particularly the absence of women with STEM backgrounds. The White House Initiative on HBCUs has encouraged greater attention to women's representation within the offices of the president, provost (or vice president of academic affairs), and dean, in addition to women's representation among faculty at all higher education institutions. In 2014, women obtained more degrees than men at every degree level and have been doing so at all levels since 2006, when women surpassed men in degree attainment at the doctoral level (Johnson 2016, 3). Among ninety-nine presidents at HBCUs listed in the White House Initiative on Historically Black Colleges and Universities School Directory, only twenty-seven presidents were women (White House Initiative on Historically Black Colleges and Universities n.d.). The overall percentage of women presidents at HBCUs matches the national figure reported in 2011, when 27 percent of presidents among all higher education institutions were women (Johnson 2016, 11). Therefore, the 2016 report *Pipelines, Pathways, and Institutional Leadership: An Update on the Status of Women in Higher Education*, published by the Center for Policy Research and Strategy at the American Council on Education, has relevance for PCFF when it concludes that "women are not ascending to leadership roles … across degree-granting postsecondary institutions; the trend is exacerbated for women of color" (Johnson 2016, 4).

Given that the positions most commonly occupied by women college presidents immediately prior to becoming president were those of chief academic officer or other senior campus executive (62 percent), and that those chief academic officers or senior campus executives were most likely to have been dean or department chair (37 percent) immediately prior to that, the importance of STEM women of color ascending to these positions—where they can be influencers of and leaders for change—becomes more meaningful. As Sarah Gibbard Cook has written, "While it may appear that women in senior and faculty positions are slowly closing the gender gap, the potential pool from which many women presidents emerge still indicates that more leadership development, mentoring, and networking are needed to increase the representation of women presidents, especially for women of color" (2012, 3).

The PCFF initiative also addressed the issue of bringing women of color with STEM expertise into senior leadership roles at HBCUs.

The statistics related to the low numbers of women in general and of women of color in particular in administrative higher education leadership roles only begin to suggest why examining the issues that women of color face in the field is so important. This monograph aims to dive deeper into the stories of STEM women faculty of color in an effort to galvanize the higher education community around fostering more inclusive, equitable experiences across the STEM fields for stakeholders at all levels, and particularly for students of color. The data and participant narratives presented in this monograph primarily emerged through intentional data collection (see sidebar on p. 5). In addition to these data, we report observations and impressions of informal interactions among PCFF participants, and among these participants and members of the PCFF project team and AAC&U staff. Together, these data weave a robust narrative of experiences, discoveries, challenges, and growth that culminates in a suite of recommendations for all campuses.

The original qualitative data for this report were obtained from the following sources:

- original PCFF project applications of participating HBCUs
- PCFF Participant Summary survey
- observed engagement at PCFF Symposia (embedded in AAC&U's annual STEM or General Education conferences)
- reflection/feedback forms completed by participants at PCFF Symposia
- observed engagement of participants at AAC&U's Engaging Departments Institute
- original and revised Action Plan documents
- webinars hosted by AAC&U
- observed engagement at supplemental professional development opportunities supported through the PCFF project

Overview of the Story

To frame the narrative that emerged from the project, each chapter offers a new vision of academic life for STEM women faculty of color, suggesting new foundations for these women's advancement in higher education leadership. Each chapter includes one or more questions that the higher education community must answer in order to realize these visions. The chapters, including the visions and key questions, are outlined below, and the visions and key questions are collected in table 1, located on page 7.

Chapter One: Opportunities to Learn New Teaching Strategies and Leadership Skills

This chapter describes the premises of the PCFF project as well as the project structure. It also includes qualitative data from participants regarding their experiences in the project to demonstrate how PCFF shaped their professional development in the areas of engaged pedagogy and leadership.

Chapter Two: Leadership Development Challenges and Responses

This chapter outlines the strong commitment of STEM women faculty of color to student retention and success in general and specifically in STEM, as well as the challenges—such as structural inequities and institutional obstacles—that they face as they seek to advance into academic leadership positions. The chapter goes on to offer an overview of the role of mentoring, coaching, and advocacy in overcoming these challenges. Firsthand reflections and accounts from project participants provide examples of both the challenges participants experienced and the assistance PCFF offered in developing their professional goals.

Chapter Three: Actions to Advance Equity for STEM Women Faculty of Color

This chapter begins with the proposition that women of color cannot and should not face leadership challenges alone. Higher education leaders have a responsibility to open doors to realize the visions outlined throughout this monograph, not just because it is the right thing to do, but because each individual has a vested interest in the success of this population. Current institutional leaders—including senior faculty and junior faculty colleagues, department chairs and deans, chief academic officers, and presidents and chancellors—need to act to create systemic change in support of equity and success. This story is also important for higher education associations,

including disciplinary associations, associations that work to serve all students and faculty equitably, and the broad array of individual and institutional membership associations. Through examination of the issues presented in this chapter, postsecondary educators can reach a richer understanding of the problems facing STEM women faculty of color and devote appropriate and adequate resources to overcoming those challenges.

Our hope is that higher education leaders will use the PCFF participants' stories and the information from the project itself to assess their own institutions' attentiveness to both STEM women faculty of color and underrepresented undergraduate students, and to work more diligently to make excellence inclusive among these populations. The institutional assessments suggested by this report are important for at least four reasons. The first is to establish equitable access to leadership positions in higher education for STEM women faculty of color. The second is because STEM women faculty of color are critical to addressing the nation's need to educate current and future generations of students who are increasingly from racial, ethnic, and cultural groups that the American higher education system has not served well. The third is because the participation of these groups in STEM leads to better scientific questions and outcomes, and is critical to US preeminence in science and technology (Cantor et al. 2014). And finally, positive and sustained interactions with faculty of color have been associated with increased success rates for students of color (Chang et al. 2008).

Our hope is that higher education leaders will use the PCFF participants' stories and the information from the project itself to assess their own institutions' attentiveness to both STEM women faculty of color and underrepresented undergraduate students.

TABLE 1. Visions and Key Questions Supporting the Advancement of STEM Women Faculty of Color in Academic Leadership

	VISIONS	KEY QUESTIONS
Chapter 1	Imagine STEM women faculty of color at HBCUs being fully recognized for successfully leading the higher education community's efforts in using high-impact educational practices to engage historically underrepresented students in pursuing STEM careers.	How could the existing capabilities of STEM women faculty of color be enriched and leveraged so that they are positioned to lead a transformation of undergraduate STEM education?
Chapter 2	Imagine that by 2025 STEM women faculty of color are well prepared and as likely to achieve tenure and ascend to the rank of full professor and beyond as their white male and female STEM faculty counterparts. Imagine that there are appreciable declines in the gap between them and their white STEM colleagues in the number of academic leadership positions they hold. Imagine the actions needed to reduce stereotypes and unconscious biases that hinder such advances—including the perceived lack of confidence of others (i.e., white women, and men of all races and ethnicities) in the leadership capabilities of women of color.	What are some of the reasons for the gap between STEM women faculty of color and their peers within senior academic and administrative ranks in higher education? What aspects of the prevailing criteria, practices, and processes for faculty review, promotion, and tenure prevent leadership advancement of STEM women faculty of color in higher education? What effect can mentoring, coaching, and networking have on advancing the academic leadership capacities and teaching capabilities of STEM women faculty of color?
Chapter 3	Imagine that, as a consequence of equitable leadership advancement for STEM women faculty of color, there is a substantial increase in the number of female and male students from currently underrepresented populations succeeding in the STEM disciplines and pursuing professional and academic careers in these areas. Imagine the institutional infrastructure—policies, processes, and practices—that would be needed to foster such changes to achieve these outcomes. Imagine that HBCUs and women of color faculty in STEM disciplines are fully engaged and included in the national dialogue about transforming undergraduate STEM education.	What intervention models can help eliminate the gap in academic leadership? What aspects of the prevailing criteria, practices, and processes for faculty review, promotion, and tenure prevent leadership advancement of STEM women faculty of color in higher education?

CHAPTER ONE

Opportunities To Learn New Teaching Strategies and Leadership Skills

Imagine STEM women faculty of color at HBCUs being fully recognized for successfully leading the higher education community's efforts in using high-impact educational practices to engage historically underrepresented students in pursuing STEM careers.

To realize this vision, we must address the following question:

- **How could the existing capabilities of STEM women faculty of color be enriched and leveraged so that they are positioned to lead a transformation of undergraduate STEM education?**

This chapter describes the programmatic elements and structure that the PCFF project used to enrich the teaching and leadership skills of STEM women faculty of color and also tells these faculty members' stories through qualitative data collected about their experiences. The data and stories from the PCFF participants highlight the reforms advanced over the past quarter century of efforts to improve teaching in higher education across the disciplines, as well as more recent efforts to improve STEM teaching and learning. Many of these findings can be generalized to any campus serving underserved students and employing women of color faculty in all disciplines in that effort.

The Premises of the PCFF Project

To realize the aforementioned vision, we designed the PCFF project based on the premise that undergraduate STEM learning and degree completion among historically underrepresented and underserved students will improve if STEM women faculty of color are offered opportunities to

- enrich their existing effective teaching strategies;
- adopt additional evidence-based practices to help students achieve essential learning outcomes;[2] and
- adapt these practices to their institutional context.

The PCFF project advanced a hypothesis that the promotion and sustainability of such cutting-edge teaching practices would be more likely if project participants were in academic leadership positions. By recognizing the existing talents of STEM women faculty of color and preparing them for academic and institutional leadership, the project aimed to better position these faculty to advance their newly acquired teaching strategies across the STEM disciplines. Moreover, project staff posited that as the women advanced into influential leadership positions, their change efforts would achieve greater visibility, be more strongly encouraged, and become more pervasively implemented.

To examine these premises, we sought to build the PCFF project on the historical strengths of HBCUs when it comes to graduating black undergraduates and doctoral

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2 For information about evidence-based high-impact practices, see https://www.aacu.org/leap/hips; for information about the Essential Learning Outcomes identified through AAC&U's Liberal Education and America's Promise (LEAP) initiative, see https://www.aacu.org/leap/essential-learning-outcomes.

students in STEM fields. Data from the National Science Foundation indicate that although HBCUs comprise only 3 percent of US higher education institutions, they award nearly 30 percent of baccalaureate degrees earned by black students in science and engineering (National Science Foundation 2015, 4). Other researchers have found that HBCUs have a positive effect on STEM graduation rates for the historically underrepresented students who attend them (Chang et al. 2008; Owens et al. 2012; Palmer, Davis, and Thompson 2010; Perna et al. 2009).

The culturally competent approach that many HBCU STEM faculty, especially black women STEM faculty, have taken with students historically underrepresented in higher education is a key factor in the students' STEM success (Mack, Rankins, and Winston 2011). Additionally, the PCFF STEM women of color report high levels of formal and informal advising and mentoring of STEM students of color. As we aimed to enrich the existing teaching practices and academic leadership capacities of women faculty of color in STEM disciplines, we recognized that building on these faculty members' significant existing strengths would have many powerful effects. Thus, the PCFF participants were identified specifically because (a) they were recognized by their institutions as significant actors in promoting underserved students' success; and (b) they had yet to be tapped for traditional academic leadership positions.

Although HBCUs comprise only 3 percent of US higher education institutions, they award nearly 30 percent of baccalaureate degrees earned by black students in science and engineering.

PCFF Project Design

Each HBCU participating in PCFF involved a team of faculty and administrative leaders in the project. PCFF was designed to support a pair of STEM women faculty of color at each participating school, creating networks within and across institutions. PCFF staff recognized that campus leadership would be essential in sustaining this work. Thus, the first step toward realizing the PCFF project team's long-term vision was to confirm that leaders from participating institutions would provide the support necessary to sustain change within the STEM women faculty of color participants' specific areas of influence and across STEM disciplines.

Institutional Leadership Support for Educational Change Efforts

By virtue of his or her signature on the application to participate in PCFF, one of the top two campus leaders—the president or the chief academic officer—committed the institution's support for the project's aims. This meant authorizing two women of color faculty in the STEM disciplines to participate in a yearlong series of activities and to lead the work specified in the campus application. It also required the institution to provide partial financial support for two additional faculty members and one senior administrator to participate in a summer institute as part of an expanded team that would further develop and implement the planned reforms in teaching. The financial commitment for each institution (25 percent of the cost of three additional team members' attendance at the summer institute) was purposefully kept small enough to limit financial barriers for the many underresourced HBCUs who applied to participate. At the same time, the HBCUs' contribution was sizable enough to ensure that attention was paid on campus to the work and its outcomes. The broad participation of HBCUs demonstrates the project's success in reaching the HBCU community. The project garnered a total of forty-seven applications over the initial

three-year selection period and ultimately engaged thirty-six campuses (35 percent of the total HBCU community). Cumulatively, participating institutions enrolled a total of 127,644 undergraduate students whose success could potentially be influenced by their institutions' participation. (See appendix A for a list of participating HBCUs.)

The PCFF application process required campuses to develop and submit preliminary plans of action for their proposed campus work to improve student STEM learning and expand leadership development opportunities for the women of color during their yearlong participation. By requiring these plans, the application offered campuses the opportunity to determine how they would use their existing strengths as the foundation for their PCFF work. In their applications, campuses also had to identify and justify the additional team members who would join the two STEM women faculty of color leaders at the summer institute to work on advancing their plans. The preliminary plans guided the change efforts of each campus, and planning activities were instrumental in moving many of the campus teams' initial good ideas to productive implementation. For instance, after engaging in the planning process, Albany State University reported an increased focus on student retention. This institutional-level focus supported PCFF faculty's work to infuse evidence-based high-impact practices into their teaching. Such high-impact practices (described in detail in appendix B) gain their efficacy by engaging students actively in learning about the discipline being taught. Through such engagement, students become better able to make connections between disciplinary theory and practice. We designed the project to require both the team approach and the initial campus leadership support for PCFF participation in consideration of research conducted on behalf of the American Association for the Advancement of Science (AAAS) indicating that ongoing support for faculty should be infused into strategies to change teaching practices (Brewer and Smith 2009).

The PCFF application process required campuses to identify two STEM women of color to participate in a yearlong set of workshops and convenings organized to create a cohort of women who would share active learning pedagogical practices and explore professional development that included formal and informal leadership opportunities and possibilities. Over the course of the project, there would be three cohorts. The participating women leaders uniformly saw themselves as scientists with active research agendas, but also as teachers devoted to student success in STEM and in college more generally. It was often more challenging, however, for the women to embrace the idea of pursuing formal administrative leadership positions in order to leverage their research and teaching accomplishments for broader institutional change that could benefit more students, future professional generations in their fields of study, and their own professional advancement.

While there was great support for PCFF from participating campuses, there were also institutional challenges associated with programmatic changes. For many campuses, the lack of resources was a challenge that precluded effective implementation of long-term change. Additionally, some institutions had constituents who were resistant to change, making it difficult to enact new policies. In other cases, when participants sought to change the numerous courses that were being taught at their institutions using traditional pedagogies and structures, they discovered administrative barriers and challenges related to institutional structures that hindered their efforts. For instance, one participant reported that she had inadequate instructional support to aid in improving students' comprehension of course materials. Other participants felt

that they had too many classes for which to prepare and not enough time to do so in an innovative way. Some examples of these challenges are outlined in table 2.

TABLE 2. Challenges to Change Efforts

THEME	DEFINITION	EXAMPLE
Resistance to change	When implementing changes, resistance from faculty and some students is a primary challenge.	"The team will have a difficult time convincing other faculty members to 'buy in' to the process…"
Need to change reward structure	It is challenging to get faculty to change their teaching and their courses without also changing the reward structure. Most institutions struggle with incentivizing teaching and service, because research has historically been more rewarded.	"[There are] limited rewards and visibility for teaching…" "[There is an] unclear benefit/ reward to faculty."
Administrative challenges	Moving away from traditional lecture-based classes to experiential learning and team teaching can cause administrative concerns. For example, it can be difficult to assign credit to faculty for team teaching a course.	"Approval of the faculty workload credit for the course by the administration [is a barrier]."
Lack of resources	Inadequate funding, access to technology, or availability of other resources make it challenging to implement changes.	"This will require financial and organizational support from the university to bring in experts to conduct workshops on the subject area, which may be unavailable due to limited funds."

Access to New Teaching Practices

There is no shortage of information about effective teaching practices, and decades of social and neurological science research on how people learn exists. For example, the National Academies report *How People Learn: Brain, Mind, Experience, and School* was published over fifteen years ago (Bransford, Brown, and Cocking 1999), and other research supporting learning in context has been published since (Medina 2014). PCFF sought to foster the use of such teaching strategies by immersing principal participants in conferences that placed high value on sessions on effective teaching strategies and on establishing student learning outcomes for general education and major courses in the disciplines. The PCFF project integrated this exposure for its participants through annual meetings and Network for Academic Renewal conferences hosted by the Association of American Colleges and Universities (AAC&U), particularly those events focused on STEM disciplines and general education, the latter of which also include considerable programming related to science and mathematics.

In addition to the above AAC&U activities, the PCFF project members participated in three scaffolded events supporting both engaged pedagogy and leadership development:

- a seminar held in conjunction with a two-and-a-half-day AAC&U Network for Academic Renewal conference

- a seminar held as part of a four-and-a-half-day summer institute focused on integrative learning and the role of departments in such efforts
- ongoing interaction and networking among participants facilitated by PCFF staff over the five years of the project's operation

The Network for Academic Renewal Conferences: Pedagogical Learning

Designated Network for Academic Renewal (NAR) conferences provided PCFF participants opportunities to engage in a PCFF-only seminar as well as attend the full conference with non-PCFF attendees. The PCFF seminar consisted of three group sessions held at strategic times throughout the NAR conferences. The first was a half-day, preconference session to welcome PCFF faculty participants to the project and to introduce them to one another in-person.[3] The next session, held on the second day of each conference, was a group luncheon with an invited speaker. The speakers were typically women of color who were academic leaders at HBCUs. The third and final session was a luncheon on the last day of the NAR conference during which participants reflected on and shared their PCFF seminar and NAR conference experiences.

In addition, participants completed surveys constructed to capture their reflections on their learning from the conference sessions. Even though the PCFF participants already were using some engaged teaching and learning practices, their reflections on the session content confirmed the power of attending a conference focused on effective teaching practices in one's discipline.

Power of written reflections on conference sessions

Participants were asked to provide written reflections on their learning from at least two of the concurrent conference sessions they attended over the three-day meeting. As prompts for these reflections, they were asked whether a given session enhanced their thinking about STEM teaching practices (see fig. 2), whether it furthered their professional research interests (fig. 3), whether it advanced their academic leadership skills (fig. 4), or whether it helped prepare them overall for their future work (fig. 5). Participants clearly found the sessions they attended useful in all areas, although respondents from cohort 3 were less likely than those from other cohorts to indicate that the sessions furthered their research interests, perhaps because they were more knowledgeable to begin with. In keeping with the topics of the conferences the PCFF participants attended—Engaged STEM Learning or General Education—most participants commented on how these events influenced their thinking about engaging students in the classroom through innovative teaching strategies. From these reflections about the content that was most valuable for participants' learning, there emerged three themes: student learning improvement strategies and techniques, learning assessment, and faculty professional development.

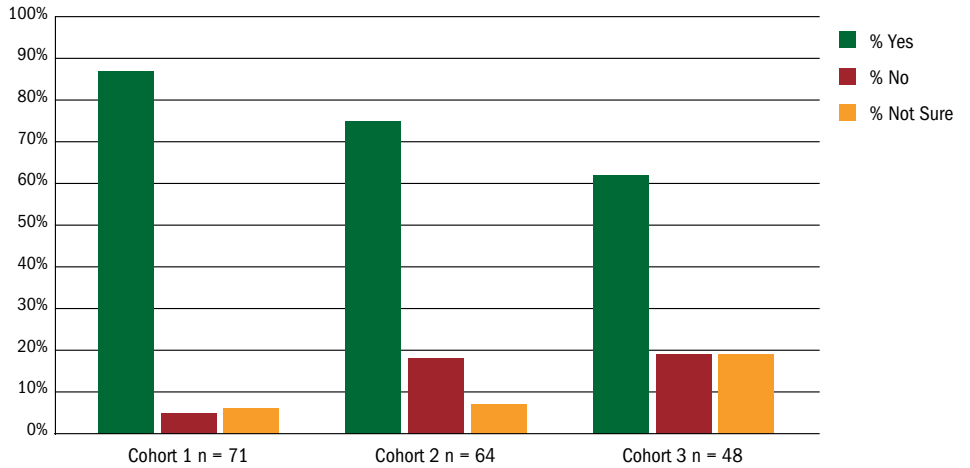
Student learning

Several women attended a session on how to use technology effectively in the classroom, covering active learning strategies such as clicker systems, "think-pair-share," and in-class polling. Participants expressed great enthusiasm for employing what they learned once they returned to their respective campuses. One participant wrote, "I plan to try this out next week," while another recorded, "I definitely will implement this strategy in my classroom." Beyond the use of technology, participants

3 The women from the first cohort had participated in at least one webinar prior to the conference, and those from the second and third cohorts participated in as many as three preconference webinars.

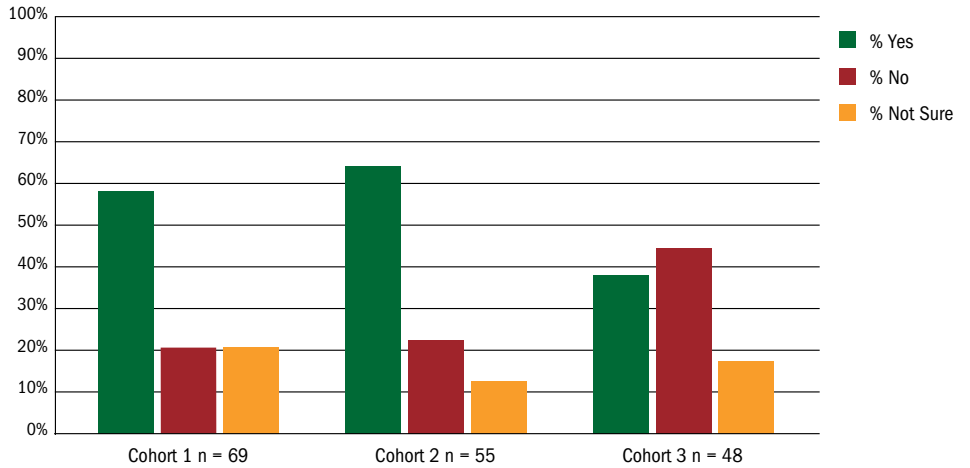
reported learning how to use concept inventories (tools that can foster conversations about how students learn), how to move from a lecture-only class to a problem-based system of teaching, and how to gain tools to assess student learning. One participant reflected on new strategies to motivate students to become more engaged in class, writing that the session "provided me with tools to [motivate] students in ways that I had not yet considered."

FIGURE 2. Percentage of responses indicating whether sessions offered new information about STEM teaching practices



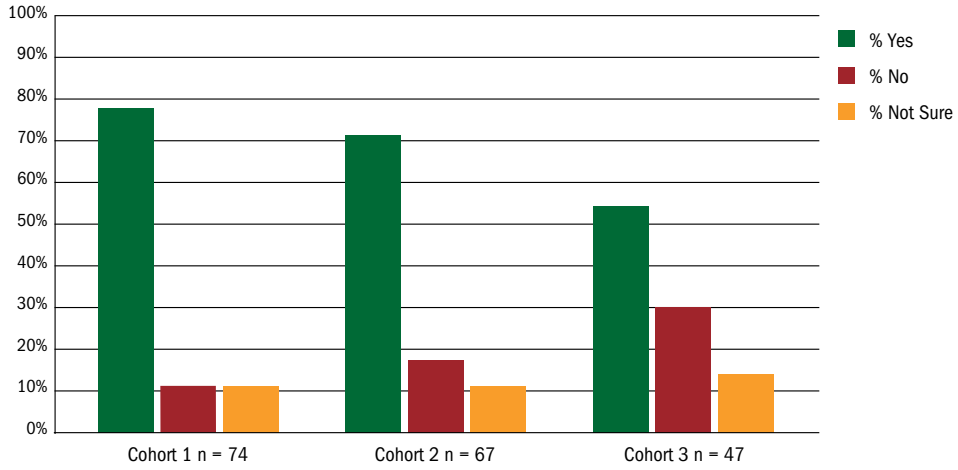
n = number of responses to the statement submitted for each cohort

FIGURE 3. Percentage of responses indicting whether sessions helped to further or enhance research interests



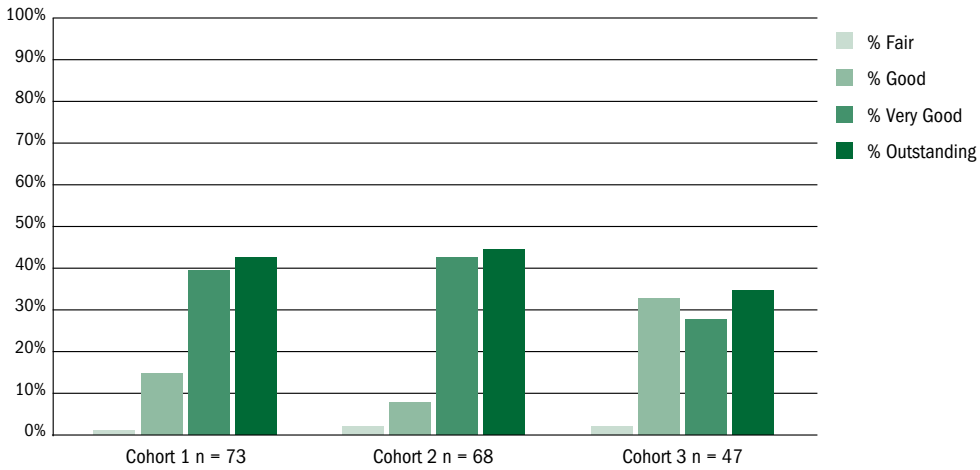
n = number of responses to the statement submitted for each cohort

FIGURE 4. Percentage of responses indicating the session offered information that will help develop academic leadership skills



n = number of responses to the statement submitted for each cohort

FIGURE 5. Percentage of responses indicating overall effectiveness of sessions attended[4]



n = number of responses to the statement submitted for each cohort

Other topics participants reported as helpful included creating interdisciplinary coursework, using graduate students as near-peer mentors for undergraduates, conducting K–12 outreach, easing the transition of students from two-year colleges to four-year campuses, establishing cross-institutional collaborations, supporting student-faculty research teams, and gathering ideas for STEM teaching and learning grants. Regarding interdisciplinary collaboration, one participant wrote, "When I return to my institution I plan to initiate a dialogue with my department first about addressing core competencies and then spearheading a discussion for a biology/math

4 Although participants had the option of giving sessions a poor rating, none of the participants did for the session characteristic reported here.

interdisciplinary course." A participant from another cohort commented in response to a different session, "[It] has allowed me to conceptualize the strengths (and weaknesses) of interdisciplinary work.… I will [use these ideas] to articulate suggestions for my department's recently requested [input for our] strategic plan."

These sentiments provide a glimpse into how participants were able to use the Network for Academic Renewal conferences to consider ideas for implementation on their own campuses. The participant's comment above related to addressing core competencies is directly linked to research on student learning, namely the claim that learning in higher education is successful only when students are able to relate new material to their previously held knowledge or understandings of the world (Neumann 2014). By first addressing core competencies, faculty are able to determine how new material can be incorporated into the curriculum so that students retain the necessary knowledge to successfully complete their degree programs.

Both faculty and students must be able to know, understand, and question the [assessment] data.

Learning assessment

Many participants commented on what they had learned about the assessment of student learning. Cohort II participants provided the majority of the comments in this area. Insights included recognition that faculty and students share the responsibility for learning assessment; the importance of knowing how to interpret assessment results; and the links between assessment, general education curricula, the academic major, and innovative pedagogy.

Several participants noted the importance of faculty members using assessment results to enhance their teaching. For these individuals, participating in the sessions enabled a deeper understanding of the purposes of assessment data, specifically as it relates to what is measured and how it can be used to improve teaching. Faculty acknowledged that, as leaders within their departments, they bore a responsibility for being clear and transparent about assessment practices and about how data are used. One participant stated:

> *I learned that both faculty and students must be able to know, understand, and question the [assessment] data … all [must be] involved to recognize the issues that are involved in student learning [and] program effectiveness and must be a part of the process of building true transformation.*

Another participant spoke specifically about a presentation regarding Duke University's process for providing incentives for students to become actively involved in their own assessment. She commented:

> *This kind of process would also help in fostering ties between the new student[s] and our STEM majors. [New students] will recognize a genuine interest in their success before they start. Instituting appropriate assessment practices across the college is a huge job. Piloting a study of assessment with a small group of incoming freshmen is do-able and mimicking the best practices from the Duke University group would be a great start to a process that could be adopted on a larger scale.*

These comments underscore participants' increased understanding of the importance of assessing student learning outcomes and suggest their exploration of the different approaches to assessment, such as AAC&U's Valid Assessment of Learning

in Undergraduate Education (VALUE) rubrics.[5] These sessions provided a foundation for the more in-depth work that participants would subsequently conduct with their campus colleagues at the summer institutes.

Faculty professional development

Many of the participants' observations regarding faculty professional development focused on the importance of transparency about expected learning outcomes. Sixty-two percent of participants in each of the first two cohorts (eight women from each) wrote about the distinct role of faculty in improving student and institutional outcomes. Included in their comments were reflections on the clear role of professional development in preparing faculty to work more effectively with students. One participant from Cohort I suggested:

> *There needs to be more documentation from [my campus] about how the faculty are teaching, training, and mentoring their students to give them the skill sets and confidence to be … competitive student[s]. This documentation will [originate] from the faculty teaching the courses and would serve a two-fold purpose … as a publication for the faculty to include in their portfolio and to disseminate the critical information to other science faculty.*

A participant from the first cohort noted that although the session she attended was based on work occuring at an institution very different from her own, she learned from it that faculty must be prepared to consider students' needs. She wrote:

> *Grant funding is important to [start] initiatives but an organized effort (an office, for example, of professional development) may be a useful strategy … [for] meeting established goals, and the follow-up activities, resources, and support of this type of coherent effort [are] essential for sustainability. As I think about what needs to happen on our campus this at least provides a starting point. There are limited faculty development funds—this needs to change.*

Participants also noted that professional development included building and sustaining strong relationships with fellow faculty. As a Cohort II participant commented:

> *This session truly opened my eyes by providing me with new information … scientific evidence on learning, and details of implemented/revised/successful programs at [the presenters'] university. Another area [of discussion] … was collaboration and camaraderie. The presenters spoke about techniques they used to build relationships within the faculty. These newly formed/found relationships could yield additional strategies to use successfully in the classroom with our students.*

This idea carried traction. Another participant from Cohort III also stressed the importance for institutional change of creating community among faculty when she noted that "faculty learning communities offer approaches to consider that will make faculty want to engage; hearing those that would not work in engaging faculty [was also] useful."

As a whole, participants realized that PCFF's approach and ultimate goals were multifaceted and intertwined. In describing the impact that participation in the PCFF project had on both her personal and career trajectories, a participant reflected:

> *I realized that the focus of the PCFF project was not only about improving undergraduate STEM education on campus, it was about me. It was about*

5 For more information about AAC&U's VALUE rubrics, visit www.aacu.org/value.

preparing me to become a campus leader. … My participation in the project has not only had a positive impact on … [my institution's] undergraduate STEM education, but has transformed my leadership on campus and nationally.

The concurrent sessions also provided participants with ideas for creating change on their campuses. In reflecting on her own plans, one participant noted that a session provided her with tools to advance her PCFF-specific project related to faculty development: "I think [through] this exposure and some further research … I will be more prepared to be a leader at our institution on this [PCFF] project." After a session on the integration of active learning, another participant wrote, "I think I could have a huge impact [on my campus] on how STEM classes are taught, proposals are written, and how my institution could better retain and graduate a more competitive student."

Future learning

Participants were asked to reflect on the sessions they attended and additional resources and information they would like to receive related to the session or the facilitator. Their responses clustered into the following areas:

- more information about how to implement and/or integrate the practices offered in the session into their teaching
- resources to help them develop an understanding of the associated scholarly literature, or greater background on the given topic
- additional resources, including web resources
- information about funding opportunities
- more information about various individual facilitators and specific details about how they implement the work presented at their home campuses
- opportunities to ask additional questions of the presenter(s)

These reports indicate participants' eagerness to learn, integrate, and implement effective new pedagogies. Some who read these reflections may consider the pedagogies noted by the participants to be standard teaching practices. Yet, given what we know about the paucity of faculty preparation for the teaching role (Pruitt-Logan, Gaff, and Jentoft 2002), we should recognize that such engaged and problem-based forms of teaching are new to many faculty at every type of institution.

Research has demonstrated that experiential learning is critical to improving STEM outcomes (Gilmore 2013). Experiential learning has been described as the process of deriving information and meaning from interactive, hands-on experiences. This type of learning enables students to partake in real-life applications of science, technology, engineering, and mathematics. Preliminary findings on the Quality of Life Technology Research Experience for Undergraduates (REU) have demonstrated that experiential learning helps underrepresented undergraduate students in STEM fields develop greater aspirations for continuing their college educations beyond the undergraduate level. Through this program, students are provided opportunities to be actively involved in solving real-world problems within STEM fields, ultimately increasing their interest in STEM (Goldberg et al. 2011).

Research has demonstrated that experiential learning is critical to improving STEM outcomes.

PCFF sought to contribute to developing the capacity of STEM women faculty of color to use such high-impact practices to stimulate their students' aspirations and meet the nation's current and future needs, while also learning from these women.

The AAC&U Summer Institutes

The PCFF participants were provided opportunities for interdisciplinary and experiential engagement at AAC&U's summer institute on Engaging Departments.[6] This summer institute emphasizes teamwork and brings together institutional leaders from dozens of campuses for the purpose of collaborating to effect change within their institutional contexts. Over the course of the institute, faculty members from different departments came together to plan how to implement learning-centered initiatives that would ultimately result in increased learning for their own students. In this venue, PCFF participants were joined by three of their campus colleagues, including an administrator, to refine and further develop their initial action plans, and to prepare to present these plans to other campus colleagues in the fall. Participants left the institute excited about implementing what they had developed with their five-member teams. As one participant put it:

Issues facing higher education are global, regardless of your student population or location.

> *The transition from leadership preparation to leading and implementing a campus plan can be a formidable undertaking which at times is overwhelming. This is where the value of PCFF becomes extremely evident. The information provided by PCFF online prior to [the] institute enabled us to strategically plan our time in order to maximize the benefits. We decided in advance which member would attend which sessions according to their interests. Each evening and upon returning home, we shared information gleaned from the sessions.*

While the participant above appreciated the opportunity for intra-institutional teamwork that the institute provided, another participant reflected on the benefits of interacting with other campus teams at the summer institute, stating:

> *The most important [part of the PCFF] program was the summer institute.… Because a diverse group of individuals and institutions were present, I observed how differing institutions are working to increase student engagement. Many of us attend conferences in our respective disciplines … but [we] rarely attend conferences that have broad themes focused on student engagement. Because of this, one is often inclined to believe that their problems are unique. The issues facing higher education are global, regardless of your student population or location. This was made evident during the institute and I was able to take away some good suggestions for improvement.*

To provide campus teams with additional motivation for implementing their plans, PCFF leadership requested that each team submit a six-month progress report on its actions. The teams created timelines and assigned different responsibilities to different team members, setting benchmarks for all team members that were integral to the development of the campus plans. A follow-up survey revealed that 75 percent of the teams that responded had progressed with the action plan they had created at the institute. For some participants, this involved meeting together as a group and presenting the plan to departments on campus. Other teams have begun more advanced work to bring their plans to fruition. For instance, 81 percent of respondents have incorporated teaching strategies they brainstormed at the institute, further demonstrating that participants were able to use institute material to implement

6 For more information about AAC&U's Institute on Integrative Learning and the Departments Institute (the Institute on Engaging Departments), see https://www.aacu.org/summerinstitutes/ild.

changes on their individual campuses. Overall, all campus teams reported that the clear assignment of action steps and responsibilities during the summer institute helped them achieve their desired outcomes, even if everything planned did not occur on schedule.

Webinars for Ongoing Engagement with the PCFF Network

In addition to the meetings and institutes, participants also engaged in regularly scheduled webinars. The webinars served multiple purposes for PCFF faculty and project staff, including

- introducing cohort participants to one another virtually;
- providing information and answering questions about the various components of the project; and
- preparing participants for their engagement in the PCFF seminars, meetings, and institutes.

The webinars served as a way for participants to support each other's learning and development. These interactions offered opportunities for participants to share their professional and personal campus experiences with others in their cohort, forming a sisterhood through these conversations. As subsequent cohorts engaged in the project, specific webinars were designated as individual cohort webinars, while others were designated as cross-cohort interactions to expand the networked community. By year three, all three cohorts were engaged in "all-cohort webinars." Participants viewed both the single cohort and the multicohort webinars as valuable informal networking and learning opportunities. As one participant put it, "Webinars gave us another platform or forum to engage in discussions about how our various institutions were trying to implement [our] transformational change [efforts], as well as keeping us abreast of other conferences and networking opportunities."

These interactions offered opportunities for participants to share their professional and personal campus experiences with others in their cohort, forming a sisterhood through these conversations.

In the fourth and fifth years of the PCFF project, the webinars were a venue for professional development presentations. For example, members of the PCFF advisory board led presentations on specific topics of interest to participants. These session topics included theories of change, learning communities, evaluation fundamentals, professional and organizational development, and effective grant-writing strategies. Participants reported that the sessions were timely and very informative to their campus work.

Overall, these webinars were a critical element of preparing participants to maximize their interaction with each other at the meetings and with their teams at the summer institutes. In most disciplines, but particularly in STEM disciplines, conference sessions are often panels of researchers presenting their work with time for questions from attendees. The primary mode of research dissemination is presenting findings, defending the methods and findings, and generating suggestions for further research. Since AAC&U's mission focuses on improving the quality of undergraduate learning, its meetings and conferences seek to model the high-impact practices it promotes. That is, the sessions are highly interactive and engage attendees in exploring topics. Through the webinars, PCFF participants had the opportunity to gain advanced preparation for the relatively unfamiliar formats they would encounter at AAC&U's meetings and at the summer institute.

Project Summary

The PCFF project goals were to offer professional development seminars, meetings, and institutes that put teaching and student learning in disciplinary and departmental contexts. The webinars provided participants a network for learning from each other as well as for providing mutual support to each other. Together these elements provided a strong foundation upon which many of the women enhanced their professional and pedagogical knowledge and developed relationships that helped them achieve greater success in managing change and leadership on their campuses.

It is worth restating that for many of these women, the teaching and professional development opportunities would not have been possible without the joint, complementary support of PCFF and of their own institutions. The synergy of this collaboration had mutual benefits for the participants, the participating HBCUs, AAC&U, and the broader STEM community. Continued institutional support of these efforts is critical to establishing pervasive and systemic change at the participating campuses.

CHAPTER TWO

Leadership Development Challenges and Responses

Imagine that by 2025 STEM women faculty of color are well prepared and as likely to achieve tenure and ascend to the rank of full professor and beyond as their white male and female STEM faculty counterparts. Imagine that there are appreciable declines in the gap between them and their white STEM colleagues in the number of academic leadership positions they hold.

Imagine the actions needed to reduce stereotypes and unconscious biases that hinder such advances—including reducing the confidence gap that STEM women faculty of color may have around their own roles in academia and the perceived lack of confidence of others (i.e., white women, and men of all races and ethnicities) in the leadership capabilities of women of color.

To realize these visions, we must address the following questions:

- **What are some of the reasons for the gap between STEM women faculty of color and their peers within senior academic and administrative ranks in higher education?**
- **What aspects of the prevailing criteria, practices, and processes for faculty review, promotion, and tenure prevent leadership advancement of STEM women faculty of color in higher education?**
- **What effect can mentoring, coaching, and networking have on advancing the academic leadership capacities and teaching capabilities of STEM women faculty of color?**

Women of color faculty in the STEM disciplines are markedly underrepresented in leadership roles in American higher education. This chapter addresses some of the challenges to their movement into these positions. Additionally, this chapter examines the unique environment for these STEM faculty members and highlights some of the challenges they face at HBCUs and across higher education. The chapter also examines the structural elements of HBCUs, and of higher education generally, that continue to impede the advancement of these women.

Some of these challenges are well known, while others are less so; and yet all can and should be addressed systemically. Doing so will enable the nation to take advantage of all of its available human capital to address the daunting challenges of graduating a million more STEM graduates in the next ten years (PCAST 2012).

There are concerns that must be addressed broadly at the institutional and national levels and those that can be addressed by the women themselves. The broader concerns are related to challenges in the larger social structures in the United States relating to gender, race, ethnicity, and the intersection of these factors. A 2007 article in the *Harvard Business Review* outlines these concerns, and emphasizes the importance of tackling barriers to advancement for women at all levels, not merely at the highest-ranking levels (Eagly and Carli 2007). These broader concerns may be considered a "wicked problem" (Butler 2013) because we have worked on them for decades and because they involve addressing complex diversity issues within academia which likely will not be solved within the course of our lifetime. We have made progress, but as a nation we have much work ahead. Women of color in academia cannot themselves do the work of addressing unconscious biases related to their place in the academy. Nor can these women dismantle negative stereotypes, outright discrimination, or even the benign discrimination of many current leaders who suggest that only the top research universities can produce high-quality scholars and academic leaders.

These concerns must be addressed by higher education leaders as well as the nation as a whole.

Beyond these systemic societal challenges, STEM women faculty of color also confront significant barriers to advancement at their home institutions. Analysis of qualitative data gathered from PCFF participants (see table 3) revealed many of the challenges that participants experienced at their home institutions. These challenges are not specific to HBCUs and reflect pervasive problems in higher education. Further, the per-student resource allocation for public HBCUs is not on par with that of their traditionally white counterparts, which reflects the historical resource discrimination that further negatively affects the advancement of STEM women faculty of color into leadership positions (Brady, Eatman, and Parker 2000).

Additionally, the combined effects of the institutional and national challenges outlined in table 3 and elsewhere conspire to create circumstances that undermine the advancement of STEM women faculty of color. While elements of the PCFF project addressed many of these challenges, some participants were more successful than others in developing the personal agency necessary for professional advancement.

Despite these findings from national studies and reports, many PCFF women were able to establish themselves in spaces where they were in contact with their professional mentoring, coaching, advocacy, and support networks. These women, and higher education at large, cannot wait to pursue and provide such individual resource development until the societal and structural concerns outlined above are addressed and mitigated. Rather, STEM women faculty of color must have opportunities to further develop the skills required to recognize themselves as valuable contributors to the success of their departments and institutions. With that in mind, this chapter will turn now to addressing the questions posed at its outset and the significant structural and social factors that impede achieving the imagined visions for change.

Examining the Leadership Gap among STEM Women Faculty of Color: Structural Concerns

To be sure, some elements of the challenge of leadership advancement in STEM are similar for all women faculty. All women encounter barriers related to the prevailing models of leadership development (see Betz and Hackett 1981); perceptions of "women's place" in the male-dominated STEM arena (Zeldin and Pajares 2000); and women's overall sense of self-efficacy (Hackett and Betz 1981). However, these environmental elements are exacerbated for STEM women faculty of color by the double bind of being a woman and being a person of color (Malcolm, Hall, and Brown 1976). Many Americans proclaim "colorblindness" as it relates to their sentiments towards people of color, yet unconscious biases, discriminatory practices, and injustices are still a reality for people of color in a variety of areas of work, housing, and—most perniciously—in K–20 education (Carnevale and Strohl 2013; Moule 2009).

Women of color are the least represented in higher education academic leadership at the full professor level relative to their proportion at the associate professor level. According to a report published by the University of California–San Diego (Cech, Pecenco, and Blair-Loy 2013), although 41 percent of science and engineering doctoral degrees were earned by women, women only held 19 percent of all faculty positions in these fields (1). Given the importance of the faculty position and experience in advancing to administrative leadership, the underrepresentation of women at higher faculty levels precludes them from advancing to senior leadership positions (Cech, Pecenco, and Blair-Loy 2013). Furthermore, the complex intersections of being a woman and

being a person of color in a color-conscious nation, as well as being a STEM faculty member in higher education (even at an HBCU), present unique dilemmas. These challenges are often manifested in the difference between women of color faculty members' and others' access to mentors, coaches, advocates, and broad professional networks.

TABLE 3. Institutional Challenges

THEME	DEFINITION	EXAMPLE
Retention and student readiness for college	Students are retained poorly at the institution and/or in STEM majors. This is largely due to a lack of preparation for college. Many note that there is an increase in the variety of readiness levels of incoming college students.	"There is increased heterogeneity in the academic skills of entering students in the STEM disciplines." "We only retain a minority of the students that declare a STEM major as freshmen."
Recruitment	The college has trouble recruiting students generally or has trouble recruiting women of color in STEM majors. Many note that their institution needs to have more targeted recruitment practices in place.	"By focusing on K–12 STEM teachers, more high school graduates would be equipped with the necessary tools to be competitive at the college level, particularly in STEM."
Faculty development	The institution needs more professional development for faculty. There is a general notion that improving faculty development will also help improve retention and student learning in STEM.	"Faculty and student development are directly connected." "Faculty development and improving STEM education efforts are connected in that in developing STEM faculty, students in STEM disciplines also benefit."
Need for more applied learning	More research, internship, and other real-world learning experiences are needed for STEM students. Many faculty agree that these experiences are especially important for first-generation students and others who may be underprepared for college.	"The goals of [the undergraduate research program] are to integrate research experiences into courses, use research to facilitate learning of students who are challenged by abstract concepts, provide research experiences for students and prepare students for graduate studies."
Need to cultivate female leadership	Many note that most women of color in STEM are not in leadership positions. It is important to create ongoing institutional support for leadership development from review and promotion through administrative and professional opportunities.	"There is also a significant need to cultivate academic leadership in STEM, particularly as it relates to leadership contributions of faculty who are women of color. Presently … there are no women of color serving as department chairpersons…. Thus, there is a pressing need to cultivate the leadership potential of junior women faculty of color."

The PCFF project worked to address these gaps by positioning participants as leaders in campus teaching reform efforts through ongoing mentorship, coaching, and advocacy as well as access to multiple national networks. These activities helped to move participants beyond seeing themselves as good teachers, scientists, and mentors to their students, expanding their self-perceptions as academic leaders at their campuses and within their disciplines.

Mentoring Relationships

Nearly universally, those who hold academic leadership positions in higher education began their journeys as faculty members. Most had one or more mentors, coaches, advocates, or champions who assisted their career trajectories. Having access to those who perform these roles well is essential for academic leadership advancement. While a fair amount of analysis has been published relative to the leadership pipeline for faculty of color at traditionally white institutions (TWIs), little systematic examination has been undertaken to determine the best leadership pathways for faculty of color, particularly for women of color, at minority-serving institutions (MSIs) (Flowers and Moore 2008). Yet the results generated by such studies would be instructive.

Within higher education, mentorship is viewed as a developmental relationship in which a senior faculty member or administrator takes on the role of advising a junior colleague to advance his or her personal and professional growth (Griffin 2012). Although these relationships are integral to the development of leadership, research has shown that women are less likely than men to have access to mentorship opportunities (Hall and Sandler 1983). A 2006 study found that the mentorship received from faculty was instrumental, not only in the classroom, but also in the field (Stanley 2006). The author further emphasizes the particular importance of mentorship for faculty of color, cautioning that a one-size-fits-all approach does not necessarily work and that mentoring is key to the recruitment and retention of faculty of color.

Research has shown that women are less likely than men to have access to mentorship opportunities.

In short, mentors advance their students and postdocs by providing career advice and by ensuring that their protégées are aware of opportunities and positioned for success. Senior leaders in disciplines and departments also serve as mentors to junior colleagues, securing their ascension through the ranks with positive reviews in the early career years, to tenure and beyond. In other words, the "self-made" person is an anomaly rather than the rule.

Feedback from PCFF participants revealed a general perception that there is a warmer climate for women of color at HBCUs than at TWIs; however, participants indicated that the climate is also chilly at HBCUs for STEM women faculty of color who feel isolation in their own departments and institutions. Many STEM women faculty of color experience these chilly climates in connection with being "the only one who looks like them" in a department, and the sense of isolation can be compounded by a disproportionate expectation that they will act as the primary mentors for students "like them." In such circumstances, one must ask who is mentoring American-born women of color faculty when they are isolated within STEM departments comprised entirely of men, many of whom are from other countries and cultures (Johnson-Bailey and Cervero 2004).

During informal conversations, some participants expressed concern about a cultural shift as departments predominantly populated by African American faculty

became populated predominantly by international and/or foreign national faculty. Mack, Rankins, and Winston (2011) have highlighted black women's history of leadership at HBCUs. Yet, as outlined in chapter 1, leadership within the STEM disciplines at HBCUs reflects the small number of women currently in leadership roles. The shift toward internationalization of the STEM disciplines is not specific to HBCUs, but is occurring nationally. Such cultural shifts have implications for who ascends to leadership roles across the higher education landscape. Implicit biases are a human characteristic without national boundaries. Without professional development (which we have already cited as lacking) to address these biases effectively, such cultural change can have a large impact on the social environments of the departments, as suggested by research from Harvard's Project Implicit, which focuses on implicit biases (Greenwald, Banaji, and Nosek 2014).

The current realities described above indicate that STEM women faculty of color may face more difficult challenges than their male colleagues in finding mentoring information and support that should be available equitably to every faculty member. Such information includes the "real" guidelines for the review process; the "must-haves" for the tenure package; the committee memberships that truly count as "service" in the review process; and the methods for identifying those who should be among one's external reviewers. Many of the women reported that the well-defined or transparent information that they gleaned about the review and tenure process from PCFF seminars, meetings, and institutes was new to them; they had received only imprecise or vague information about the process previously. Moreover, participants reported that when they had spoken with female colleagues in other departments on their campuses who had received and revealed more detailed information, those exchanges were stressful because participants did not know how to interpret the lack of information from their departments or their home institutions. In one case, a participant asked her male mentor about the new information she had heard. She reported that her inquiry disconcerted the mentor because he perceived it as her questioning his mentorship. Although she received tenure, her ability to mentor other faculty effectively was diminished because she herself continues to lack critical "insider" information about the process.

Gaining tenure is the first critical step toward further advancement in academic leadership in higher education. Without mentorship by knowledgeable colleagues at one's institution, and preferably within one's department, it is more difficult to advance. In most cases, by including a senior-level administrator on the institute team by design, the PCFF project gave participants intensive access to influential campus leaders and enabled these leaders to observe the women's commitment and skills directly. Several participants made advancements in their careers that even they did not anticipate. For example, during her panel presentation at the Association of American Colleges and Universities' (AAC&U's) 2012 Annual Meeting, a PCFF participant reported that when she took her faculty position, she intended to do her work and "stay under the radar." She attributed her participation in PCFF to realizing her leadership talent—and so did her institution's administrative leaders. She was tapped to become department chair when all she had previously aspired to be was a good faculty member.[7]

7 We expect to conduct a survey of PCFF participants to learn more about their career advancement and the role PCFF played in it.

These few examples represent just a small sliver of the vast documentation related to PCFF participants' experiences with mentoring. Without representing the full breadth of participants' experiences, these examples underscore the particular need to define specific mechanisms, skills, and strategies for mentoring across difference. One outcome of the PCFF project was that participants were better able to examine and share perspectives on leadership and articulate what kinds of mentorship were meaningful to them as they defined plans of action for achieving career success.

Coaching and Advocacy Relationships

Crawford and Smith (2005) highlight the importance of recognizing the unique intersection of race and gender for women of color, specifically black women. In doing so, they emphasize insightful efforts and recommendations that increase opportunities for women of color as they navigate higher education leadership. Furthermore, in their work on leadership development, Birnbaum and Umbach (2001) suggest that academic leadership should come from within rather than outside of the academy. While more research is needed, the work to date suggests that proactive coaches and advocates can play key roles in opening leadership opportunities for women of color.

Although coaching relationships are similar to mentoring relationships, they differ in that coaches are often more proactively engaged with the development of their colleagues or protégées. This proactivity can take the form of identifying opportunities for advancement and offering not only to respond to requests for references, but also to provide introductions to others who can further advance the colleague or protégée in assuming leadership positions. Thus, the key difference between a coach or champion and a mentor is that coaches actively look for hidden talents that can be further developed to better ensure success.

Like those who coach sports, successful faculty coaches are more likely than mentors not only to recognize, value, and help improve the obvious talents of their protégées and colleagues, but also to recognize hidden talent and work to draw it out. As coaches, they help their colleagues and protégées focus on and hone specific assets that advance their academic career development. Coaches often have achieved success in the academy in traditional and nontraditional ways. Those who have risen in nontraditional ways may offer perspectives on the pathway to leadership success that vary from those of academic mentors. Coaches also may be more proactive in engaging faculty in the nonacademic elements of their careers, suggesting approaches to work-life management, encouraging more assertive ways of establishing relationships with people of influence in the field, and offering practical advice about interpersonal interactions with colleagues who are difficult or resistant to change efforts. In doing so, they are able to instill in their colleagues/protégées a sense of agency that enables them to successfully navigate the process of leadership development. Such teaching and advocacy is especially helpful for STEM women of color for the reasons mentioned previously related to biases, discrimination, and the double bind.

The PCFF project's staff and advisory board members served as mentors, coaches, and advocates/champions for project participants. Many of these relationships, which frequently inspired participants to develop alternative visions of their individual leadership trajectories, will last a lifetime; others were temporary. Nevertheless, most of these relationships were viewed by the women as having a positive influence on their success—in this context, defined as their positioning for advancement. As a result of their work with senior-level, influential academic leaders, the majority reported having a better understanding of their personal goals and how to work toward those goals.

For example, PCFF participants at Morgan State University highlighted the importance of having advocates to assist in implementing their action plan. In particular, they received strong support from the provost and vice president for academic affairs, which ensured that the project was validated by peers and administrators. They cited the involvement of the senior administrator who was a part of the AAC&U summer institute campus team as critical to their success. As one participant noted, "It was important for us to have this internal champion to provide us an administrator's perspective and facilitate interactions … on campus."

Professional Networks for Leadership Advancement

When STEM women faculty of color actively engage in a variety of professional networks, they can identify and connect with others who have similar or complementary research and teaching interests. Through the PCFF project, participants made new professional connections with contacts who can serve as collegial acquaintances and speak about their work or, at the very least, provide introductions to others in participants' fields and help them build a web of networks. At best, these new contacts become colleagues with whom participants can conduct collaborative research or copublish peer-reviewed articles. Each connection broadens the sphere of networked individuals aware of each other's mutual strengths and research interests as well as their academic perspectives and experiences.

Each connection broadens the sphere of networked individuals aware of each other's mutual strengths and research interests as well as their academic perspectives and experiences.

PCFF networking was seen by participants and project staff as a key to participants' development in several areas, including personal confidence to succeed, knowledge about how to become an effective academic leader, and understanding of the broader STEM community. Because the PCFF project was consistently linked to AAC&U's ongoing professional development networks, the broader academic community also became more aware of the wealth of expertise the PCFF participants had to offer.

Several PCFF participants ranked professional networks and the opportunity to collaborate with other STEM women of color through the national conferences as the single most important aspect of participating in the project. Additionally, some women cited the summer institute as providing an invaluable opportunity to connect with colleagues at other institutions and to receive feedback from their institutions' senior leadership about progress on their action plans.

Similarly, other participants emphasized the importance of building relationships, writing that their experiences with PCFF contributed to their "acquisition of emerging leadership skills and confidence building." More specifically, participation provided them with opportunities to secure research grants, gain visibility and voice within their departments, and become appointed to significant campus-wide initiatives. These participants also acknowledged the challenges associated with transitioning from preparing young students as STEM leaders to leading and implementing a campus plan with and for their STEM colleagues. Despite the overwhelming task that lay ahead as they anticipated implementing action plans, PCFF participants found that their participation in the project enabled them to strategically manage and maximize their time and resources.

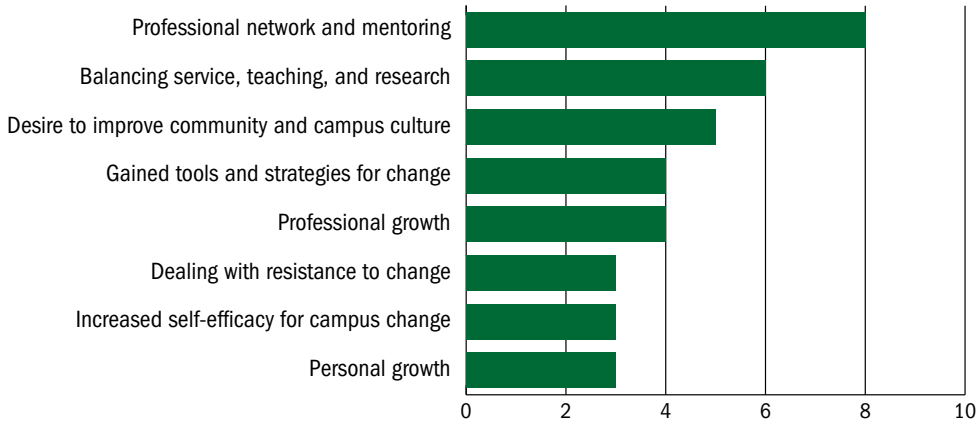
All of the participating HBCUs were selected on the strength of their applications. However, the selection committee was mindful of the cluster of HBCUs located in

North Carolina—the largest number of HBCUs (eleven) in any single state. Project leaders recognized the potential for synergy, and that potential was realized. While many of these campuses had previously existing connections, the PCFF project provided opportunities for participants to strengthen their ties at each gathering supported by the grant, which in turn strengthened the bonds between both public and private institutions within North Carolina and established new connections between these institutions and other participating HBCUs. Several PCFF participants from HBCUs outside of the state attended a faculty development symposium for women hosted by North Carolina A&T University, which allowed those individuals to broaden their professional faculty networks.

As noted in a previously published summary of project outcomes,

> Data collected on various program elements revealed networking to be among the most beneficial elements of participants' involvement [(see fig. 6)]. While participants cited other lessons that were reflected in the content of program activities, they found the opportunities for open-ended dialogue particularly powerful. Seasoned [STEM women faculty of color] provided practical advice about managing time and resources, using technology, and urging institutional leadership to hold all faculty accountable for student success. Meanwhile, participants shared their similar experiences with their cohort colleagues and affirmed each other's value as researchers who are … committed to ensuring that all students thrive. (Clayton-Pedersen 2015, 19)

FIGURE 6. Number of webinars where participants reported positive outcomes in relation to each theme[8]



PCFF offered a total of twenty-one webinars to participants across the three cohorts. This figure originally appeared in *Diversity & Democracy* (Clayton-Pedersen 2015, 19), and is reprinted with permission.

Other participants cited the importance of participating in PCFF for their leadership development. For example, one PCFF participant shared her reflections on leadership development and the lessons she learned through PCFF by indicating that

8 Readers are encouraged to read the spring 2015 issue of AAC&U's *Diversity and Democracy*, which focuses entirely on gender equity in higher education and is available online at www.aacu.org/diversitydemocracy/2015/spring. Readers who want more information about the benefits of the networking component on strengthening the agency of STEM women faculty of color will find the article by Alma Clayton-Pedersen (2015) particularly useful.

"working hard and doing what was required and regarded was insufficient [for me] to becoming a leader. Leaders are cultivated through networks of people.... Before coming to this project I did not know that I had to be this strategic about my career in order to climb the academic leadership ladder."

Examining the Leadership Gap between STEM Women Faculty of Color and Their Peers: Personal Challenges

Undervaluing one's own professional worth creates an additional barrier to leadership advancement. As previously mentioned, when first joining PCFF, many participating STEM women faculty of color undervalued their significance and experiences as educators and scientists, citing the pressures of stereotype threat; microagressions; the lack of exposure to, or awareness of, effective advancement strategies; and the scarcity of role models with shared experiences. We address these challenges below.

Data collected from the second cohort of participants revealed great diversity in the women's leadership aspirations. Twenty-three of the twenty-six participants in this cohort responded to a question about their aspirations. Of those responding, seven sought to receive formal recognition for teaching, research, and/or service. Five women aspired to academic leadership positions, while three others had leadership aspirations in their respective STEM professional societies. For five others, being a leading contributor to teaching and learning was important, with one woman writing, "I envision being recognized as a leading expert in minority student achievement [within] STEM." Three other participants sought to organize resources for faculty peers that would support and assist them in increasing their teaching effectiveness.

This snapshot of one of the three PCFF cohorts demonstrates that within the context of higher education, "leadership" has a broadly diverse range of possible meanings. While each of the women articulated aspirations for leadership, only five (19 percent) expressed an interest in formal academic leadership positions.

Low Aspirations and Undervaluing of One's Significance and Experience

When responding to an initial survey question that asked PCFF participants to identify their personal aspirations for disciplinary development, participants most often articulated goals related to "becoming a better educator to improve student success," "obtaining a teaching award," "becoming a leader in their discipline," "becoming a better researcher or a leader in research," "receiving a grant award," or "achiev[ing] tenure." Rarely did respondents state administrative aspirations, that is, the aspiration "to be a dean or department chair." As discussed by Gutiérrez and Lewis (1999), women of color often have less personal, interpersonal, and political power than their male or white counterparts. Moreover, Eagly and Carli (2007) found that women broadly, across all races, face challenges related to the perception of equal opportunity for both men and women; these perceptions ultimately lead change agents to approach problems in ways that do not account for the actual inequities in opportunity that exist.

Eagly and Carli posited that the glass-ceiling metaphor, although powerful, serves to perpetuate the idea that top-down forces must be responsible for change, thus ignoring or discounting the social and personal change that also needs to take place among all individuals, regardless of their positions within the institution. Top-down leadership may open up opportunities for women, but with prejudices continuing to exist across the institution, these opportunities ultimately may not increase the number of women in leadership positions. When coupled with the history of

oppressive forces that women of color have faced and continue to face, the perspective that existing prejudices will limit women's leadership, regardless of the support they get from the top, can shape these women's understanding of themselves, and subsequently their professional aspirations. Although not much has been published about black women's leadership in academia from a developmental perspective, the corporate literature provides some understanding of the barriers, stereotypes, and unconscious biases that exist (Morrison and von Glinow 1990).

In the PCFF project, evidence of the undervaluing of the significance of STEM women of color at HBCUs and/or of their experiences within the context of mainstream STEM higher education reform was most apparent when PCFF participants interacted with faculty from TWIs at AAC&U Network for Academic Renewal conferences. Non-PCFF STEM faculty appeared to be genuinely amazed that pedagogical techniques and strategies the PCFF women had implemented at HBCUs—often reflective of their own experiences as students—represented approaches that seemed to be new to their white counterparts.

Women of color have long navigated leadership hurdles as community organizers, participants in public service organizations, and leaders within faith-based organizations. Research focused on these examples of community-based leadership development can inform our understanding of the issues facing women of color in higher education, specifically in the STEM disciplines. Women of color traditionally have had significant experiences outside the academy, but have devalued their extra-professional community experiences. For example, Ngunjiri, Cramby-Sobukwe, and Williams-Gegner (2012) have discussed the prevalence of the "stain-glass ceiling," a metaphor for the limitations placed on women who were denied formal ordainment within religious contexts. Despite this barrier, some women went on to establish their own congregations. History is replete with examples of women leaders such as Harriet Tubman, Mary Jane McLeod Bethune, Rosa Parks, and Dorothy Height. At the time of their activism, these women were not acclaimed or "named" as leaders; yet they exhibited characteristic leadership traits, including tough strategic thinking, risk-taking, utilization of resources, and cross-cultural communication skills. Women of color in the academy continue to face difficulty in being recognized for or identified as effective in using these strategies as leaders. Collins (2000) helps us understand the dangers these women of color face, complicated by the intersection of race and gender as they balance and rebalance their varied identities and their access to success in the academy.

Women of color traditionally have had significant experiences outside the academy, but have devalued their extra-professional community experiences.

According to Leading Women,[9] an international consulting firm on gender equity, women of color in the corporate sector report that acts of assertiveness, confidence, and self-promotion have been mislabeled or misinterpreted as "angry," threatening, or non-collegial. This experience also was described by PCFF participants.

PCFF helped participants recognize the aforementioned traits of assertiveness and confidence, for example, as academic leadership strengths that the women should value and develop. The remaining challenge is for the institution to develop structures that prompt those who are in positions of power and decision-making to recognize and

9 Leading Women is a consulting firm "for companies committed to closing the leadership gender gap and achieving their goals for women's advancement." See http://www.leadingwomen.biz/about-us.

address the often implicit or unconscious biases that influence actions and decisions and act as barriers to leadership advancement for STEM women faculty of color.

Professional Stereotype Threat

Stereotype threat is often presented as a phenomenon occurring within student populations, experienced by both students of color and white women. But it is infrequently discussed as having continuing effects as these groups transition from student to professional status. And yet women, particularly women of color, frequently use terms such as "imposter "or "outsider" when describing their feelings of professional inadequacy. The internal struggle for self-confidence may be more deeply rooted at the intersection of race and gender than in gender alone. Women of color, particularly black women, who exhibit confidence through tone, posture, or mannerisms may be judged in work environments to be "angry" or "animated," when their self-expression simply represents a cultural variance in communication style (Gudykunst 2003). Eagly and Carli (2007) also found that women face a double bind in that when they behave in an agentic manner, they are seen as too aggressive. Conversely, if they appear to be too passionate about a topic, women are seen as overly feminine and unable to serve in a leadership capacity. This double bind holds true for self-promotional behaviors. Women are perceived negatively for such behaviors, while similar behaviors among men are seen as positive.

"Sponsorship," support from individuals in positions of power, was one of the most influential factors in African American women's success in navigating to positions of leadership.

Nonetheless, the internal struggle experienced by STEM women faculty of color does not vary significantly in description from the stereotype threat experienced by students. Describing their theory of stereotype threat, Steele and Aronson (1995) have posited that students from marginalized populations who are aware of the negative stereotypes of their group perform worse than students who either are not a part of this population or are not aware of these stereotypes. This notion has been discussed extensively as it relates to women and people of color in leadership by Sanchez-Hucles and Davis (2010), who identified barriers specifically related to gender and the intersection of gender and race.

PCFF participants indicated that they would be less likely to experience stereotype threat if they were in a numerical majority. However, according to PCFF participants, dynamics of power and privilege do play out in the STEM disciplines at HBCUs when the existing leadership predominately consists of international males from historically colonial cultures. For women of color, these dynamics add another dimension to the challenge of successfully navigating access to leadership. Davis's dissertation findings (Davis 2012, 163) showed that "sponsorship," support from individuals in positions of power, was one of the most influential factors in African American women's success in navigating to positions of leadership. Women aspiring to become leaders must expand their networks to draw on the expertise of others in their fields.

One participant recounted her feelings prior to her participation in PCFF, describing her experience as an assistant professor as "stressful." She reported that participation in the project increased her level of confidence and provided necessary tools to develop professionally. Indications of this change included reviewing proposals for and presenting at an AAC&U conference and publishing in an AAC&U periodical. Through the project, she recognized and combated the elements of

stereotype threat and used the networking opportunities, mentorship, and support to successfully navigate the tenure process and earn a promotion to associate professor.

Creating Culturally Sensitive Teaching Strategies and Professional Development

Research suggests that people learn best when the context is familiar. In other words, when a problem or a new concept is introduced using examples that students have encountered in their daily lives or in previous learning experiences, they can build new knowledge onto what they already know well. Most STEM knowledge can be very abstract, particularly for those from underserved populations or underresourced schools. Without ways to connect abstractions to their existing knowledge, students are less likely to learn the advanced disciplinary principles and skills needed for success. The principle of learning by building on existing knowledge applies to all aspects of our lives. And, though some advanced learning requires more complex foundational knowledge, all advanced knowledge requires some familiar foundation on which to build new knowledge (Bransford, Brown, and Cocking 1999).

If we are to develop a new, larger cadre of STEM professionals for all sectors of the workforce, including higher education, we must make STEM content more relevant to the increasing number of learners from the underserved and underrepresented populations that undoubtedly will constitute a significant share of the workforce of the future. Higher education leaders cannot afford to offer engaging, high-impact curricula solely or disproportionately to already-privileged populations with the hope of successfully creating the next generation of STEM professionals. Kelly Mack, AAC&U vice president for undergraduate STEM education, led a session at the AAC&U 2013 summer institute, which PCFF participants attended. She offered a rich example of culturally sensitive pedagogy in biology. She demonstrated how faculty can stimulate deep engagement in difficult concepts by consistently situating the problem in a cultural context.

Bringing knowledgeable speakers such as Kelly Mack to address faculty in STEM disciplines will aid those who seek to embed culturally sensitive pedagogy in the STEM curriculum and could enhance the teaching practices of the entire faculty. Women of color in STEM could lead efforts to infuse the curriculum with examples that resonate with students who have mainly experienced the curriculum as abstract and irrelevant to their lives. By capitalizing on the capacity of STEM women faculty of color to contribute to mainstream pedagogical development and innovation, all institutions of higher education can increase their capacity to offer culturally sensitive STEM curricula and create leadership opportunities for this cadre of faculty. Such practice would also position STEM women faculty of color to be leaders in the much-needed research on STEM teaching and learning, which is gaining greater recognition as an important component of good disciplinary stewardship. Moreover, by drawing on these women's expertise in advancing learning, institutions would be demonstrating what it means to make excellence inclusive for both faculty and students.[10]

Culturally sensitive pedagogy in the STEM curriculum could enhance the teaching practices of the entire faculty.

10 See Boyer (1991) on the scholarship of teaching.

Lack of Exposure to Effective Leadership Advancement Strategies

The pattern and style of leadership ascension that characterizes HBCUs is at a historical crossroads. These institutions' achievements have been buried in the politics of being underfunded by traditional sources (i.e., state allocations, federal grants, foundations, corporations, and private donors). Faced now with declining enrollments and increases in the actual costs of providing a world-class education—not to mention competition for students with TWIs—HBCUs are no longer able to succeed by "doing more with less." Yet, institutional leaders and faculty must increase their exposure to better strategic analysis, better resources supporting more contemporary pedagogical models, more efficient strategies for managing teaching and student advising loads, and stronger research collaborations. Naturally, disrupting existing traditions, cultures, and practices in the circumstances described above can be daunting.

Current trends among HBCUs include (1) the underrepresentation of women of color as institutional leaders compared to their representation among faculty members; (2) more international faculty in departmental leadership roles; and (3) little to no understanding of how to provide professional development for rising leadership. PCFF offered opportunities for cohort participants to access a variety of different resources. Yet, in some instances, the trends described above challenged participants' ability to apply lessons learned from their new experiences at their home institutions. In other words, PCFF participants were exposed to methodologies designed to expand their capacity for leadership advancement, but found themselves having to negotiate their new awareness within the old structures and customs at their campuses. This is not a challenge that is specific to HBCUs; it was also observed at TWIs during a project evaluating programs to increase diversity and inclusion of students and faculty at twenty-six California institutions (Clayton-Pedersen et al. 2007). Faculty of color generally cite limited availability of resources when queried about why they are not engaged in teaching or attending professional development activities focused on new pedagogies and innovations (e.g., workshops and innovations in student success modeling or freshman research experiences). Therefore, faculty may default to their own experiences as models for their teaching strategies. Overall, it is very difficult to interrupt usual patterns of behavior in American higher education.

Overall, it is very difficult to interrupt usual patterns of behavior in American higher education.

When it came to teaching and demonstrating leadership to students, a distinct commonality emerged among the STEM women faculty of color in the PCFF project. They often found themselves overburdened with advising students of color. The literature indicates that STEM women faculty of color at TWIs experience the same high demands related to student mentoring because students of color at TWIs also seek out their support as part of their survival mechanism (Patton and Harper 2003; Thomas and Hollenshead 2001). When considering the allocation of time to meet the demands of teaching schedules and burdensome advising loads, research expectations, and high personal standards for performance, it is clear that there might not be viable solutions to the challenge of balancing personal expectations and institutionally imposed expected outcomes. Interrupting a cycle of "doing what you have always done"—changing behavior strategically and effectively—requires opportunity, awareness, and resources. All these factors likely contribute to the challenging experiences of and resultant outcomes for STEM women faculty of color when it comes to administrative and institutional leadership opportunities.

Campus leaders can begin to address some of these issues with small professional development efforts. For example, during the PCFF seminar embedded in the summer institute, the initial two PCFF STEM women faculty of color from each campus team attended a one-hour session on multitasking in the midst of conflicting or unclear personal and professional priorities. This was different from the traditional time management activity. Women of color find themselves responding to multiple expectations—some explicit, others more implicit. These latter expectations may be set for certain faculty because they are the only women of color in a department. For example, STEM women faculty of color may be expected to "represent" the perspectives of "others," or to be role models for students who look like them. The exercise asked the women first to list their professional goals, then their personal goals, and finally their goals if they were told by their physician that they had just six months to live. They then compared and discussed their lists. The session not only focused on practical ways to manage time, but also demonstrated just how unbalanced participants' lives were—and for some, this was quite alarming. Most of the women realized that they had not pursued their personal goals as vigorously as their professional goals, and that better management of both would likely lead to greater success in both areas of their lives. Two to three years after their yearlong engagement in the PCFF project, many participants indicated the power of this activity.

Interacting with colleagues across campus is integral to developing agency in and out of the classroom as well as the leadership skills necessary for career advancement.

PCFF Women Taking the Lead

Many PCFF participants had very few teaching-related opportunities for professional development prior to their participation in the project. Their reports are consistent with Terosky, O'Meara, and Campbell's (2014) research, which indicates that interacting with colleagues across campus is integral to developing agency in and out of the classroom as well as the leadership skills necessary for career advancement.

PCFF participants found that participating in this project solidified for them that "leadership is not a function of position, rank, or title" and that their positions as STEM women of color should not preclude them from the mentorship and professional growth available to their other colleagues. As STEM women faculty of color, they found opportunities in PCFF that they did not have elsewhere. By participating in the project, they gained leadership skills as well as the confidence necessary to implement ideas on their individual campuses.

One participant highlighted the importance of collaborating with colleagues for enhancing her teaching practices. Referencing her first experiences teaching with a colleague, she stated:

> *[My colleague] and I made a great collaborative team where we held joint, weekly planning sessions to map out the course and invite guest lecturers such as professors from the social sciences and the psychology departments. We truly succeeded in making this class integrated and interdisciplinary.*

This participant drew on her experiences at the PCFF meetings to discuss the extensive ways in which the project enhanced her professional development. As she recounted:

> *The positive impact that PCFF has had on my professional development is more than I ever expected. Through the various meetings I've attended, I learned*

"best practices" to incorporate in my classroom. Right now, I am focused on finding ways to incorporate research within the classroom and to give students a mentored research experience on campus. I am thankful for all that PCFF has done to help me teach more effectively by giving me the tools to have an impact on student learning.

Her experience is indicative of the powerful ways in which PCFF enhanced the professional experiences of a significant number of people. By giving her the tools necessary to incorporate effective teaching strategies, PCFF also has shaped positively the experiences of the students in her classroom. Beyond that, her experiences working with her colleague in innovative, cross-disciplinary ways provided her with an opportunity to expand her expertise within her discipline. She described the PCFF project as having provided her with "an opportunity to view and learn from [her] colleague's teaching style, as well as learn how to look at a topic from someone else's perspective." She found the PCFF project to be an "invaluable tool" for her professional development, and cited the opportunity to network, teach, and collaborate with colleagues across different disciplines as integral to her success. Similar sentiments were expressed by other PCFF participants.

In addition to increasing the amount of collaboration across disciplines, PCFF faculty also reported seeing evidence of the benefits of experiential learning. Specifically, one participant found that students in her class "enjoyed the different types of health disparity models and they liked the fact that math was applied to real life situations." She continues to discuss how much of an effect the course has had in increasing interdisciplinary teaching, both within and outside of the STEM fields on her campus. Her narrative aligns with the research finding that experiential learning can be beneficial in supporting STEM students' aspirations.

In relation to leadership development, participants also found that the PCFF project enabled them to network with colleagues at different institutions, ultimately giving them the confidence to take on leadership positions at their own institutions. For example, one participant has experienced two leadership opportunities since first becoming engaged in the PCFF project in 2010 and consistently cites her participation as an integral factor in her professional development. Having been a part of PCFF, she was positioned to be accepted to the first class of the National Science Foundation-sponsored OURS Leadership Program hosted by the Chicago School of Professional Psychology (see appendix C for a brief description of the goals and purposes of this program). Her leadership development story is in part about the mentoring, coaching, and advocacy she received, and in part about the content of the PCFF sessions. Together, the two elements of the project have made a significant difference in both her teaching and her leadership skills. Hers is but one of many stories of the development of self-efficacy among the PCFF participants.

As a result of the project, she was able to develop a sense of agency as a faculty member.

Another PCFF participant also stated that the PCFF project has enhanced her leadership skills. She reported that "one of the greatest values of participating in PCFF has been the acquisition of emerging leadership skills and confidence building." As a result of the project, she was able to develop a sense of agency as a faculty member. This manifested in different ways, including when "[campus action plan team] members competed successfully for faculty research grants, gained greater 'visibility and voice' in their respective departments, sought opportunities to become more involved in decision making regarding pedagogy and learning within the disciplines, and

were appointed to [participate in] significant campus-wide initiatives." Overall, PCFF participants felt that participation in this project laid a promising foundation for "continuous emerging leadership development."

PCFF worked to position STEM women faculty of color for academic leadership advancement, both personally and structurally. As previously mentioned, opportunities for personal development were offered through the seminars, meetings, institutes, and webinars as well as through mentoring, coaching, advocacy, and championing. The structural elements were designed to highlight participants' emerging leadership capabilities, both at their institutions and nationally. For example, by requiring PCFF participants to lead the planning and implementation of their campus action plan, the project was designed to highlight these women's potential for campus leadership roles. Consistently offering these women opportunities to engage in the national dialogue on improving the quality of higher education generally, and STEM education specifically, exposed them to national higher education leaders.

CHAPTER THREE

Actions to Advance Equity for STEM Women Faculty of Color

Imagine that, as a consequence of equitable leadership advancement for STEM women faculty of color, there is a substantial increase in the number of female and male students from currently underrepresented populations succeeding in the STEM disciplines and pursuing professional and academic careers in these areas.

Imagine the institutional infrastructure—policies, processes, and practices—that would be needed to foster such changes to achieve these outcomes.

Imagine that HBCUs and women of color faculty in STEM disciplines are fully engaged and included in the national dialogue about transforming undergraduate STEM education.

To realize these visions, we must address the following questions:

- **What intervention models can help eliminate the gap in academic leadership?**
- **What aspects of the prevailing criteria, practices, and processes for faculty review, promotion, and tenure prevent leadership advancement of STEM women faculty of color in higher education?**

This chapter highlights actions that campus leaders can take at the structural, organizational, and institutional levels to recognize the substantial assets women of color bring to higher education and address the unique challenges that STEM women faculty of color face at all types of institutions. Addressing these uncommon challenges will require uncommon considerations. For example, the PCFF women have provided feedback about elements of the PCFF project that helped them combat the following: microaggressions; generalized undervaluing of themselves and their experiences by mainstream higher education; and lack of access to mentors, coaches, and sponsors. In addition, even the savviest women of color can be stymied when faced with powerful leaders, institutional structures, or campus cultures that block their ascension to leadership positions. Clearly, substantial barriers still exist, and higher education leaders are not fully developing and using all of the STEM faculty human capital available to address the nation's current and future challenges.

In this chapter, we shift our focus from STEM women faculty of color to all existing higher education leaders, suggesting actions they might take from their positions to structure faculty development to make excellence inclusive. Our analysis includes leadership by professional associations that serve faculty and their member institutions, as well as the senior faculty, department chairs and deans, and faculty colleagues who are key actors in STEM academic settings. Our recommendations also are designed to stimulate action by chief academic officers and presidents and to encourage both minority-serving institutions (MSIs) and traditionally white institutions (TWIs) to document their successes.

Topics of Concern for PCFF Participants

The STEM women faculty of color participants played an important role in setting the priorities of the PCFF project and determining the project's ultimate recommendations for change in institutional behaviors. Much of the interaction among PCFF

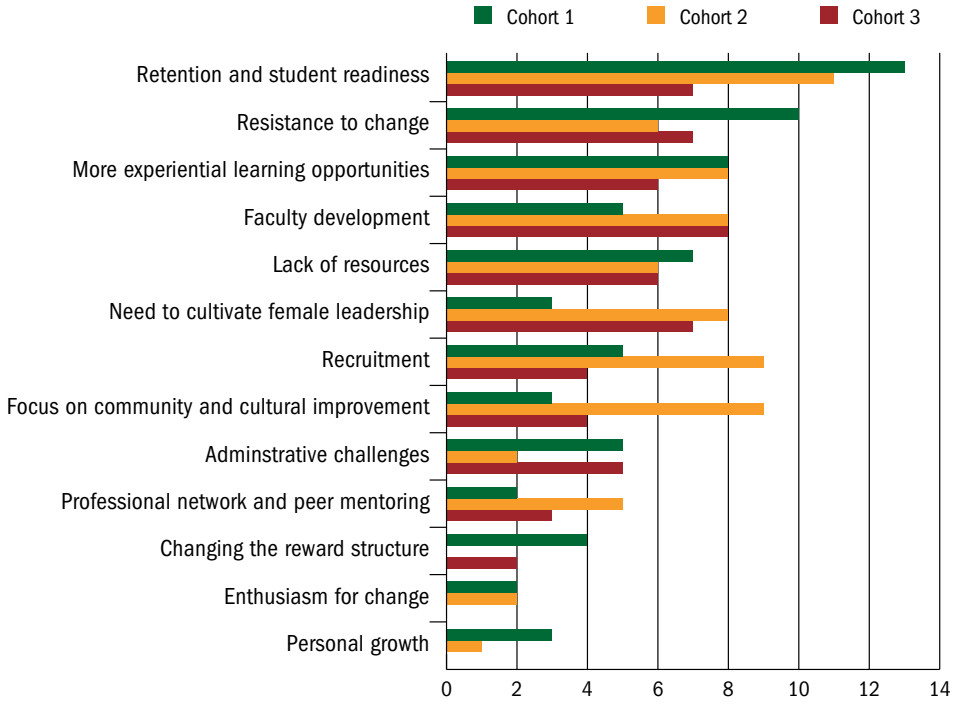
participants across the cohort groups was conducted via webinars. PCFF staff recorded, transcribed, and analyzed these webinars using software designed to capture themes. The webinar data became a rich resource for the focus and activities of the project as it unfolded. Figure 7 indicates the number of times during the twenty-one webinars when particular topics were discussed by participants across all three cohorts, disaggregated by the individual cohorts. It should be noted that reviews of other written discussions of important themes (applications and action plans) indicated that these STEM women faculty of color were focused primarily on their students' success, their limited resources, and the resistance to change that they encountered. Their own development had less prominence across the data sources, underscoring previous observations about how these faculty initially saw themselves positioned within academia more as teachers and advisors than as leaders and teaching innovators.

While no single pattern emerges from the data reflected in figure 7, there are some notable changes in topic emphases from cohort to cohort. For example, there was a decreasing focus across the three cohorts on the topics related to students and resistance to change, and an increasing focus on topics related to faculty development and recruitment of women leaders. These differences between the first and the latter two cohorts likely reflect the PCFF staff's increasing knowledge of participants' needs. That is, the earlier cohort's attention to their students may reflect the project's initial focus on the articulated goal of enhancing student learning and success through pedagogical change. As participants became more comfortable within their cohorts, interacting in safe environments and developing trust in project leadership and in each other, they began to express their concerns related to challenges beyond the preparation of their students, the limits of their institutions' resources, or their ability to present their research at disciplinary conferences.

Without a strong professional development program, it would not be possible to change traditional teaching strategies within their departments.

The women and the project leaders recognized that leadership development needed to become a primary focus of the project if it were to help the women shape and attend to improving their students' success. Without a strong professional development program, it would not be possible to change traditional teaching strategies within their departments, even if these particular women used more engaging pedagogical strategies. Unless PCFF participants gained greater leadership skills and confidence, systemic change did not have a chance of being realized. At best, changes would be limited to the participants' individual courses.

FIGURE 7. Number of times each subject was discussed in webinars, by cohort



At the final PCFF-supported professional development seminar in the fall of 2014, participants were asked to indicate what this project monograph should tell the higher education community. Consistent with the predominant themes reflected in figure 7, the women gave voice to their imaginings for the future: *We are only as powerful as we allow ourselves to be, not as others allow us to be. Confidence is key. We are not a stereotype, we are individuals with our own character and the world deserves to receive all we have to offer.… white institutions should collaborate with minority-serving institutions to address the issue of developing "STEMists" for the future. This is a joint effort, not a separate one. We are more than our discipline and therefore have an effect on society that is beyond our profession. Our input and output set the tone and direction of society, if we are heard.*

Actions That All Vested Parties Can Take

The challenges and issues identified above need to be recognized and addressed by all individuals and groups involved in higher education in order to positively influence the advancement of STEM women faculty of color across all higher education sectors.

Education about Unconscious Biases, Stereotypes, and Discrimination

The first and most harmful challenge involves the stereotypes and implicit biases that exist about women of color in STEM at HBCUs and in the academy generally. These perceptions diminish higher education's ability to fulfill America's unmet promise of equality (Witham et al. 2015). These stereotypes also undermine our nation's ability to fill the many existing gaps in human capital in the STEM fields, which are vital to fueling the nation's economy now and in the future.

Many people believe that they are gender-, income-, and color-blind. Yet, there is abundant research showing that everyone—regardless of race, ethnicity, country of origin, gender, sexual orientation, and religion, to name a few identifiers—holds unconscious biases (also called hidden and implicit biases) about others who are different from themselves (Greenwald and Krieger 2006). Unconscious or implicit biases help all of us more readily accept those who are like us over those who are not. In environments that are dominated by like-minded, like-looking, and like-acting people, those who are not "like us" can choose to accept being excluded or assimilate. But Scott Page's (2008) work suggests that such behaviors actually stifle rather than enhance the desired organizational attributes of creativity and innovation. Unless we address unconscious biases as a human characteristic, hiring will continue to proceed with these biases at play, with decision-makers continuing to hire "those who are like me" rather than taking action that promises greater equity in hiring results.

Unless we address unconscious biases as a human characteristic, hiring will continue to proceed with these biases at play.

The good news is that unconscious biases can be addressed effectively. The United States is comprised of generations of people from all other nations in the world. It is possible for us to use our broad diversity as a strength—rather than a challenge—by offering all sectors of the nation's workforce high-quality education about diversity, equity, inclusion, and the role that unconscious biases play in undermining our national productivity in all areas. The Office of Diversity and Equal Opportunity at the National Aeronautics and Space Agency (NASA) has developed a multimedia tool specifically for its higher education grantees to address these biases by linking diversity, inclusion, and equal employment opportunity (EEO) to underscore the connection between these important elements and their role in increasing the STEM workforce. With this tool, "Unconscious Bias in STEM: Addressing the Challenges,"[11] NASA seeks to raise awareness of the role that unconscious biases play in sustaining barriers to the advancement of historically marginalized populations and offers ways to address those biases. Such tools can be used broadly to increase the number of faculty and administrators who can become champions of women of color through increased awareness of how unconscious biases work. Nevertheless, while they are helpful, tools are not enough. Opportunities to enhance teaching strategies and professional development must accompany these efforts to raise awareness of evidence-based practices that lead underrepresented students to achieve success in the STEM disciplines.

What Higher Education Institutional Leadership and Stakeholders Can Do

While all stakeholders can take steps to address the unconscious and implicit biases outlined above, individuals and groups can influence change by taking specific actions based on the relative influence of their positions within and beyond the academy. The above NASA example highlights how small, relatively inexpensive efforts can have powerful results. Another low-cost action that institutional leaders can take emerged from the PCFF participants' experiences in building a safe and trusting environment. Such an environment places women of color in the company of similarly situated women of color. These venues have already been developed at the national level, but

11 "Unconscious Bias in STEM: Addressing the Challenges" is available at http://missionstem.nasa.gov/eLearn.html.

they can also be developed and sustained in regional professional communities like Project Kaleidoscope's regional networks and the Society of STEM Women of Color (see appendix D). These low-cost, high-impact opportunities offer knowledge and interpersonal interactions that bolster these women's self-efficacy, as well as professional networking that informs them of other opportunities to which they may not otherwise have access.

Below, we offer guidance for variously positioned individuals—faculty colleagues and postdoc supervisors, department chairs, deans and chief academic officers, presidents, and association professionals—to support the leadership of STEM women faculty of color.

Faculty Colleagues and Postdoc Supervisors

Foster a welcoming environment for fellow faculty and postdocs.
Encouraging historically underrepresented and underserved students and postdocs who pursue STEM disciplines to become faculty members will require faculty colleagues and postdoc supervisors to promote a more positive vision of the life of a faculty member, especially for faculty from underserved and underrepresented groups. STEM majors from these groups see firsthand how their own faculty struggle with being overworked and underresourced at both HBCUs and TWIs. Additionally, STEM majors see many STEM women faculty of color being overlooked and undervalued at TWIs and at HBCUs alike, to the point that many of these women internalize their marginalization and are further undercut by not being taken seriously by their colleagues. Yet, faculty colleagues may assume that there is little or nothing they can do, or feel they do not have a responsibility as stewards of their disciplines to support their women faculty of color colleagues. In these cases, it is unlikely that STEM women faculty of color will feel a sense of belonging in departments or disciplines. This is especially true for women who are "the only one" in their departments.

Invest in retaining postdocs of color.
Many PhD-producing HBCUs are committed to building a more diverse STEM workforce. Yet, neither they nor TWIs can continue to produce that workforce for higher education only to have their graduates mistreated at the postdoctoral stage of their academic careers. Postdocs have enough talent to leave faculty roles behind and assume more lucrative research careers in industry. Rather than attribute these exits to "a bad fit," higher education leaders must examine more robustly the reasons for this exodus. With the increasing withdrawal of federal and state support for public higher education, leaders at public and underresourced private institutions will do well to examine closely what they can do with the resources that remain available. They also should understand that developing all of their institutional talent will help them weather this financial storm better than simply increasing tuition and enrollments. Like industry, higher education should recognize and value a diverse workforce for the talents and perspectives it brings to the work and for the success it brings to the financial bottom line.

Recognize and value a diverse workforce for the talents and perspectives it brings.

Develop cultural competence in departments and programs.
As described by the Fresno State University President's Commission on Human Relations and Equity (2012),

> Cultural competence is the state of having and applying knowledge and skill in four areas: awareness of one's own cultural worldview; recognition of one's attitudes toward cultural differences; realization of different cultural practices and worldviews; and thoughtfulness in cross-cultural interaction. Over an extended period of time, individuals and organizations develop the wisdom and capability to (1) examine critically how cultural worldviews influence perceptions of power, dominance, and inequality; and (2) behave honorably within the complex dynamics of differences and commonalities among humans, groups, and systems.

If higher education hopes to have a broad diversity of faculty to serve as role models for all students, current men and women faculty of all races and ethnicities must develop the cultural competence to establish inclusive environments for STEM women faculty of color and other historically marginalized groups. This should be done not just for the sake of STEM women of color and disenfranchised others. It should be done to enrich the disciplines with new ideas originating with people whose lived experiences often foster perspectives that value inclusiveness and community as the natural order of things, and who can apply knowledge gained through their varied experiences to their disciplines and contexts.

Department Chairs

Encourage self-efficacy and provide leadership opportunities for women faculty of color. Department chairs are often viewed as having the most difficult leadership role in academia, especially by those who have held the position. The difficulty lies in marshaling the best talents of departmental faculty in balance with a critical understanding of the administrative constraints imposed on the department chairs by their institutions. They must now also guide the development of a twenty-first-century curriculum that better ensures high-level student learning and faculty advancement. In the resource-strapped environments of many HBCUs, these roles become particularly challenging. PCFF participants reported that STEM department chairs who are women of color at HBCUs and at TWIs experienced challenges from their male colleagues that they believe are related to gender, yet their male counterparts often see the same challenges as issues of academic freedom rather than issues of gender.

It is important for current department chairs to act as effective role models, mentors, coaches, and/or advocates and champions for STEM women faculty of color.

Being a department chair is most often an early step in climbing the academic leadership ladder. It is important for current department chairs to act as effective role models, mentors, coaches, and/or advocates and champions for STEM women faculty of color. At this level, modeling and coaching may be two of the most effective methods of preparing women faculty of color for leadership. Chapter 2 suggests some actions that department chairs and others could take to affirm the self-efficacy of women of color.

One suggestion made in chapter 2 was to assign meaningful responsibilities that enable these women to demonstrate their leadership acumen. For example, chairs can create limited leadership appointments that may be rotated among faculty, or they might consider delegating an area of their own responsibility within the faculty. These arrangements would incrementally expose faculty to academic management, which would in turn make them better leaders when management opportunities arise. The

downside to this approach, however, is that it requires commensurate reductions in faculty members' existing teaching, service, or research responsibilities. Otherwise, faculty will find themselves feeling burdened with "just one more thing"—with little ability to enjoy the experience of the leadership development activity.

Share and encourage professional development opportunities.
Communication about opportunities is a critical element of supporting leadership advancement for STEM women faculty of color. Advancement and support related to professional growth are harder to obtain when these women are alone in a department and are not within a network that regularly encourages professional development outside of their disciplines. For example, PCFF project staff found that many participants did not learn about the opportunity to participate in PCFF from their institutions' presidents or from STEM department chairs, to whom the Association of American Colleges and Universities (AAC&U) extended initial project invitations. Our expectation was that these leaders would communicate the opportunity broadly to all who might be interested. Some PCFF participants reported that they learned of the project from other women not in leadership roles. Nevertheless, participants developed institutional support for the application on top of heavy course workloads, advising duties, and research projects. Ultimately they were grateful for the opportunity to join PCFF, although their participation came at a personal expense.

Communication about opportunities is a critical element of supporting leadership advancement for STEM women faculty of color.

It would be inappropriate to draw assumptions about motivations from such incidents, because department chairs at all higher education institutions frequently are selective in sharing information among their faculty based on their own or their dean's priorities. However, when the total representation of women of color in STEM is so underdeveloped nationally, one would hope that equity-minded opportunities such as PCFF would be broadly welcomed.

PCFF staff observed that STEM women faculty of color in leadership roles at PCFF institutions (e.g., dean, chairs, and associate/assistant chief academic officers) were more likely to support women's notification and engagement and to be actively involved in the PCFF project themselves. For example, of the nine institutions that submitted applications strong enough to be selected to participate in the second phase of the project, seven (78 percent) included women of color as the senior administrator required to be a part of the team. Women of color administrators were critical team members in all institutions that implemented evidence-based teaching practices in the second phase of the work. This suggests that women administrators of color not only are essential for developing other women of color faculty, but also can be critical to successfully infusing effective, equity-minded teaching practices into the STEM curriculum.

Deans and Chief Academic Officers

Create a culture that values and rewards leadership and innovation around teaching and learning.
Among higher education leaders, deans are best positioned to design and establish mechanisms that encourage STEM women faculty of color to undertake increased leadership responsibility. Chief academic officers must champion such efforts and support their implementation to establish a culture where teaching and learning are valued broadly. If designed solely to focus on STEM women faculty of color, such efforts may inadvertently diminish the work and the women who participate. At the

same time, it is important to provide safe spaces where these women can discuss their challenges without fear of being perceived as less focused on their research.

Deans and chief academic officers usually are best able to lead the creation of structures that not only support teaching and service, but also elevate the value of teaching and service in the promotion and tenure processes. Faculty reward structures typically are focused on encouraging faculty to secure research grants and publish in refereed journals. Faculty reward systems largely attribute less importance to teaching acumen and service responsibilities such as advising. Attending to the value of these critical elements of student retention and completion in STEM might lead deans and chief academic officers to recognize that women of color faculty, especially those who are junior faculty, disproportionately fulfill these teaching and service roles. The value of teaching and service is particularly reduced at research extensive institutions, where most current faculty members pursue their terminal degrees. It is not surprising that the current faculty have carried the values of their doctoral institutions into their faculty careers, especially at TWIs, which make up the largest proportion of research extensive institutions.

Encourage and support professional development.

One lesson learned from the PCFF project is that there is a real need for continued, structured professional development at HBCUs. Faculty members depend on their colleagues or the internet for learning new teaching strategies, technology, or administrative processes. In the absence of resources to develop offices or programs that provide such professional development, innovative administrators might create networks for faculty to share disciplinary and interdisciplinary scholarship and/or learning related to student success methodology and pedagogy that may enhance faculty productivity and leadership ascension. The PCFF project cannot achieve its aspirations without structures that sustain participants' exposure to and recurring participation in pedagogical innovations and continuing professional development programs.

Deans and chief academic officers usually are best able to lead the creation of structures that not only support teaching and service, but also elevate the value of teaching and service in the promotion and tenure processes.

At the very least, administrators at these levels can support the engagement of STEM women faculty of color in grant-funded professional development opportunities offered through programs where the only resource required is the time to participate (even though that resource may be the most limited).[12] After participating in one of these programs, STEM women faculty of color can, and most do, share the lessons they have learned at program gatherings with other women faculty of color in STEM and other disciplines on their campuses. In fact, such sharing could be an expected, ongoing outcome for all faculty who participate in internally and externally funded professional development. Thus this strategy can strengthen both the individuals who participate and their home institutions.

Make mentoring students of color a shared, institution-wide responsibility.

It is critical for educators at HBCUs and TWIs alike to provide professional development for all faculty members so they can mentor, advise, and guide students' pathways to success, while also supporting their own success. The notion that women of color

12 Several programs exist that foster leadership and networking opportunities for women of color, including the National Science Foundations' Opportunities for Underrepresented Scholars, the Society of STEM Women of Color Conclave, and Understanding Interventions.

are the best or only advisors for students of color is misguided and unfair, yet also pervasive in higher education (Johnson-Bailey and Cervero 2004). Guiding all students toward success is a skill that white faculty and faculty of color must develop as the nation's campuses become more racially and ethnically diverse and increasingly predominantly female. Because STEM women faculty of color know all too well the need for mentoring, they are more likely to accept these roles at the expense of their own careers. This tendency can deprive women of color of opportunities for advancement because they accept responsibilities that should be shared (Crutcher 2006).

When it comes to mentoring, all students need both *windows* and *mirrors* in their learning experiences.

When it comes to mentoring, all students need both *windows* and *mirrors* in their learning experiences.[13] All students need people who look like them in faculty roles and other positions of respect and authority in order to envision themselves in those roles and to envision their own possibilities broadly. At the same time, students also need people who are different from themselves in such positions so that they have windows into different perspectives that can broaden their understanding of the world beyond themselves. It is unfortunate that the current state of American higher education offers students of color many windows but few mirrors, while providing white students with many mirrors but few windows. In these circumstances, neither group has the opportunity to develop the cultural competence they need to live in a twenty-first-century, global society. Indeed, research suggests that cross-cultural mentoring provides a context for better learning, not only among students but also among junior and senior faculty colleagues (Crutcher 2014).

In addition to cross-cultural mentoring, institutions can use a variety of strategies to make student success a shared responsibility while also increasing the number of mirrors that students may encounter. These strategies include advising faculty

> to direct students to the appropriate campus resources for support with issues such as finances, psychological stress, family responsibilities, and academic strengthening when needed. Staff providing these resources must be culturally competent to ensure that students feel encouraged instead of demeaned for seeking assistance. (Clayton-Pedersen 2015, 19)

By easing pressure on STEM women of color faculty to carry the entire load of supporting students of color, "robust networks of shared support for students of color in STEM would have the additional benefit of supporting [women of color] in their faculty roles" (Clayton-Pedersen 2015, 19). As Clayton-Pedersen has written elsewhere, "Imagine what our campuses would be like if institutions took steps to ensure that *all* faculty"—and, we add, all staff—"accepted responsibility for [facilitating] *all* students' success" (2015, 19).

Engage all faculty stakeholders in developing and implementing high-impact practices for better STEM learning.

Numerous government reports (e.g., Chen 2009; Fairweather 2008; Kuenzi, Matthews, and Mangan 2006) have supported the idea that improving STEM education is critically important, particularly for an increasingly technologically advanced and

13 Alma Clayton-Pedersen first encountered the metaphor of windows and mirrors during a personal conversation in 1997 with Felix Boateng, then the director of the Bishop Joseph Johnson Black Cultural Center at Vanderbilt University. Dr. Boateng indicated that he had learned the phrase from his community in Ghana, Africa. Its use here expands on Dr. Boateng's original description, but holds true to his meaning.

globalized society. It is imperative that US higher education institutions prepare a new generation of STEM professionals, including scientists, engineers, and mathematicians, to compete with their global counterparts. STEM women faculty of color surely will play a significant role in this effort.

STEM faculty want students who are well prepared for college-level work. But regardless of students' preparation level, the evidence-based, high-impact teaching practices advocated earlier in this publication can be implemented in all disciplines. Chief academic officers and deans should work together to communicate the value of robust teaching across the curriculum. It is unlikely that faculty will employ such practices without these leaders setting the expectation, linking the use of these practices to faculty and institutional excellence, and infusing implementation efforts into faculty reward structures.

Seek collaboration between TWIs and HBCUs to research and implement effective practices for engaging students of color in STEM.

Researchers from TWIs must partner with their counterparts at HBCUs to develop greater understanding of approaches that work to stimulate underrepresented students' interest in STEM. STEM retention research must be more than a series of fact-finding missions aimed at publication and acclaim. As criteria for securing their institutions' support for their research funding, researchers should be obliged to submit plans for how they expect their research to be useful beyond their own or their institutions' financial or professional recognition. Such a requirement may help researchers consistently translate their findings into context-specific institutional policies and effective practices. This is especially important in light of research that points to institutional context as a factor for retaining students historically underrepresented in STEM—the majority of whom attend TWIs.

Without attending to all these elements—diversity, equity, and inclusion—the institution will realize only modest advancements over time.

Presidents

Establish diversity, inclusion, and equity in STEM as a campus priority.

The college president is both blamed and admired in higher education, but the president's influence cannot be denied. Although it takes more than just a president's effort to shift institutional culture and retain stability, presidential leadership can shape institutional action during a president's tenure. Given current and anticipated demographic changes in the traditional college-going population, the presidential hiring process often requires candidates to engage with topics related to diversity and inclusion. Yet, for the most part, these conversations focus on the need to accommodate shifting student demographics; if they also touch on the need to increase faculty diversity, they may do so by focusing on the need for students to have role models. While, as mentioned above, all students need broadly diverse role models, presidents who articulate only this rationale for a diverse campus community miss the important role their leadership can play in creating inclusion and equity at every functional level.

Without attending to all these elements—diversity, equity, and inclusion—the institution will realize only modest advancements over time. Presidents must hold their chief academic officers accountable for instilling the values of diversity, equity, and inclusion throughout the campus academic community, without granting exceptions to those who generate high levels of grant funding—for example, faculty in the STEM disciplines. Presidents must use their influence to establish the paradigm that

diversity, equity, and inclusion has a place in the STEM disciplines—the argument that "science is science" notwithstanding—or there will continue to be a dearth of women of all races and ethnicities and faculty of color of either gender in STEM.

Associations

Intentionally create spaces for women of color to network, share, and develop as academic leaders.

As noted, AAC&U as an organization learned tremendous lessons from conducting the PCFF project. A central component of AAC&U's Centennial LEAP Challenge,[14] launched in 2015, is the call for all institutions to commit to equity and inclusive excellence. In connection with this call, the organization has developed resources for institutions to closely and comprehensively examine their policies, practices, and curricula to ensure equitable learning outcomes. AAC&U's actions include establishing greater intentionality in designing inclusive environments for women of color at our meetings, conferences, institutes, and other important venues that shape higher education. AAC&U's purpose is to enrich undergraduate liberal education for all students. Therefore, recognizing the important role of women of color and the unique challenges that block these women from serving the educational needs of undergraduates is an organizational imperative.

Higher education professional associations should pay particular attention to creating spaces within their professional development programming that invite STEM women faculty of color to engage with each other, and should be transparent about and committed to their reasoning for creating such spaces, regardless of challenges or pushback. For example, at the first PCFF seminar and meeting held in conjunction with an AAC&U meeting, all of the participating PCFF women sat together for the plenary sessions as a consequence of consecutive events in the same venue; they simply didn't change their seats when the seminar ended and a plenary session convened. A white conference attendee approached a PCFF staff member and said how great it was to have more women faculty of color at the meeting, but wondered why they all sat together and asked if it would not be better if they spread out. After she was told about the project, she was asked if she had noticed that all of the white faculty were sitting together as well. In this scenario, no offense was meant; and none was taken, as evidenced by the participant's gratitude for the productive forthrightness that followed. But the participant's initial comments reflect how "diversity" is often viewed. Diversity efforts are often seen as either offering resources to educate white people so that they can interact positively with people different from themselves, or are framed in terms of providing role models for students of color. In actuality, such programs are about creating safe, collaborative environments where all stakeholders—many of whom have been excluded historically—can engage in the learning process as equal contributors to each other's growth. Association leaders and staff must be proactive and prepared to engage in difficult teachable moments to achieve the benefits of effectively engaging diversity.

Association leaders and staff must be proactive and prepared to engage in difficult teachable moments to achieve the benefits of effectively engaging diversity.

14 An extension of AAC&U's Liberal Education and America's Promise (LEAP) initiative, the LEAP Challenge calls on colleges and universities to engage students in Signature Work that requires them to integrate and apply their learning to significant projects with meaning to the students and to society. A key element of the LEAP Challenge includes institutional commitment to equity and inclusive excellence.

The argument here is not that women of color should be in separate spaces, but that associations should intentionally create opportunities where these women can connect with other women of color as well as with larger groups of disciplinary faculty and administrative leaders. When STEM-focused higher education associations recognize a lack of racial diversity among their members, they need to accept responsibility for facilitating opportunities for people of color to make these connections, for all of the reasons laid out in this and previous chapters.

AAC&U seeks to use this monograph to raise awareness across the higher education community, increasing understanding of the challenges that STEM women faculty of color face and providing guidance about how to address these challenges across all higher education contexts.

Conclusion

Why is it important to continue examining the issues addressed in this monograph?

The PCFF project found that STEM women faculty of color participants often had limited leadership aspirations while simultaneously shouldering a disproportionate responsibility to serve as mentors and advisors to students who look like them. Because women faculty of color often have had experiences similar to those of their students of color, they have strong commitments to these students' success. The PCFF project experience provided participants with opportunities to realize and pursue leadership as well as the recognition that they could actually better assist their students' success by advancing educational practices that work for STEM learning on an institutional level.

These STEM women faculty of color also revealed the structural, personal, and institutional challenges that often isolate them, even at HBCUs. The structural challenges are related to pervasive social perceptions of women and people of color, as well as perceptions about the intersection of these two identities. Research related to women of color in leadership positions has demonstrated that people often attribute these women's ascension to leadership to affirmative action, solely based on their identities as women of color (Turner and González 2011). Participants viewed their personal challenges as largely a result of structural challenges related to the intersection of race and gender. These challenges were exacerbated by the institutional challenges of limited resources, and were heightened when the faculty member was the only American-born person—male or female—within her department, even at an HBCU, creating another kind of challenge related to cultural dynamics.

The PCFF project was designed to support STEM women faculty of color at HBCUs—to advance their success as leaders in their respective STEM disciplines, as effective teachers in the classroom and lab and as academic leaders on their campuses and in their disciplinary societies. The project offered resources and networking opportunities to address discipline-related challenges that block participants from achieving greater success. Turner and González (2011) have suggested that opportunities for women faculty of color to connect and network can ultimately help them navigate their experiences and provide them with an inside perspective on the challenges they face. Ultimately, recognizing these challenges and realizing that they are not unique to specific individuals can spark larger conversations about STEM women faculty of color, equity, and inclusiveness. Such conversations should continue among PCFF participants and their colleagues across all institutional types.

By attending to elements of these women's experiences as well as to institutional policies, practices, and reward systems in higher education, we can improve undergraduate STEM education across all higher education sectors—not just at HBCUs. By engaging in PCFF activities and other projects focused on STEM women of color, the seventy-two participants began addressing these challenges, albeit some more successfully than others. Through the PCFF project, all of the participants became linked to professional networks for women of color in which they continue to engage today.

Finally, a key component of the PCFF project was to expand, sustain, and evolve practices that increase the number of underrepresented students who enroll in college, persist, and complete STEM degrees. The project's focus on HBCUs was intentional, because HBCUs are a significant part of the equation when it comes to increasing the

number of underrepresented students in STEM. As such, they should be significant contributors to the dialogue about how to address the national challenge of developing one million more STEM graduates (PCAST 2012). These PCFF participants and their HBCU institutions have demonstrated many successes in the face of significant challenges. Yet, too often, despite their records of success, both STEM women faculty of color and HBCUs are excluded from the national dialogue about how to transform our institutions and increase the number of college graduates in STEM and other fields.

As the nation strives to provide quality education to more diverse students and to produce more STEM graduates to meet societal needs, higher education leaders must draw upon the valuable lessons learned from the success of HBCUs. The STEM women faculty of color in PCFF demonstrated leadership actions, resources, and strategies ranging from faculty classroom innovations for engaged student learning to scaling innovations through formal programmatic positions at middle and top administrative levels that could influence policy and decision-making on a broad scale. Higher education faculty and administrators, at their own risk, too often ignore or fail to cultivate the critical leadership, experience, and insights of these women of color in meeting the goal of a quality education for all students. Now is the time to act on the evidence of what works to achieve inclusive excellence and to initiate the multi-layered changes that support achievement of equity and quality.

Coda

The Association of American Colleges and Universities (AAC&U) will continue to tell the stories of HBCUs and institutions of other types, as well as the stories of STEM women faculty of color, on our website and in our other publications. These sources will also include additional evidence of how PCFF and its successor (PCFF2), as well as AAC&U's Project Kaleidoscope STEM initiative, continue to support project participants' and other STEM women's ascent to leadership positions and enhance their effect on their students' learning and their institutions' vitality.

APPENDIX A

Participating PCFF Institutions

Alabama State University
Albany State University
Alcorn State University
Benedict College
Bennett College
Bethune-Cookman University
Bowie State University
Central State University
Coppin State University
Dillard University
Edward Waters College
Hampton University
Howard University
Jackson State University
J.F. Drake State Technical College
Lane College
Lincoln University
Livingstone College
Morgan State University
North Carolina A&T State University
North Carolina Central University
Paine College
Prairie View A&M University
Southern University and A&M College
Southern University at New Orleans
Spelman College
Tennessee State University
Texas Southern University
Tougaloo College
Tuskegee University
University of Arkansas at Pine Bluff
University of Maryland Eastern Shore
University of the District of Columbia
Wiley College
Winston-Salem State University
Xavier University

APPENDIX B

High-Impact Educational Practices

First-Year Seminars and Experiences

Many schools now build into the curriculum first-year seminars or other programs that bring small groups of students together with faculty or staff on a regular basis. The highest-quality first-year experiences place a strong emphasis on critical inquiry, frequent writing, information literacy, collaborative learning, and other skills that develop students' intellectual and practical competencies. First-year seminars can also involve students with cutting-edge questions in scholarship and with faculty members' own research.

Common Intellectual Experiences

The older idea of a "core" curriculum has evolved into a variety of modern forms, such as a set of required common courses or a vertically organized general education program that includes advanced integrative studies and/or required participation in a learning community (see below). These programs often combine broad themes—e.g., technology and society, global interdependence—with a variety of curricular and cocurricular options for students.

Learning Communities

The key goals for learning communities are to encourage integration of learning across courses and to involve students with "big questions" that matter beyond the classroom. Students take two or more linked courses as a group and work closely with one another and with their professors. Many learning communities explore a common topic and/or common readings through the lenses of different disciplines. Some deliberately link "liberal arts" and "professional courses"; others feature service learning.

Writing-Intensive Courses

These courses emphasize writing at all levels of instruction and across the curriculum, including final-year projects. Students are encouraged to produce and revise various forms of writing for different audiences in different disciplines. The effectiveness of this repeated practice "across the curriculum" has led to parallel efforts in such areas as quantitative reasoning, oral communication, information literacy, and, on some campuses, ethical inquiry.

Collaborative Assignments and Projects

Collaborative learning combines two key goals: learning to work and solve problems in the company of others, and sharpening one's own understanding by listening seriously to the insights of others, especially those with different backgrounds and life experiences. Approaches range from study groups within a course, to team-based assignments and writing, to cooperative projects and research.

Undergraduate Research

Many colleges and universities are now providing research experiences for students in all disciplines. Undergraduate research, however, has been most prominently used in science disciplines. With strong support from the National Science Foundation and the research community, scientists are reshaping their courses to connect key concepts and questions with students' early and active involvement in systematic investigation and research. The goal is to involve students with actively contested questions, empirical observation, cutting-edge technologies, and the sense of excitement that comes from working to answer important questions.

Diversity/Global Learning

Many colleges and universities now emphasize courses and programs that help students explore cultures, life experiences, and worldviews different from their own. These studies—which may address U.S. diversity, world cultures, or both—often explore "difficult differences" such as racial, ethnic, and gender inequality, or continuing struggles around the globe for human rights, freedom, and power. Frequently, intercultural studies are augmented by experiential learning in the community and/or by study abroad.

Service Learning, Community-Based Learning

In these programs, field-based "experiential learning" with community partners is an instructional strategy—and often a required part of the course. The idea is to give students direct experience with issues they are studying in the curriculum and with ongoing efforts to analyze and solve problems in the community. A key element in these programs is the opportunity students have to both apply what they are learning in real-world settings and reflect in a classroom setting on their service experiences. These programs model the idea that giving something back to the community is an important college outcome, and that working with community partners is good preparation for citizenship, work, and life.

Internships

Internships are another increasingly common form of experiential learning. The idea is to provide students with direct experience in a work setting—usually related to their career interests—and to give them the benefit of supervision and coaching from professionals in the field. If the internship is taken for course credit, students complete a project or paper that is approved by a faculty member.

Capstone Courses and Projects

Whether they're called "senior capstones" or some other name, these culminating experiences require students nearing the end of their college years to create a project of some sort that integrates and applies what they've learned. The project might be a research paper, a performance, a portfolio of "best work," or an exhibit of artwork. Capstones are offered both in departmental programs and, increasingly, in general education as well.

APPENDIX C

Overview of NSF OURS Program

The Opportunities for Underrepresented Scholars (OURS) leadership program is the outcome of a $2.2 million grant from the National Science Foundation (NSF) with the purpose of increasing gender diversity in the STEM academic leadership ranks at both historically black colleges and universities (HBCUs) and tribal colleges and universities (TCUs). Through the acquisition of leadership skills, women participating in the program are expected to become more competitive for senior leadership positions within these institutions. Upon the completion of each yearlong program, the fellows receive a Post-Graduate Certificate in Academic Leadership from The Chicago School of Professional Psychology and will be positioned to assume leadership positions in higher education, up to and including the level of president.

This program was created to increase equitable outcomes for women seeking to advance to academic leadership at these minority-serving institutions. According to recent statistics, HBCUs represent less than 3 percent of US colleges and universities, and yet they graduate approximately 17 percent of all African Americans who acquire undergraduate degrees. With respect to TCUs, these institutions enroll 7.8 percent of Native American students despite the fact that they represent less than 1 percent (in fact 0.82 percent) of all US institutions of higher education, and less than one-third of 1 percent of four-year institutions, according to the American Indian Higher Education Consortium (AIHEC).

By supporting women in the STEM disciplines, especially women of color, in realizing their leadership potential, OURS is expected to help ensure that STEM students and faculty will benefit from the skills, wisdom, breadth of experience, and unique perspectives that women academic leaders will provide.

For more information, see http://www.thechicagoschool.edu/nsfours-program.

The text in this appendix was provided by NSF OURS and is published here with permission.

APPENDIX D

Overview of Society of STEM Women of Color

The goal of the Society of STEM Women of Color, Inc. (SSWOC) is to ensure that all women in the academic STEM disciplines, particularly those from historically marginalized populations, attain professional liberation—the freedom to pursue one's professional goals to the extent of one's own aptitude without externally imposed limitations. Using cultural, structural, and disciplinary sources of authority to produce new knowledge on intersectionality theory, the society seeks to develop a community of practice for radical social change in the academy, enhance self-efficacy and leadership attributes, provide creditable resources, and create and disseminate new knowledge.

With generous funding from the National Science Foundation and the Henry Luce Foundation, the SSWOC partners with GPRA Strategic Management, Inc., to host an annual Conclave® that provides a unique opportunity for women and men of all racial and ethnic backgrounds to examine the intricacies of intersectionality theory and the lived experiences thereof, contribute to an expanding body of knowledge, and shape the national discourse on STEM faculty diversity in higher education. The Conclave provides a continual and deliberate focus on deeper insights into other relevant career development theories, practices, and purposes related to achieving the highest stages of power and utilizing them for whole career-life equilibrium and advancement. Race-gender intersectionality, as well as feminist and womanist epistemologies, are also explored at the Conclave.

For more information, visit http://www.sswoc.org.

The text in this appendix was provided by the SSWOC and is published here with permission.

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About AAC&U

The Association of American Colleges and Universities (AAC&U) is the leading national association concerned with the quality, vitality, and public standing of undergraduate liberal education. Its members are committed to extending the advantages of a liberal education to all students, regardless of academic specialization or intended career. Founded in 1915, AAC&U now comprises more than 1,300 member institutions — including accredited public and private colleges, community colleges, research universities, and comprehensive universities of every type and size. AAC&U functions as a catalyst and facilitator, forging links among presidents, administrators, and faculty members who are engaged in institutional and curricular planning. Its mission is to reinforce the collective commitment to liberal education and inclusive excellence at both the national and local levels, and to help individual institutions keep the quality of student learning at the core of their work as they evolve to meet new economic and social challenges.

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