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Voices

What Needs to Change in Academia to Increase the Number of Black Scientists and Engineers?

Invest in Your Trainees



Bryan Bryson
Massachusetts Institute of Technology

I am a firm believer in the power of mentorship and sponsorship. I also recognize that there are cultural barriers around these practices that make it sometimes difficult to do this in a multicultural setting, but mentorship is an essential component in investing in the success of our trainees. As my former department head once advised me, “get to know your trainees as people.” This includes those trainees from backgrounds different from our own. Evaluating, customizing, and adjusting our mentoring style to fit our trainees’ needs and professional aspirations should be common practice.

I also think we need to stop invoking the K-12 pipeline as the sole source of all our challenges in cultivating a diverse community of academics. I remember coming to college and having more Black people in my STEM-related classes than I ever had before. Saying that Black people who are qualified for academia don’t exist is erasure. We need to collectively do the work to raise the visibility of our diverse pool of trainees. We need to track their successes and continue to encourage them as they move from college to post-graduate training. We also need to learn from those universities that have been successful in recruiting a diverse faculty and from those universities that help contribute to a more diverse graduate community.

Build a Scientific Identity



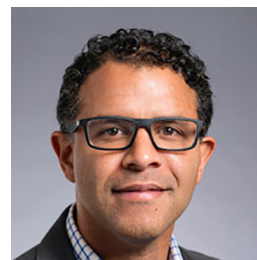
Casey Overby Taylor
Johns Hopkins University

More opportunities to develop a scientific identity are needed to increase the number of Black scientists and engineers. Developing a scientific identity is a predictor of who will continue on to graduate school in STEM (<https://doi.org/10.1187/cbe.17-04-0066>). The first step to building a scientific identity is being aware of STEM communities you may aspire to join. I was fortunate to learn about and be exposed to research in bioinformatics early on during undergrad. This, along with academic mentorship, enabled me to pursue a concentration in bioinformatics for my Bachelor of Science.

But I often felt uncertain I *belonged* in STEM. This experience is common among Black students who report finding it hard to position themselves and be seen by others as authentically scientific (<https://doi.org/10.1002/tea.20237>). For me, participating in summer research during high school and undergrad and the training experience in graduate school helped overcome such uncertainties. The early-summer research provided the catalyst for awareness of STEM communities, and the later training provided the collegiality and mentorship to help me see myself as *part* of a community of scholars.

Organizing summer programs that help students build a scientific identity is not a new idea, and many strong programs with high-quality research experiences and mentorship exist. My hope is that pathways to such opportunities for Black students, in a variety of STEM areas, will grow in number to foster and increase scientific aspirations among Black students.

It’s up to the Faculty



James Carothers
University of Washington

I am a tenured associate professor at the University of Washington running a research group in RNA synthetic biology. I benefited from terrific advisors in graduate school (Jack W. Szostak at Harvard) and as a postdoc (Jay D. Keasling at UC Berkeley). At UW, I have had smart, hard-working students and postdocs and great collaborators, and I’ve been the lead PI on > \$5M of NSF, DOE, and industry grants. I love the work we’re doing, and it’s going very well. Many more Black people could thrive as academics. Here are three changes faculty could make that would really help:

Use better ways to evaluate impact. Research shows that typical measures for evaluating teaching (student evaluations) and research (e.g., citation counts, speaking invitations) are imprecise and routinely undervalue women and minorities. The continued overreliance on these biased measures is demoralizing—and possibly illegal. We should use approaches that are more rigorous and fairer for everyone.

Make diversifying science and engineering everyone’s job. It’s an old saw, but the task too often falls to already-overburdened women and minorities.

Senior researchers should hold institutions, journals, and funding agencies accountable. Recently, my PhD advisor joined 14 others in resigning from the board of *Angewandte Chemie* to protest an anti-diversity screed it published. Imagine if everyone showed this kind of conviction!



Steps to STEM Inclusivity

Tyrone Porter
Boston University

Other than minority-serving institutions, the education system in America was never designed for Blacks or any person of color, leading many to perceive predominantly white institutions as inhospitable and unwelcoming. Unfortunately, for too many Black students in STEM disciplines, this perception becomes a reality. Due to the appallingly low number of Black students and faculty in STEM departments, Black students tend to feel alone and unsupported. Moreover, the curriculum and the textbooks are written to highlight the accomplishments of prominent White scientists and engineers. If Black students do not see Black faces in the classroom or in the course material, then it's VERY difficult to identify as a scientist or an engineer.

Another impediment is the rising cost of a college education. The American Council on Education reported in 2019 that Black students leave college with a higher debt per borrower on average than students from other ethnic groups. Academia and society need to take steps to topple these barriers. Universities need to hire more Black Americans for faculty and leadership positions. States need to allocate more funds to public universities to increase the affordability of college education. Additionally, universities need to create an inclusive climate and teaching pedagogy that is more welcoming to students of color and fosters culture competency throughout the university. In short, achieving the stated goal will require a fundamental change in how we fund and support Black STEM students.

Support and Accountability

Samira Musah
Duke University

In stem cell biology and bioengineering, we often investigate and adjust the tissue culture environment when cells do not grow, differentiate, or function the way we envision. Similarly, we must create appropriate conditions or environments to cultivate excellence in people. Many Black scholars are passionate about science and cannot imagine life without it. However, when an environment is filled with a cloud of bias, discrimination, and harassment, it becomes exceedingly challenging to maintain enthusiasm for science within that space.

Indeed, many Black scholars might have reached their positions by overcoming unthinkable challenges. Academic institutions must ensure that these scientists and engineers feel supported in inclusive ways that enable them to focus on excellence. In implementing these practices, there must be consistency in actions at all institutional levels if we all are genuinely willing and committed to cultivating talent from all corners.

The bystander effect is also a huge problem in academia. Most people know the right things to do; whether they care enough or feel empowered to act determines their response. I recently received “Bystander to Upstander” training, which equipped me with tools and strategies to promote a culture in my lab of holding each other accountable for our behavior, whether consistent or contrary to our values. I hope that every academic institution provides this type of training to all students and employees. The more people we have with appropriate intervention skills, the better we can build academic communities that have fewer bias and harassment incidents.

A Son of Redlines

Corey J. Wilson
Georgia Institute of Technology

Three brothers, black males, one murdered, one incarcerated—one unscathed (me). Three cousins, black males, two incarcerated—one with his liberties intact (me). Six siblings, only two completed high school—one being me. I remember, when I was 4 years old, walking to the store with my sister and being scolded for picking up a hypodermic needle someone used to inject heroin... and we lived in the better part of my neighborhood. This is the legacy of redlining, compounded by mass incarceration. If you do not know what redlining is, look it up. Purportedly, redlining ended in 1968; however, it is still the birthright of many black Americans. My early life experience is the product of this legacy.

So, when people ask me “what was the hardest part of my academic journey?”, I tell them “getting here to begin with.” Studies suggest that success in STEM correlates with a student’s experience and exposure in middle school—my first positive experience with STEM was in college, in the form of a calculus course. From that moment, academia (STEM) was a sanctuary for me—once I realized it was an option. After college, I finished graduate school (PhD) in 3 years with 10 published papers and started my position as faculty 2 years later. Ending the legacy of redlining is synonymous with fixing the “pipeline” for increasing the number of black scientist and engineers.

The Will to Act Now



Warren L. Grayson
Johns Hopkins University

Neither the protests in response to the slaying of George Floyd nor the lived experiences that gave rise to these protests are new. Systemic racism and the subjugation of Blacks are deeply engrained in the American narrative and have, by extension, contributed to sustained under-representation of Black people in STEM. “Solutions” to provide equal opportunity toward a gradual reversal have been implemented for decades but, while they have helped a few, they have not enabled proportional representation in STEM. Additionally, these changes have not been coupled with transformations to institutional cultures and biases that would provide welcoming environments. Consequently, the very small percentage of Black people hired into elite academic institutions are often marginalized, taxed with being the representatives of their race, and expected to assimilate into the predominant culture.

Effective change cannot and should not be gradual. It requires a radical implementation of proposed solutions toward enacting proportional representation now. In the academy, these would necessarily include cluster hires via target of opportunity pathways along with support systems to facilitate their long-term growth particularly as it pertains to building the collaborations needed for successful grant funding and promotion. COVID-19 has revealed to us that implementing drastic (and possibly uncomfortable) adaptations are immediately possible in dire existential situations. The race situation in STEM is dire and requires drastic action now.

The Next Generation



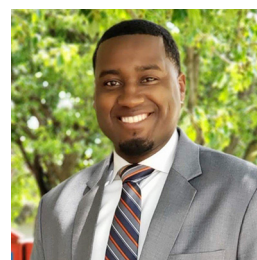
Aaron Streets
University of California, Berkeley

After watching white police murder a Black man, again, it can be challenging to imagine how, as academic scientists, we might address a problem that is so horrific yet entirely systemic in our country. Naturally, we think of our students first, and ask how we can provide support. However, we quickly realize that most faculty have no idea how to relate to issues of racism and have little shared experience with our students of color.

This lack of diversity in STEM faculty is at the core of our national dilemma. It is both a symptom of historic racism in our country and a cause that perpetuates the system. When most Americans see a Black person, they do not see a scientist or an engineer. They do not see a doctor, a programmer, or a tech entrepreneur. This is because when they look at the faculty of our most “prestigious” universities, in the highest reaches of the ivory tower, they do not see Black people.

This is a 400-year-old issue, and the problem is not the applicant pool. Instead, it is the systematic failure of an outdated recruitment pipeline. To fix this, we must first acknowledge that the ivory tower is no more meritocratic than Wall Street. Where you go to school still matters more than the education you receive. Impact factor still matters more than your impact. Because opportunity is not evenly distributed, we need more Black voices in STEM to control the spotlight. We need more channels to highlight the next generation of Black faculty. We have some solutions, and we need your support.

Representation and Allyship



Derrick Scott
Delaware State University

I am a Black Man from the Lowcountry of South Carolina. Even though my county is mostly Black, I did not have a Black teacher until middle school. From kindergarten until I earned my Ph.D., I only had one African American teacher in the sciences. This lack of representation is suffocating to young minds who are already on the fringes of science. At Virginia State University, a historically black university (HBCU), I met my first Black science teacher. He planted the seed of “*If he’s a scientist, maybe I can be one too.*” Representation is power.

I completed my M.S., Ph.D., and post-doc while seeing few students and no professors that looked like me. I soon realized that I could make an impact by cultivating intellectuals at a HBCU. This led me to teach at Delaware State University where I develop research and programs that help employ students as scientists or go on to earn graduate degrees.

However, this is not enough. No social change has happened in this country without the help of White allies. Allyship is recommending a Black researcher to chair a session at a conference. It’s suggesting a Black reviewer on journal submissions. It’s inviting a Black speaker to give a talk. These actions lead to opportunities that produce successful tenure packages. These scientists then become flames that attract young scientists to do it too. In short, we must open the door wider and actively welcome young Black scholars to enter academia while embracing and supporting our Black scholars who are already in the room. We are here. Find us.

Enough



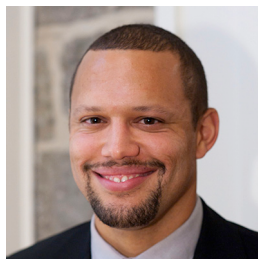
David Van Valen
California Institute of Technology

America has never dealt with its original sin of slavery. Our current racial climate is the fallout from centuries of false moral existence, in which American academia has played a large part. The ideas we promote and the people we elevate determine our present and future conditions. As the last few weeks have shown, America—and by extension its academy—cannot continue to exist without repairing this injustice.

To move forward, we must dispense with the false and harmful notion that individual and systemic racism are borne out of naivete or ignorance. Rather, they are learned, calculated, and deliberate methods for directing resources to White Americans - both men and women - at the expense of the direct descendants of American slavery and other minoritized groups. We must also diversify our scientific workforce with a speed that matches the urgency of the current moment and ensure the safety of all minoritized workers by eliminating the toxic, racialized culture that is pervasive in academia. All institutions must look inward and perform honest assessments of their racial climate, including anonymous surveys of the Black experience. Safe avenues of reporting must be established and repeated perpetrators of racial abuse at all levels of seniority need to be removed and not rehired. Lastly, institutions of all forms must commit significant financial resources to recruit, train and retain black workers. Funding agencies should fund people rather than institutions so these workers can live near their communities.

Statements in the absence of meaningful change ring hollow. While the opportunity to usher in long needed changes in science and our broader society now exists, we must remember that failure remains an option. Only now, failure could mean the end of the American experiment.

Faculty Preparation Programs



Douglas Densmore
Boston University

Increasing the representation of Black scientists and engineers in academia is a complex challenge, requiring nuanced discussion with many stakeholders. Targeted education and recruitment, such as my own experience as a UC Chancellors Postdoctoral Fellow at UC Berkeley, can be beneficial. I feel, however, that intervention at the postdoctoral stage is much too late and acting earlier would more effectively increase representation. Universities should specifically identify late-stage undergraduates and actively recruit them to Ph.D. programs as part of a “faculty accelerator” track that prepares them for faculty jobs at the same institution.

This multifaceted program would include: education on preparing for the academic job market, a meaningful connection to junior and senior faculty as academic career path mentors, and a regular review of progress toward becoming a faculty candidate (e.g., publications, speaking engagements, grant writing experiences). It would proactively introduce the candidates to the departments they would be hired into early so that they essentially transition from Ph.D. candidate to a colleague with existing grants and research connections in place. These applicants would not count against existing faculty hiring slots, thus incentivizing universities to hire their own graduates. Universities would be expected to believe in both their graduates and the training program.

I am not naive to the potential stigma and resentment this type of program might produce. However, if managed correctly this would become a more rigorous “fellows” program that could fit in existing portfolios of many academic programs. Not only is the pipeline larger but the result of a “failure” is still a Black student with a graduate education.