

REVIEW

NIH's scientific approach to inclusive excellence

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Email: hannah.valantine@nih.gov**Abstract**

The representation of women and scientists from underrepresented groups (URGs), including Black/African Americans, Hispanic/Latinx, Pacific Islanders, and American Indians, diminishes as individuals advance in their careers from training to senior leadership positions. Correcting this imbalance requires integrated strategies to achieve inclusive excellence within the scientific workforce reflected by creating and sustaining environments, in which diverse talent thrives. The National Institutes of Health (NIH) Scientific Workforce Diversity office has led the charge to develop and implement evidence-informed interventions toward achieving this goal that undergirds NIH's mission to improve the nation's health. Past and current efforts aiming to enhance workforce diversity but targeted to individuals are necessary but insufficient for lasting change. Thus, NIH-funded institutions should develop and prioritize integrated, systems-targeted efforts as foundational components of a well-supported, productive workforce. At the heart of these endeavors is institutional accountability that ties progress toward inclusive excellence to institutional values and reward systems.

KEYWORDS

diversity, inclusion, scientific workforce

1 | INTRODUCTION

Extensive research supports the argument that scientific workforce diversity is essential to accomplish the National Institutes of Health (NIH) mission for discovery and innovation toward improving human health.^{1,2} While numbers of individuals from racial/ethnic underrepresented groups (URGs) pursuing biomedical careers have risen substantially over the past decade, representation of women and URG scientists among faculty and leadership remains a recalcitrant challenge that reflects decoupling of the trainee and faculty talent pools (3, Figure 1). For example, women

comprise more than half of PhD graduates in NIH research-relevant disciplines, but only 42% of tenure-track faculty, 26% of tenured US biomedical faculty,⁴ and only about one-third of principal investigators (PIs) on NIH-funded research (R01-equivalent) grants.^{5,6} The gap is even greater for URG scientists. According to 2019 data from the National Science Foundation (NSF) Survey of Earned Doctorates, currently, the URG PhD recipient pool in the United States is 15%, but only 7% of current assistant professors and 5% of tenured faculty. Moreover, URG representation lags among applicants and recipients of NIH research grants (fewer than 2% of all PIs on NIH-funded

Abbreviations: DSP, Distinguished Scholars Program; FIRST, Faculty Institutional Recruitment for Sustainable Transformation; IRP, Intramural Research Program; NEC, NIH Equity Committee; NIH, National Institutes of Health; NRMN, National Research Mentoring Network; NSF, National Science Foundation; PI, principal investigator; URG, underrepresented group.

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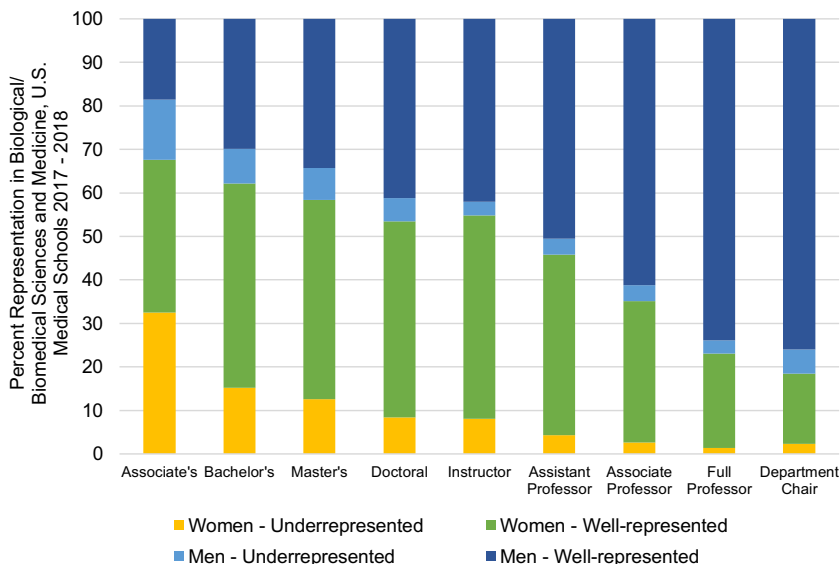


FIGURE 1 Diminishing representation of women and underrepresented racial and ethnic groups in biological or biomedical sciences and medicine. Underrepresented racial/ethnic groups include: Black or African American, Hispanic, Native Hawaiian or Other Pacific Islander, American Indian or Alaskan Native. Well-represented racial/ethnic groups include: White, Asian. “Two or more races” and “non-resident alien” categories not shown. Degree level (Associate's, Bachelor's, Master's, and Doctoral) obtained from US Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Fall 2017 and Fall 2018. Academic appointment (Instructor, Assistant Professor, Associate Professor, Full Professor, and Department Chair) obtained from Association of American Medical Colleges Faculty Roster, 2018

research awards are Black/African Americans and fewer than 4% are Hispanic/Latinx). Diversifying academic faculty and leadership remains a top NIH priority for catalyzing excellence in research quality, including assuring that our research agenda addresses the full range of biomedical research challenges that face our nation. Herein, I describe NIH's scientific approach to achieving inclusive excellence and call upon institutions to contribute to the culture change that will be required to do so.

2 | AN INSTITUTIONAL APPROACH TO ACHIEVING INCLUSIVE EXCELLENCE

Over the past decades, most diversity programming from NIH and other biomedical funders has been framed around efforts directed to individual students and faculty, through research experiences, mentoring, financial assistance, and other concrete actions to recruit and retain diverse talent into biomedicine. More recently, the \$500 million nation-wide Diversity Program Consortium is currently using a scientific approach to understand and mitigate barriers to recruitment and retention of biomedical trainees, toward informing the design of future programs. The initiative, now in its second phase, has already yielded important knowledge about successful strategies for attracting and retaining diverse talent in a wide variety of contexts.⁷

These investments to enhance scientific workforce diversity—mostly targeted to individual students and faculty—have been productive and essential for progress, but it is clear that to achieve sustainable change, it is now necessary to apply systems-level methods to create scientific environments reflective of inclusion and equity (Table 1). These include systematic review of hiring and promotion procedures and policies; transparency via collecting and publicizing aggregate diversity metrics; committed resources and diversity tools; continual evaluation of impact; and an action plan to combat systemic racism. Toward achieving the type of institutional shift needed for systems change, NIH developed the NIH Scientific Workforce Diversity Toolkit, a free, downloadable interactive resource of integrated solutions that institutions can adopt to achieve inclusive excellence.⁸ The toolkit guides users through evidence-based inter-related activities, described briefly below, that must be paired with oversight and accountability, and tied to reward systems for staying power.

2.1 | Mitigating bias

Bias is pervasive throughout society, including in science and medicine. It is reflected by attitudes, behaviors, and actions that are prejudiced in favor of or against one person or group compared to another. Implicit bias occurs automatically and unintentionally, since it is rooted in stereotypes and it begins early in life. A 2017 study showed that as early as 6 years of

TABLE 1 NIH strategies to create inclusive excellence

Strategy	Features
Diversify talent pool	Holistic, unbiased recruitment searches to identify a diverse applicant pool, trans-NIH searches; outreach to communities enriched with URG scientists
Mitigate implicit bias	Bias education: raise awareness and provide strategies to mitigate behaviors (workshops, online modules, case studies, computer simulations)
NIH Equity Committee	Transparency and accountability for diversity and inclusion metrics; identify and eliminate equity gaps; link success to institutional reward systems
NIH Distinguished Scholars Program	Build self-reinforcing community of IRP researchers committed to diversity, inclusion, equity, mentoring, and sponsorship; foster culture change
NIH Climate and Harassment Survey	Use survey results to design new anti-harassment interventions, prevent incivility, modify supervisor behaviors to create supportive and inclusive climates
NIH Anti-Racism Action Plan	Acknowledgement Black/African American scientists' distress and empower allies to report and punish acts of racial bias, expand research on health effects of systemic racism, objectify promotion and hiring criteria

age, girls are less likely than boys to believe that members of their gender are “really smart” and begin to avoid activities associated culturally with being smart.⁹ Implicit bias is infused within biomedicine, with measurable effects on scientific careers of women and URG scientists.¹⁰ For the most part, stereotypes drive this behavior. A 2016 study, for example, concluded that based on looks alone that feminine women are less likely to be judged as scientists and more likely to be judged as early childhood educators.¹¹ Implicit bias in health-care settings as well has also been well-documented.¹²

As these and many other examples and studies have shown, the effects of implicit bias on judgments, decisions, and behaviors can pose a significant barrier to recruiting and retaining a diverse scientific workforce. At NIH, we have identified and promoted best practices to mitigate cognitively based biases. Implicit-bias educational modules have been shown to mitigate gender bias,^{13,14} and NIH has implemented bias education NIH-wide. We have also promoted the use of tools to: (i) identify candidates from diverse backgrounds, (ii) ensure selection committees are diverse, (iii) write position descriptions carefully so they do not contain words or phrases that deter URG scientists from applying, (iv) develop objective criteria for positions, and (v) use structured interviews that are uniform from one candidate to the next. Other approaches intended to combat bias more generally include featuring images or photographs that counter stereotypical notions of who achieves success¹⁵ and encouraging individuals to speak up as “bias interrupters” when bias is experienced or observed¹⁶

or shifting perspective by imagining what it is like to be a person who experiences people questioning your ability or skills because of your social identity.¹⁷

2.2 | Diversifying the talent pool

Identifying diverse talent, whether at the senior/leadership level or at the early-career level, depends upon conducting a systematic, unbiased approach, extending beyond personal/professional networks which may provide limited diversity of individuals. Since 2010, NIH has employed trans-agency searches to identify candidates for the prestigious Earl Stadtman Search for Intramural Research Program (IRP) scientific positions. Casting a wider net compared to Institute-specific searches has had a measurable impact on the IRP's diversity metrics. In addition, NIH has developed a recruitment search protocol that gathers bibliometric and other qualitative data from highly qualified scientists from diverse backgrounds working in various scientific fields. This search protocol is being used by NIH leadership and search committees to help increase the diversity of the NIH applicant pool.

2.3 | Mentoring

Part of the Diversity Program Consortium, the National Research Mentoring Network (NRMN) has been put into

place at NIH-funded institutions to match junior investigators with established peers via grant-coaching workshops to address the R01-funding gap among URG scientists. NRMN is also having broader impact by creating a platform for matching investigator mentors with URG student mentees, across institutions. This innovative, tailored approach to culturally sensitive mentoring offers opportunities for discussing racism and being prepared to help mentees address it, as well as connecting mentees with professional networks to set them up for success. Decentralized programs like NRMN are likely to be especially important as the 2020 COVID-19 pandemic persists and imposes career harms to biomedical trainees everywhere.

2.4 | Creating a welcoming environment

The NIH Distinguished Scholars Program (DSP) aims to build a more inclusive community within the NIH IRP by reducing the barriers to the recruitment and success of URG scientists. The program recruits a cohort of up to 15 researchers from diverse backgrounds each year and provides them with mentoring and other professional development activities that foster research and career success. Importantly, selection for the program is competitive, based upon outstanding accomplishments both in scientific research and in promoting diversity and inclusion. Since its inception in 2018—and combined with the impact of trans-agency searches that deepen the talent pool—the DSP has contributed to a dramatic increase in URG representation within the IRP. Hispanic/Latinx and Black/African American scientists now make up 13% of NIH's tenure track investigators. Based on promising initial results, NIH has recently expanded the DSP concept nationwide, through the Faculty Institutional Recruitment for Sustainable Transformation (FIRST) initiative.¹⁸ FIRST, launched in September 2020. NIH will provide FIRST institution awardees with funding to establish a faculty cohort model for hiring, supporting, and mentoring outstanding scientists with a demonstrated commitment to diversity—as well as to establish best practices for culture change. Like the DSP, FIRST is a cohort-based model to ensure that newly hired URG scientists are not “the only one” in a department and helps to build community.

3 | INTEGRATED APPROACHES ARE NECESSARY

Prior research supported by both NIH and the NSF provides evidence for a set of strategies that, as a minimum, must be integrated into any institutional approach to systemic and sustained culture change promoting inclusive excellence

where thriving faculty can make major contributions to the research enterprise. The NIH-funded Research on Causal Factors and Interventions that Promote and Support the Careers of Women in Biomedical and Behavioral Science and Engineering funded 14 grants that addressed four thematic barriers to career advancement, including mentoring, coaching, and sponsorship; career flexibility and work-life balance; pathways to leadership; and compensation equity. This research has provided a deeper understanding of the obstacles that women face in academic health sciences, and it also describes a toolbox of evidence-based solutions at all levels to ensure diverse voices are included to advance academic missions of excellence in research, clinical care, and education.¹⁹ Data from the NSF ADVANCE Institutional Transformation awards, the STEM Equity Achievement (SEA) Change initiative, as well as the Athena Scientific Women's Academic Network (Athena SWAN, in the United Kingdom) provide information about the hiring and retention of women before and after implementation of multifaceted strategies such as training to mitigate the impact of implicit bias delivered across an institution, mentoring schemes, work-life balance policies, and other practices aimed at advancing women faculty in STEM.²⁰ Each of these initiatives emphasize the importance of transparency and accountability for collecting, tracking, and evaluating institutional data about faculty demographics, resources, and salaries. Each also highlights the importance of senior institutional leadership support, leading to changing policies to fully integrate a cohort.^{21,22}

Instigating culture change in the complex environment of academic science requires institutional engagement and accountability driven by concrete steps to understand individual institutional cultures—as each one is unique. Recognizing the need for benchmark data to assess its own climate, in January 2019, NIH commissioned development and validation of the NIH Workplace Climate and Harassment Survey to assess the incidence of sexual harassment in scientific research environments and to identify its organizational-climate predictors. The survey's goals were to: (i) determine the extent of sexual harassment and define vulnerable populations; (ii) identify potential factors associated with harassment; (iii) assess current NIH harassment-reporting systems and determine if and how supervisors respond to those who have been harassed; and (iv) establish a baseline assessment useful for evaluating NIH progress via future administration of the survey. The main findings of the survey confirmed the formative role of organizational climate in enabling sexual harassment to appear and persist, and NIH has taken several remedial steps to counter this behavior.²³ Building on our groundwork with the survey, NIH recently created a centralized, real-time data collection platform to monitor direct experiences of investigators, including URG faculty and trainees

who may be disproportionately harmed from COVID-19 pandemic-related isolation and other untoward effects. The nation-wide survey is planned for launch in October 2020, and a similar survey has already been administered to IRP investigators to inform the development of inclusion and civility interventions across Institutes and Centers on the NIH campus.

Accountability is at the crux of everything NIH and every institution does toward creating inclusive environments that drive research innovation to address the nation's many vexing health challenges. Achieving true accountability is not simple: It is an ambitious, yet vital, goal for all of us to pursue that requires unrelenting support from leadership structures. One approach NIH has taken along these lines is establishing the NIH Equity Committee (NEC), which was developed in response to a taskforce of senior NIH leaders²⁴ charged with addressing equity issues and has been used within the NIH IRP over the past 2 years. The goal of the NEC is to hold leadership accountable for specified inclusion metrics and actions to address inequities, which are separately monitored and tracked annually for each NIH institute. The NEC, which meets bimonthly, monitors Institute-specific, and agency-wide progress related to the following topics: (i) reviewing and ensuring equality in salary and resources; (ii) ensuring width, breadth, and fairness in talent searches; (iii) sponsorship of all investigators through promotion for awards and inclusion in professional networks; and (iv) endorsement and promotion of work-life balance resources for all investigators.

4 | ADDRESSING SYSTEMIC RACISM

The harmful effects of bias have been vividly exemplified through racial inequities across all sectors in the United States. In science, as noted by *Science* Editor-in-Chief H. Holden Thorp, bias cuts across all scientific disciplines, reflective of a pervasive problem that needs to be addressed.²⁵ Systemic racism has limited opportunities for many URG scientists, who also feel personal anguish and exhaustion over routine experiences of racism that create ongoing stress.²⁶ The recent unveiling of systemic racism across the country has prompted many distinguished scientists and physicians to share their personal encounters of racism and the devastating impacts on their well-being.²⁷⁻³⁰ Research tell us that despite surviving these egregious environments and establishing successful careers, the ultimate consequences of chronic racism puts Black/African Americans, including Black/African American scientists and physicians, at markedly higher risk for chronic health conditions. This phenomenon, described as allostatic load, goes beyond socioeconomic status and is thought to

contribute to the disproportionate burden of hypertension, diabetes, and cancer in Black/African Americans who are affluent and have full access to healthcare.³¹

As a biomedical community, we must fully address deterrents such as bias, stereotypes, ineffective mentoring, and work/life issues that continue to stymie faculty representation of women and certain racial/ethnic groups. The Working Group on Diversity of the NIH Advisory Committee to the Director has developed a framework for action to address systemic racism in science, calling for immediate steps the whole scientific community should embrace immediately.³² These actions encompass five distinct elements: openly acknowledging the problem of blackness in science; promoting community-based research by scientists who have in-depth knowledge of the experiences of racism; supporting our Black/African American peers during this time of emotional turmoil and feelings of hopelessness; adjusting the factors that admissions and other selection committees value to account for systemic racism; monitoring and reporting acts of racial bias; holding perpetrators accountable; empowering allies to be actively anti-racist; and redistributing resources and power as a path to ensuring racial equity. An important, underlying concept conveyed by the Working Group on Diversity is the need to face reality and avoid diminishing acts of aggression and racism as “micro-aggressions” or “perceived racism.”

5 | CONCLUSION

Despite the challenges and threats to diversity, inclusion, and equity in biomedical research, I believe that integrated, institutionally based strategies can be employed immediately to sustain and accelerate gains we have made toward diversifying the scientific workforce. The entire biomedical ecosystem—government, academia, and industry—will benefit from shifting the current scientific culture toward a more inclusive and equitable system where the full benefits of diversity can be harnessed to inform research that transforms human health. We must all work diligently to put these evidence-based strategies into place toward creating inclusive scientific environments where diverse talent thrives.

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CONFLICT OF INTEREST

The author declare that he has no conflict of interest.

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