



# Fostering the Professional Advancement of Minority STEM Faculty at HBCUs

► **Mohammed A. Qazi**, Professor, Department of Mathematics, Tuskegee University  
**Martha Escobar**, Associate Professor, Department of Psychology, Oakland University

**M**ost workers in the coming decades will be expected to exhibit proficiency in science, technology, engineering, mathematics (STEM), and related fields. The STEM professoriate at American colleges and universities plays a critical role in preparing the twenty-first-century workforce to face these challenges. The STEM faculty role is twofold—they must dispense knowledge to students through instruction and contribute to innovations that advance science and benefit society (Lane 2008). Like any sector of the workforce, ideally the professoriate would resemble the country’s demographics. Unfortunately, this is not what is found at most institutions of higher education. As a result, talent from individuals from certain underrepresented racial and ethnic minority groups (URMs) cannot contribute to STEM academia. This seriously limits diversity of thought and reduces the likelihood that science will address the needs of all segments of society. Additionally, the low representation of URM faculty in academia results in few role models for students of color, who often turn to faculty who look like them for mentoring and support (Benitez et al. 2017).

African Americans, Hispanic Americans, Native Americans, Alaska Natives, Native Hawaiians, and Native Pacific Islanders constitute 30 percent of the US population, yet account for only 9 percent of STEM faculty at US colleges and universities (National Center for Science and Engineering Statistics 2017). However, overall underrepresentation of minorities in STEM academia is only one aspect of the issue. Even when members from URM groups enter careers in academia, many do not appear to advance in the professorial pipeline at the same rate as individuals from non-URM racial and ethnic groups. Figure 1 presents the propor-

tion of science and engineering faculty holding academic positions at assistant, associate, and full professor ranks in 2014. The expectation is that, as faculty advance through tenure and promotion, the proportion of full professors (the terminal status of professorial careers) should exceed that of associate professors, which in turn should exceed the proportion of assistant professors. That is, if most assistant professors attain tenure, the number of associate professors should increase and, if associate professors continue successfully advancing their careers, there should be an accumulation of full professors that consistently grows at the same pace as the size of the professorial workforce. However, White faculty are the only group that seems to follow the expected progression from assistant to full professor (fig. 1). This trend is reversed for African American faculty, the majority of whom are employed at Historically Black Colleges and Universities (HBCUs) (Strauss 2015). This may be due, in part, to institutional factors at HBCUs that are not conducive to STEM faculty advancement. For example, it is well known that faculty appointments at most HBCUs are characterized by (1) high teaching, advisement, and service responsibilities; (2) an absence of mentors; (3) a lack of peer collaborators; (4) inadequate access to research laboratories; and (5) little or no funds provided to start or supplement a laboratory, hire research assistants, or obtain supplies (Fields 2000; Jackson 2002). These institutional factors are compounded by external factors such as the persistent underfunding of HBCUs relative to predominantly White institutions (PWIs) (Shorette 2015). This negatively affects the scholarly productivity of HBCU STEM faculty, consequently reducing their success in obtaining tenure and promotion.



The literature on factors that facilitate or impair the advancement of early-career URM STEM faculty at HBCUs is very sparse. A recent report (Quality Education for Minorities Network 2016) outlines the minimum conditions necessary for scholarly productivity among early-career URM STEM faculty at HBCUs, but strategies to promote this productivity and ways to implement them have not been developed on any scale. It may also be financially prohibitive for HBCUs to implement strategies to eliminate or even mitigate the factors and practices that negatively impact the advancement of their faculty. Yet, there is an urgent need to propose meaningful and sustainable ways to support these faculty members for tenure and promotion immediately after they are hired.

### THEORETICAL FRAMEWORK

Most tenured African American faculty are found at HBCUs, and up to two-thirds of HBCU faculty are URMs (Gasman 2013). However, most of the current research on the conditions that determine the advancement of URM faculty has investigated their experiences at PWIs, not HBCUs (Frazier 2011). There are valuable reports that outline what is needed to support early-career faculty at HBCUs (Fields 2000; Jackson 2002; Quality Education for Minorities Network 2016), but there is a need to

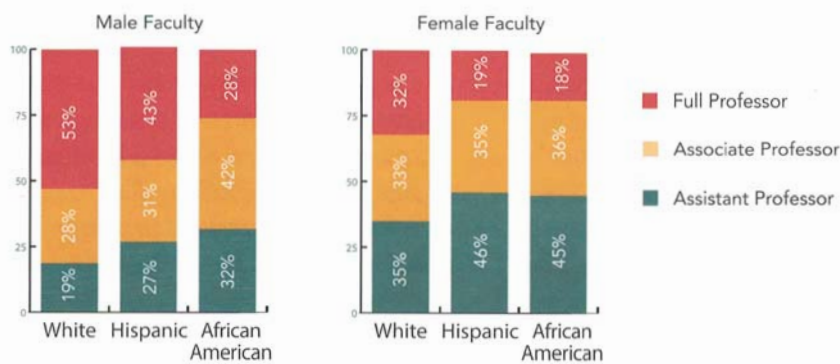
characterize why there is such variability in the success of early-career faculty in the HBCU environment. Early-career faculty may have unclear ideas of what is expected of them for tenure and promotion and may have difficulty adapting to the productivity expectations of their institutions, a problem very prevalent for URMs, at least at PWIs (Tillman 2001). Some interventions appear to facilitate the advancement of early-career faculty within different institutional settings and disciplines. They include, for example, strong networks of support within and outside the institution (Salazar 2009), formal mentoring by successful URM faculty (Tillman 2001), and networking with others who can provide advice (West-Olatunji 2005). However, a systematic model that incorporates these variables, along with explicit support for STEM research productivity, has not been investigated within the context of the challenges (outlined above) that are known to exist at HBCUs.

### IMPLEMENTATION

In 2018, to help address these gaps in knowledge about URM faculty development, the National Science Foundation Alliances for Graduate Education and the Professoriate (AGEP) awarded \$2.6 million to an alliance in the Southeast to establish the AGEP Historically Black

Universities Alliance: A Model to Advance Early-Career Minority Faculty in the STEM Professoriate. Like all AGEP projects, this alliance of Tuskegee University, Jackson State University, and Tennessee State University—three research-focused HBCUs with thriving STEM programs—is designed to increase the representation of URMs in STEM academic careers by developing intervention-based models to mitigate difficulties faced by URMs with STEM academic aspirations at all stages of their professional development. The alliance also includes a knowledge-generating partner (Oakland University) and the Department of Energy National Laboratories. The alliance has proposed the Pathways for Advancement and Tenure at HBCUs (PATHs) model, which is composed of interventions to be implemented and evaluated at the three HBCUs (to better link it to the model it proposes, the alliance is known as the PATHs Alliance). Over the course of five years, the PATHs Alliance will recruit eighteen URM STEM faculty members (PATHs fellows) across the alliance who are within their first three years of appointment, to participate in a series of interventions—including a three-year residency program—designed to provide the support they need to successfully obtain tenure and promotion at their home institutions. Findings from these interventions will inform recommendations for how HBCUs can change policy and practice to better support their early-career URM faculty.


FIGURE 1. PROPORTION OF ASSISTANT, ASSOCIATE, AND FULL PROFESSORS IN SCIENCE AND ENGINEERING BY RACE/ETHNICITY AND GENDER (2014)



Due to rounding, numbers may not add up precisely to the totals.

### KEY INTERVENTIONS OF THE PATHS MODEL

In their report, the Quality Education for Minorities Network (2016) made thoughtful recommendations to foster the professional growth of early-career STEM faculty members at HBCUs. Consistent with these recommendations, PATHs proposed an intervention-based model that focuses on promoting research produc-



tivity of early-career faculty and adopting wellness strategies to assist them in coping with the challenges present at HBCUs. An outline of these interventions is provided below.

### The Grantsmanship Institute

Early-career STEM faculty at PATHs institutions are expected to show evidence of grant-writing success in tenure and promotion applications. A survey of STEM faculty at PATHs institutions revealed that many early-career faculty members find the prospect of seeking external funding intimidating and find it difficult to prepare applications in parallel with their teaching, advising, and service obligations. Some specific challenges included finding appropriate solicitations, assembling a suitable team of collaborators, preparing applications for institutional research compliance committees, and finding time to prepare proposals. A few of the nation's HBCUs have well-staffed offices of sponsored programs that assist with proposal preparation, but the majority of HBCUs do not have staff that can serve this function (Coleman and Matthews 2011). To address this need, PATHs has developed a grantsmanship institute around an ambitious cloud-based proposal preparation platform, HBCUs Networking to Energize Transformation (HBCU-NET). HBCU-NET is a network of interconnected partners that will provide constructive, progressive, and structured support to help PATHs fellows develop research ideas into competitive proposals. HBCU-NET will help match fellows with teams, which are composed of individuals from institutions across the country who have a history of successfully attaining awards. Fellows will work closely with their teams, to develop and refine research proposals for submission to funding agencies. The institute will provide workshops to assist fellows in preparing other proposal requirements (e.g., budget and research compliance). Thus,

the grantsmanship institute integrates the functions of a mentor and a traditional office of sponsored programs into a unified intervention.

### The National Laboratory Research Program

One of the challenges that early-career faculty face at HBCUs is the lack of access to adequate laboratory space, equipment, instrumentation, and graduate research assistants at their institution (Quality Education for Minorities Network 2016). This lack of resources can compromise their success in scientific research and reduce their interest in continuing in academia (Smart 1990). Focused interventions can help ameliorate the barriers that early-career faculty may encounter at HBCUs and create a support network that may extend beyond the institution. To that end, the National Laboratory Research Program will enable each PATHs fellow to spend summers at a national laboratory. Fellows who become visiting researchers at these centers will have access to cutting-edge resources to initiate and continue high-caliber research and will be able to allocate the majority of their effort to research, which highly correlates with research productivity (Bellas and Toutkoushian 1999).

### Faculty Quality of Life

Productivity is closely linked to motivation, which is, in turn, associated with job satisfaction (Smart 1990). It is critical that young faculty members acquire a balance between the many demands of their work responsibilities and their personal goals and interests. URM faculty at HBCUs have traditionally expressed student-oriented service motivations (e.g., serve as a role model for the next generation) and fulfilling this motivation may be important for their quality of life (Benitez et al. 2017). However, it may also be detrimental to their research productivity (Bellas and

Toutkoushian 1999). To help faculty navigate these issues, PATHs will hold workshops focusing on three main issues: effort allocation (e.g., time management, balancing teaching and research); establishing and managing a successful research team; and maintaining work-life balance.

### EXPECTATIONS FOR THE PATHS PROGRAM

The PATHs interventions will be assessed to determine the extent to which they help develop an academic community that serves to support early-career faculty on their path to tenure and promotion. During their PATHs residencies, all fellows are expected to submit at least two proposals to an external funding agency, become a visiting researcher at least once in a partnering national laboratory, and successfully achieve tenure and promotion. Although it is out of the scope of the program to change the institutional variables that may create difficulties for early-career faculty's progression to tenure and promotion, the model is expected to provide an infrastructure that will allow faculty to overcome the barriers known to affect faculty at HBCUs, thus increasing their chances of continuing in productive academic careers and achieving tenure and promotion. The knowledge-generation component of this program will identify the variables that increase or reduce early-career faculty's motivation to progress in their academic career, as well as the personal factors that determine job satisfaction and commitment to academia.

### CONCLUSION

Senior faculty members and other leaders in the HBCU community must commit to initiatives that provide academic and social support to their young faculty as they navigate the difficult tenure-track years. The AGEP program provides excellent opportunities to this community to form alliances and develop models based



on strategies to increase the number of early-career URM STEM faculty who successfully advance through tenure and promotion. Alliances among two- and four-year HBCUs, as well as among HBCUs, PWIs, and external agencies, can provide the resources needed to at least partially address the challenges that URM STEM faculty face on these campuses. Regardless of the type of alliance, the commitment of HBCUs to support their young faculty scientists should be as far-reaching as the dedication that these same faculty show and the compromises they make to prepare their students (Gasman 2013).

For any AGEP structure to be successful, the partners should be carefully selected to ensure they are committed and can meaningfully contribute to the development and implementation of the model. In the case of the PATHs program, the alliance partners were selected based on a long history of successful collaborations in STEM research and education. Intervention models should also seek to interfere minimally with the central mission of HBCUs, which is to prepare students through mentoring and instruction. For example, the National Laboratory Research Program intervention may prove to be beneficial to participating faculty fellows in terms of research production and the long-term outlook of their own career, but their time away from the institution may immediately interfere with teaching and mentoring of undergraduate and graduate students. To find a proper balance, the home HBCU institutions must commit to the development of long-term goals for their faculty members while implementing measures to address the short-term issues that may ensue, such as providing mechanisms to cover assigned classes and continued supervision of graduate students. In the long term, faculty development will benefit the institution, so this commitment

should be viewed as an investment in the institution's future.

An important broader impact of the PATHs Alliance will be the outcomes of its research investigation focused on social science, which will add to the literature and help strengthen future models for the development, advancement, and retention of URMs at research-focused HBCUs, such as the members of the PATHs Alliance. There is great need for other HBCUs in different settings (e.g., two-year, four-year) to also propose ambitious research-based models specifically tailored to these institutions' contexts to promote the professional growth of their early-career URM STEM faculty and contribute their findings to the knowledge base. The insights gained by the lead author's participation in the Center for the Advancement of STEM Leadership's first residency program helped the PATHs Alliance shape the proposed interventions and gain awareness of the leadership level needed to implement them. ■

#### ACKNOWLEDGMENTS

This work is supported by the National Science Foundation through the Alliances for Graduate Education and the Professoriate (AGEP) Program, grants number 1820981 and 1820961; and through the Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP). The authors also wish to thank Kelly Mack and Claudia Rankins for offering thoughtful suggestions on this manuscript.

#### REFERENCES

Bellas, Marcia L., and Robert K. Toutkoushian. 1999. "Faculty Time Allocations and Research Productivity: Gender, Race, and Family Effects." *The Review of Higher Education* 22 (4): 367–390.

Benitez, Michael, Mary James, Kazi Joshua, Lisa Perfetti, and Brooke Vick. 2017. "Someone Who Looks Like Me": Promoting the Success of Students of Color by Promoting the Success of Faculty of Color." *Liberal Education* 103 (2): 50–55.

Coleman, Toni, and Joan Matthews. 2011. "Black Colleges Step Up Pursuit of Sponsored Research." *Diverse Issues in Higher Education*, January 6, 2011. <https://diverseeducation.com/article/14582/>.

Fields, Cheryl D. 2000. "Can HBCUs Compete for Black Faculty?" *Black Issues in Higher Education* 17 (20): 39.

Frazier, Kimberly N. 2011. "Academic Bullying: A Barrier to Tenure and Promotion for African-American Faculty." *Florida Journal of Educational Administration and Policy* 5 (1): 1–13.

Gasman, Marybeth. 2013. *The Changing Face of Historically Black Colleges and Universities*. Philadelphia: Penn Center for Minority Serving Institutions, University of Pennsylvania. [http://repository.upenn.edu/gse\\_pubs/335](http://repository.upenn.edu/gse_pubs/335).

Jackson, David H. 2002. "Attracting and Retaining African American Faculty at HBCUs." *Education* 123 (1): 181–185.

Lane, Neal. 2008. "US Science and Technology: An Uncoordinated System that Seems to Work." *Technology in Society* 30 (3/4): 248–263.

National Center for Science and Engineering Statistics. 2017. *Women, Minorities, and Persons with Disabilities in Science and Engineering*. Special Report NSF 17-310. Arlington, VA: National Science Foundation.

National Research Council. 2005. *National Laboratories and Universities: Building New Ways to Work Together: Report of a Workshop*. Washington, DC: National Academies Press. <https://doi.org/10.17226/11190>.

Quality Education for Minorities Network. 2016. *A Research Mentoring Guide for Early Career STEM Faculty at HBCUs*. [http://static1.squarespace.com/static/57b5ee7d440243ac78571d0a/t/57b57b35016e14742baf25/1471883190911/PDM\\_MentoringGuide.pdf](http://static1.squarespace.com/static/57b5ee7d440243ac78571d0a/t/57b57b35016e14742baf25/1471883190911/PDM_MentoringGuide.pdf).

Salazar, Carmen F. 2009. "Strategies to Survive and Thrive in Academia: The Collective Voices of Counseling Faculty of Color." *International Journal for the Advancement of Counseling* 31 (3): 181–198.

Shorette, C. Rob, II. 2015. "Black Colleges." *Inside Higher Ed*, January 15, 2015. <https://www.insidehighered.com/views/2015/01/15/essay-why-historically-black-colleges-matter-because-they-serve-black-students>.

Smart, John C. 1990. "A Causal Model of Faculty Turnover Intentions." *Research in Higher Education* 31 (5): 405–424.

Strauss, Valerie. 2015. "It's 2015. Where Are All the Black College Faculty?" *Washington Post*, November 12, 2015. <https://www.washingtonpost.com/news/answer-sheet/wp/2015/11/12/its-2015-where-are-all-the-black-college-faculty/>.

Tillman, Linda C. 2001. "Mentoring African American Faculty in Predominantly White Institutions." *Research in Higher Education* 42 (3): 295–325.

West-Olatunji, Cirecie A. 2005. "Incidents in the Lives of Harriet Jacobs—A Reader's Theatre: Disseminating the Outcomes of Research on the Black Experience in the Academy." In *Black Education: A Transformative Research and Action Agenda for the New Century*, edited by Joyce E. King, 329–340. Mahwah, NJ: Erlbaum.