



FASEB comments in response to [NOT-CA-067](#), “Request for Information: Seeking Stakeholder Input on Enhancing Diversity and Inclusion in the Cancer Research Workforce”

Comments submitted via email at NCI.RFI.DiversityandInclusionWorkforce@nih.gov on July 8, 2021

The Federation of American Societies for Experimental Biology (FASEB) appreciates the opportunity to provide feedback to the Request for Information (RFI) issued by the National Cancer Institute (NCI) seeking information on how to enhance diversity and inclusion in the cancer research workforce. FASEB is a coalition of 29 scientific societies collectively representing 130,000 individual researchers in the biological and biomedical sciences, with many receiving grant support from NCI.

Over the past few years, FASEB has commented on several RFIs issued by the National Institutes of Health (NIH) or its individual Institutes and Centers seeking guidance on ways to enhance diversity, equity, accessibility, and inclusion in the research workforce. Thus, our comments in response to this RFI reiterate and highlight key aspects of those previously stated positions. In addition, FASEB urges NCI to consider the impact of the diversity of its research workforce on community and patient engagement in activities critical to combatting cancer, namely clinical trial recruitment.

In April 2021, FASEB submitted [comments](#) in response to the NIH-wide RFI, “[Inviting Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity, and Inclusion in the Biomedical Research Workforce and Advance Health Disparities and Health Equity Research](#).” Most of the comments from that response – intended to inform the broader NIH [UNITE initiative](#) to end structural racism within the scientific community – inherently ring true for this RFI. Of specific interest to the current RFI are the comments discussing factors that present obstacles in training, mentoring or career path (pages 2 – 3) and successful actions NIH and other institutions and organizations are currently taking to improve representation, equity, and inclusion (pages 4 – 5).

FASEB also provided [extensive comments](#) in response to a 2018 RFI issued by the National Institute of General Medical Sciences (NIGMS) seeking input on “[Strategies for Enhancing Postdoctoral Career Transitions to Promote Faculty Diversity](#).” FASEB’s comments provided a comprehensive review of initiatives sponsored by individual member societies to support professional development and career progression of scientists from underrepresented populations and insights from participants in FASEB’s 2018 Postdoctoral Preparation Institute.

FASEB encourages NCI to review the information included in the RFI responses cited above, as they include many examples of successful strategies employed by an array of scientific organizations to foster diversity, equity, and inclusion in the research workforce to the extent that the information well exceeds the page limit detailed in the current RFI. In addition, we strongly recommend that NCI coordinate its efforts to bolster diversity, equity, and inclusion with those of other NIH Institutes, namely NIGMS, and NIH-wide initiatives such as UNITE and the NIH Office of Scientific Workforce Diversity.

Attachments:

- FASEB comments in response to NOT-OD-21-066, “Inviting Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity, and Inclusion in the Biomedical Research Workforce and Advance Health Disparities and Health Equity Research” (2021)

- FASEB comments in response to NIGMS RFI, “Strategies for Enhancing Postdoctoral Career Transitions to Promote Faculty Diversity” (2018)



FASEB comments in response to [NOT-OD-21-066](#), “Inviting Comments and Suggestions to Advance and Strengthen Racial Equity, Diversity, and Inclusion in the Biomedical Research Workforce and Advance Health Disparities and Health Equity Research”

Comments submitted electronically via online [Comment Form](#) on April 6, 2021

Perception and reputation of NIH as an organization, specifically as an employer (e.g., culture), with respect to support of workforce diversity and as an overall advocate for racial and gender equity in NIH-funded research.

Demographic [data on the total NIH workforce](#) as of September 2020 indicates the intramural program has made great strides towards equity. Comparing to [2019 census population estimates](#), intramural workers are well represented at almost 60 percent female compared to 50.8 percent from the general United States population, 20.6 percent Black compared to 13.4 percent from the census, and 19.1 percent Asian compared to 5.9 percent from the census. However, NIH lags in proportionate representation compared to the general population in intramural staff who are Hispanic, two or more races, American Indian and Alaska Native, and Native Hawaiian and other Pacific Islander.

Furthermore, while the total NIH intramural workforce is fairly diverse, personnel [data from the Office of Intramural Research](#) indicates that intramural research program principal investigators and branch chiefs are primarily White and male. Recruitment of diverse individuals is just the first step. It is vital that NIH take action to ensure individuals from historically excluded groups are promoted into positions of meaningful leadership and power and are represented at all levels of the organization.

Moreover, it is critical that NIH assess prior efforts and initiatives on promoting intramural diversity to understand what has succeeded and what was lackluster. Pre- and post- presentation data collection on webinars featuring topics on diversity may be enlightening. For example, the [NIH Scientific Workforce Diversity Toolkit](#) shows promise via [participant polling](#) in helping to disseminate evidence-based tools. As feasible, metrics on inclusive environments and culture change should be measured and evaluated. A pilot study could be conducted longitudinally with participants in the [NIH Distinguished Scholars Program](#), and qualitative data collected must be considered. Culture change often provokes emotional reactions, which may be difficult to measure quantitatively, but [acknowledging these emotions](#) is key to engagement with change. Moving forward, it is important NIH evaluate past efforts to enhance intramural diversity to pivot away from initiatives that had little or no impact and importantly build upon programs that have shown success.

New or existing influence, partnerships, or collaborations NIH could leverage to enhance its outreach and presence with regards to workforce diversity (both the internal NIH workforce and the NIH-funded biomedical research enterprise); including engagement with academic institutions that have shown a historical commitment to educating students from underrepresented groups (especially Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions

(HSIs), Tribal Colleges and Universities (TCUs), and other institutions), racial equity organizations, professional societies, or other federal agencies.

In addition to bolstering its engagement with academic institutions demonstrating a historical commitment to educating students from underrepresented groups, FASEB strongly encourages NIH to actively partner with scientific and professional societies to expand its outreach and foster development and retention of a diverse workforce. The majority of discipline-specific societies include committees devoted to diversity, equity, and inclusion. Such committees serve as the leads for developing and implementing programs to improve the recruitment and retention of researchers from underrepresented backgrounds. Similarly, affinity organizations centered on individual identities, such as [Society for Advancement of Chicanos/Hispanics and Native Americans in Science \(SACNAS\)](#), [Out in Science, Technology, Engineering, and Mathematics \(oSTEM\)](#), [Association for Women in Science \(AWIS\)](#), and the [American Indian Science and Engineering Society \(AISES\)](#) offer impressive networks wherein members can enhance their research skills and expand their professional networks.

Development of a robust and diverse biomedical workforce is dependent upon students gaining early exposure and interest in science and research. Many programs emphasize development of the academic research workforce from undergraduate education through doctorate and postdoctorate training. Success of these programs are dependent upon student interest and experience in scientific research well before undergraduate training. Therefore, we urge NIH and other federal agencies supporting scientific research to partner with the Department of Education and organizations focused on K-12 learning, such as the [National Science Teaching Association](#), to foster interest in science much earlier in a student's education.

Finally, when engaging in these outreach activities, we encourage NIH to help highlight the range of career opportunities available within the biomedical sciences. Far too often, students and trainees perceive success as an academic career path. However, as noted in the [2012 report of the NIH Advisory Committee to the Director Biomedical Workforce Working Group](#), only a small proportion of the biomedical workforce has a tenure-track position at a research university. Highlighting the many ways and venues in which one can contribute to the research enterprise could aid in retaining individuals in the biomedical research workforce.

Factors that present obstacles to training, mentoring, or career path (e.g., training environments) leading to underrepresentation of racial and ethnic groups (particularly Black/African Americans) in the biomedical research enterprise throughout the educational and career continuum and proposed solutions (novel or proven effective) to address them.

Effective mentorship is a key component in training the next generation of biomedical researchers. The recent National Academies of Sciences, Engineering, and Medicine report, [The Science of Effective Mentorship in STEMM](#), highlights non-dyadic mentoring structures as providing a myriad of benefits, particularly for underrepresented students. Access to a mentor network with varying knowledge, skills, and abilities aids in personal and professional development. However, the apprenticeship structure in science prioritizes dyads between the Principal Investigator (PI) and trainee.

The benefits of mentorship are related to the mentor's skills, motivation, and aptitude. Quality [culturally aware](#) mentorship is a learned skill, and yet traditionally research advisors do not receive

pedagogical mentorship training. Although the paradigm is shifting, promotion and tenure practices often do not account for demonstration of evidence-based mentoring or pedagogical mentorship training.

NIH can lead in shifting these norms of dyadic mentorship structures and lack of training. Criteria for trainee fellowships could be updated to reflect the importance of a mentoring network, rather than rely on the PI to be responsible for majority of training. Eliminating the expectation of a dyadic mentorship structure would fundamentally shift the PIs primary role in the application to be with respect to the science. Then, the trainee could demonstrate support for their professional development with a myriad of individuals in their mentor network. Additional mentors to fulfill the development needs of the trainee past the sponsor(s) should be a scored criterion. The current emphasis on the sponsor does not create an expectation of trainees sustaining a meaningful mentor network.

Furthermore, scored criteria regarding the sponsor(s') track record of mentoring individuals could be revised to include evidence-based mentoring skills and continuous pedagogical training. Currently, judgement of the sponsor(s') ability to mentor is largely undefined, with the number of past trainees placed in desirable positions being a common metric. This penalizes newer PIs and their trainees when the commitment to evidence-based mentoring is not correlated to length of time as a PI. Just as there are senior PIs who do little to mentor students, there are junior PIs who voluntarily undergo mentor training to improve their skills. Scoring the sponsor(s') ability to mentor individuals should reflect the effort to utilize evidence-based mentoring practices.

Moreover, scoring academic records in trainee fellowship applications should be evaluated. There is a growing body of evidence suggesting traditional measures of academic success, such as undergraduate [grade point average](#) and [GRE scores](#), aren't predictors of success in graduate school.

Finally, NIH can create new programs to model the benefits of [sponsorship](#) in addition to mentorship. Sponsors use their power and influence to publicly promote careers of their protégés. Individuals from historically excluded groups may need a sponsor, not only mentors, to progress in their career. While traditionally utilized in the business sector, sponsorship is being incorporated in science. For example, there is a push for sponsorship programs in [academic medicine](#), and a [Drexel University](#) program advances women faculty. An NIH funded formal sponsorship program may help increase diversity in positions of power.

Barriers inhibiting recruitment and hiring, promotion, retention and tenure, including the barriers scientists of underrepresented groups may face in gaining professional promotions, awards, and recognition for scientific or non-scientific contributions (e.g., mentoring, committees), and proven strategies or novel models to overcome and eliminate such barriers.

The National Academies of Sciences, Engineering, and Medicine recently released the "[Promising Practices for Addressing the Underrepresentation of Women in Science, Engineering, and Medicine: Opening Doors](#)" report, which details efforts to improve recruitment, retention, promotion and tenure in academic settings. Although this report is focused on women, many suggested practices may also benefit other historically excluded groups. Importantly, the report acknowledges that actions taken cannot benefit only White women, and that intersectional invisibility is a challenge specific to Black women.

Recruitment is addressed in Chapter 3, and [Box 3-2](#) highlights mentoring programs designed to support diversity and inclusion in the sciences, which may enhance recruitment and retention into

research careers. Chapter 4 features advancement and retention, including innovations in the process of promotion and tenure. For example, [Box 4-4](#) lists programs at institutions of higher education that include efforts to promote diversity, equity, and inclusion in promotion and tenure dossiers. The University of Oregon is further highlighted in [Box 4-5](#) for requiring faculty to incorporate their contributions of promoting equity and inclusion in the promotion and tenure process, and the University of Oregon created a [rubric of examples](#) to help faculty understand this new metric.

Barriers to implementation of evidence-based practices are addressed in [Chapter 5](#). The importance of committed leadership, dedicated financial and human resources, data collection, and an intersectional approach are stressed.

Parenting also poses unique challenges and may act as a barrier to retention; 43 percent of women and 23 percent of men who are new parents [leave full-time STEM employment](#) after their first child. COVID-19 has [exacerbated these stressors](#). As NIH develops new policies, ensuring parents are not pushed out of the pipeline is crucial.

Recommendations for action are described in [Chapter 6](#). [Recommendation 2](#) suggests federal agencies hold grantee institutions accountable for adopting effective practices. [Recommendation 6](#) asks that federal agencies support efforts targeted at addressing underrepresentation throughout the educational and career path. This includes addressing funding disparities for early researchers, particularly women of color. Finally, [recommendation 8](#) encourages federal agencies to recognize and celebrate institutions of higher education that are working to improve gender equity.

NIH has many opportunities to rise to the actions suggested by the National Academies. For example, NIH may help influence this space by incorporating metrics such as evidence of equitable recruitment and promotion and tenure processes in existing funding opportunities or creating new funding mechanisms that help address these issues. The [Faculty Institutional Recruitment for Sustaining Transformation](#) program is an exciting initiative and FASEB looks forward to data measuring success of this cohort model. Furthermore, NIH can also be a standard bearer by tying data collected to extramural funding. Perhaps NIH begins to require extramural institutions to report their personnel demographics to be eligible for funding. Further, NIH may emphasize the importance of diverse personnel and encourage extramural institutions to improve their metrics over five to ten years. Finally, closing funding gaps may be a difficult task, but is necessary to promote equity in the extramural research community.

Successful actions NIH and other institutions and organizations are currently taking to improve representation, equity, and inclusion and/or reduce barriers within the internal NIH workforce and across the broader funded biomedical research enterprise.

The coronavirus pandemic quickly changed realities of daily life for all in the biomedical research ecosystem. FASEB is grateful to NIH for swiftly enacting flexibilities where possible. For example, since the COVID-19 pandemic took hold of the world and forced the majority of scientific trainees to work from home, NIH's Office of Intramural Training and Education (OITE) has been generous in expanding programming to [extramural researchers](#). OITE staff have provided webinars and blog posts on crucial topics dealing with all aspects of career and psychosocial growth—everything from workplace dynamics, mental health, conducting a job search, and more. Access to these materials has benefitted trainees far beyond the intramural workforce, and we hope OITE will continue allowing extramural participation after the pandemic has subsided.

Outside of NIH, other agencies and organizations are also working towards improving equity and removing barriers. Harassment creates hostile environments and may be a driving factor for underrepresented minorities to leave science. Promising practices for addressing harassment collated by [National Science Foundation](#) and National Academies for Sciences, Engineering, and Medicine through the [Action Collaborative on Preventing Sexual Harassment in Higher Education](#) may inspire NIH and other organizations to implement evidence-based practices that have shown success elsewhere. Additionally, professional societies are also making an impact by coming together to establish uniform standards of excellence in STEM fields, including professional conduct, in the [Societies Consortium on Sexual Harassment in STEMM](#). Model policies and implementation tools to cultivate inclusive environments are highlighted in the Societies Consortium [library](#). FASEB is proud to be an inaugural member of the Societies Consortium and continues dedicated work to combat harassment and create safe environments.

Furthermore, FASEB is excited about the newly launched [Maximizing Opportunities for Scientific and Academic Independent Careers](#) (MOSAIC) program. Providing postdoctoral scholars with a cohort and access to professional development programming will hopefully aid in combatting imposter syndrome and feelings of isolation by creating community and developing job readiness for these diverse scholars. The National Institute of General Medical Sciences highlighted during the February 2021 Advisory Council [meeting](#) that the first round of MOSAIC K99 applicants was 75 percent female and 76 percent underrepresented minorities. FASEB looks forward to future cohorts of MOSAIC scholars and evaluation of program success both in job placement and establishment of professional networks by providing [social support](#).

Finally, efforts to enhance diversity such as MOSAIC and the [Faculty Institutional Recruitment for Sustainable Transformation](#) (FIRST) programs are exciting but must be viewed as only the beginning. Establishing the FIRST program [Coordination and Evaluation Center](#) is vital to assess challenges and achievements towards reaching the overarching goal of inclusive excellence at NIH-funded institutions. Understandably, the MOSAIC and FIRST programs are initially limited in size and treated as pilots. However, if these cohort models make meaningful impact it is crucial NIH continue to fund these and other initiatives. Small pilot programs--with less than twenty scholars each funding round--will be insufficient to move the needle on a national scale, and additional investments may be necessary.

Existing NIH policies, procedures, or practices that may perpetuate racial disparities/bias in application preparations/submissions, peer review, and funding, particularly for low resourced institutions, and proposed solutions to improve the NIH grant application process to consider diversity, inclusion, and equal opportunity to participate in research (e.g., access to application submission resources, changes to application submission instructions/guidance, interactions with and support from NIH staff during application process).

The “[Ginther gap](#)” was first noted almost a decade ago, and calls for [equity in funding](#) remain fervent to this day. NIH must act with all legally allowable authority possible to close the funding gap based on race and ethnicity. An achievable first step may be critically evaluating the peer review process. Implicit bias during peer review may be a negative component when assessing the applicant, and for trainee applicants may also create undesirable consequences when evaluating the sponsor(s). FASEB looks forward to results from the [anonymized review](#) of the Transformative Research Award to help understand if implicit bias is adversely affecting applicants from historically excluded backgrounds.

Best practices or proven approaches to build new or enhance existing partnerships and collaborations between investigators from research-intensive institutions and institutions that focus on under-resourced or underrepresented populations but have limited research resources.

NIH's [Support of Competitive Research \(SCORE\) Program](#) is fundamental to encourage participation from Minority Serving Institutions (MSIs) in competing for NIH awards. However, it was noted at the January 2020 National Institute of General Medical Sciences Advisory Council [meeting](#) that SCORE is too concentrated in only a few college and university systems, and the majority of SCORE applicants are not from historically excluded racial and ethnic backgrounds. The SCORE program shows promise, but widespread success requires broader uptake. To the extent possible, NIH may benefit from a larger applicant pool by offering frequent seminars or workshops to help institutions with applications for their first SCORE award.

Additional ideas for bold, innovative initiatives, processes or data-driven approaches that could advance the diversity, inclusion, and equity of the biomedical research workforce and/or promote research on health disparities.

FASEB is grateful for the engagement on this vital topic and for the bold declarations in the [Racism in Science](#) report. It is refreshing to see the agency directly acknowledge the challenges that lie ahead, particularly for Black and African American scholars. The NIH UNITE Initiative holds promise, and we look forward to further development and implementation. To aid in the Committees' ability to address needs of the extramural community additional stakeholder input may be required. Particularly on the "T" and "E" Committees, which focus on the extramural research ecosystem and transparency, inviting extramural stakeholders to be sitting members of the Committees may provide much needed perspective to the intramural groups.

Moving forward, it is vital that the NIH UNITE initiative collect data that may show uncomfortable outcomes; ultimately, disparities cannot be addressed if NIH is unaware of the extent of the matter. Furthermore, it is difficult to address the needs of both the intramural and extramural research communities without understanding their background and experiences.

FASEB appreciates and supports the initial focus on Black scientists and recognizes the need for efforts to expand to include all historically excluded groups to achieve the ultimate goal of an equitable research ecosystem. Downstream expansion of targeted efforts to include further diverse and historically excluded scholars is an exciting prospect. Steps can be taken to enrich data collection that put intersectionality and personal identities at the forefront. For instance, demographic categories in eRA Commons can be expanded to allow for more granular evaluation. For example, "Asian" is a broad category that when disaggregated almost certainly includes underrepresented minorities such as those in the research community of Hmong descent. Thus, while the whole of Asian individuals are well-represented in science, this may not tell the full story. Moving beyond race and ethnicity, data collection on "gender" should be inclusive of the breadth of possible identities including genderqueer and non-binary individuals. Although these are only two basic examples, there are many expansions to demographic data collection that will help illuminate underrepresented groups to target in future implementation of efforts to promote equity and diversity in science.



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The Federation of American Societies for Experimental Biology (FASEB) appreciates the opportunity to provide feedback to the Request for Information (RFI) issued by the National Institute of General Medical Sciences (NIGMS), “[Strategies for Enhancing Postdoctoral Career Transitions to Promote Faculty Diversity](#).” FASEB comprises 30 scientific societies representing over 130,000 researchers, clinicians, and engineers in the biological and biomedical sciences. To provide the most comprehensive representation of Federation and individual society activities to enhance postdoctoral career transitions and promote faculty diversity, programmatic information was collected from FASEB member societies and FASEB’s Office of Sponsored Programs, Diversity and Grants Administration (OSPDGA). This information was supplemented by feedback from advanced graduate students and postdoctoral fellows who participated in the 2018 Postdoctoral Preparation Institute (PPI) program organized by OSPDGA with support from NIGMS. The Federation is committed to help identify, develop, and implement new strategies that will enhance successful career transitions for postdoctoral scientists who come from underrepresented groups in biomedical research, and looks forward to working with NIGMS on this important issue.

1. The barriers scientists from underrepresented groups face as they progress from postdoctoral training into faculty positions at research-intensive institutions, and potential strategies to overcome these barriers.

The comments included in this response were collected from the population of interest (late-stage graduate students and postdoctoral fellows, mostly from groups underrepresented in biomedical research) who attended this year’s [FASEB Postdoctoral Preparation Institute \(PPI\)](#) in Minneapolis, MN. The PPI is a two-day workshop that provides participants with resources for various career pathways, as well as opportunities for career and professional development in the biomedical research workforce. The responses collected reflect the participants’ personal experiences and perceptions on barriers they encounter as they progress from postdoctoral training into faculty positions at research-intensive institutions.

Identified barriers fell into five general themes:

- 1) Lack of effective mentoring, particularly for first-generation college/graduate students who may require additional counseling
- 2) Feelings of inadequacy/incompetency, such as suffering from the “imposter syndrome” and microaggressions experienced within the laboratory/institutional environment
- 3) Experiencing cultural and institutional biases from faculty and institutional leadership
- 4) Limited financial and professional resources for underrepresented groups

- 5) Over-commitment in terms of being asked to lead diversity initiatives and/or serve on committees, taking time away from the ability to fulfill their duties of conducting research or leading a laboratory.

Strategies that can help overcome these barriers:

- 1) Providing mentee/mentor training that complies with the [National Research Mentoring Network](#) (NRMN) standards and resources (some FASEB member societies are already NRMN partners). It is critical to advise mentees that it is acceptable to have multiple mentors within academia and outside of academia
- 2) Supporting access to mental health resources, supportive peer networks, fellowships, internships, and leadership training for underrepresented scientists to ensure their success in their scientific careers
- 3) Providing diversity, civility, and unconscious bias training to all faculty and institutional leadership in order to create a more inclusive environment, including not penalizing or harassing trainees for religious or family obligations
- 4) Offering funding opportunities that include scholarships, grants and/or fellowships specifically for underrepresented scientists
- 5) Establishing clear and flexible expectations for new and/or underrepresented faculty members, including limits on non-research obligations. This could include providing detailed promotion and tenure criteria to newly hired faculty, and making adjustments based on research and mentoring activities as well as personal professional goals.

The personal experiences and perceptions collected from the PPI participants align with those identified in the current literature. Information regarding strategies, resources, and programs offered by FASEB member societies to promote additional opportunities for scientists and clinicians to become successful in their careers is provided in our response to Question 4.

2. The qualities and perspective that scientists from underrepresented groups bring to the research enterprise, and how these can be drawn upon to encourage and promote career transitions into the professoriate at research-intensive institutions.

Scientists from underrepresented groups bring creativity, resilience, cultural values and international awareness to the research enterprise, all of which are essential to providing a broad scope and diverse perspective to new or on-going projects. Many underrepresented scientists have experienced and overcome economic, personal, and professional setbacks during their training, instilling in them the grit and resolve necessary to surmount workplace challenges that may arise. Many underrepresented and/or

first-generation scientists share a desire to serve as mentors and role models to future generations (starting from elementary school to the postdoctoral level), helping them to relate to other trainees with similar backgrounds, and providing constructive feedback. Having a diverse pool of scientists and role models with these qualities increases the number of underrepresented groups enrolling and pursuing faculty positions in the biomedical sciences at research-intensive institutions.

3. Approaches that key stakeholders (e.g., faculty advisors, institutions, scientific societies, etc.) can employ to promote the successful career transitions of postdoctoral scientists from underrepresented groups into the professoriate at research-intensive institutions, and how these can be coordinated and sustained to maximize impact.

A. Approaches

As a coalition of 30 professional societies united by our mission to advance health and well-being by promoting research and education in biological and biomedical sciences, FASEB is committed to fostering a research workforce that is diverse and inclusive. The FASEB OSPDGA, which oversees the FASEB [Maximizing Access to Research Careers \(MARC\)](#) and [Diversity Resources for Enrichment, Access, and Mentoring \(DREAM\)](#) programs, and the minority affairs committees and staff of our member societies have, for decades, undertaken activities and interventions designed to provide trainees from underrepresented groups with educational and career development opportunities and access to resources they might not otherwise get. We grouped these approaches into four categories based on their primary intent: mentoring, networking, fellowships and travel awards, and leadership experience. Although the focus of the RFI is postdoc-to-faculty transitions, we believe providing academic and professional support to trainees from underrepresented groups is critical to keeping them in the biomedical workforce “pipeline” until they reach the postdoc stage; therefore, many of the programs outlined here are open to trainees at multiple stages, not just postdocs.

Mentoring. Mentoring has been shown in the literature to be one of the most effective means of setting people up for success. When the mentoring relationship works properly, mentees come away with a greater sense of self-confidence, knowledge of their strengths and weaknesses, and a better understanding of how to reach their career goals. The NRMN helps trainees expand the number and breadth of their mentors by connecting them with professionals across numerous career stages, professions, locations, racial and ethnic groups, and more. FASEB and five of its member societies—the American Physiological Society (APS), the American Society for Biochemistry and Molecular Biology (ASBMB), the Association of Biomolecular Resource Facilities, the Genetics Society of America, and the Society for Developmental Biology—are NRMN partners, which means they work to build awareness of their mission through offering NRMN programs and workshops.

In addition to NRMN, many member societies sponsor their own mentoring activities. The American Society for Pharmacology and Experimental Therapeutics (ASPET) started its own [Mentoring Network](#) in

2016 based on the career coaching model developed by Rick McGee, PhD. The goal of the ASPET network is to provide career guidance to trainees and to promote diversity in pharmacology careers. Small groups of gender-balanced, racially/ethnically mixed graduate students and postdocs meet in-person prior to the Experimental Biology meeting for training and facilitated discussions. This is followed by a year of monthly, virtual meetings to discuss careers, transitions, skills, and implicit bias. Additionally, there are one-on-one interactions between coaches and mentees, and peer mentoring is encouraged. Evaluations from the first cohort revealed mentees were satisfied (or better) with their participation and felt their career choices were more achievable. The American Society of Human Genetics (ASHG) offers a mentoring session for trainees from underrepresented groups at the [Diversity Breakfast](#) during its annual meeting. The session focuses on training and career opportunities in genetics and genomics. The [American Association of Immunologists' \(AAI's\) Minority Affairs Committee \(MAC\)](#) maintains a list of members from underrepresented groups who have volunteered to be a part of a mentoring and networking community within AAI. Additionally, MAC members mentor AAI Young Scholars awardees on their research and presentation skills during the annual meeting.

Networking. Providing opportunities for virtual and in-person networking for members from underrepresented groups is a key function of professional societies, including FASEB MARC and FASEB member societies. The American Society for Bone and Mineral Research (ASBMR) sponsors one underrepresented postdoc member per year to attend the [Network of Minority Health Researchers Annual Workshop](#), which is organized by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). In addition to networking opportunities, the workshop offers mentoring on career advancement. The ASBMR Diversity in Bone and Mineral Research Committee sponsors an [interactive networking reception](#) for underrepresented minorities at its annual meeting. The Society of Toxicology (SOT's) Postdoc Association organizes a [speed networking event](#) at its annual meeting, giving postdocs the opportunity to network with mid- and late-career mentors from a variety of toxicology-related occupations. AAI's MAC sponsors the "[AAI Careers and Networking Roundtable](#)" program for early- and mid-career members at their annual meeting.

Fellowships and Travel Awards. The FASEB MARC program is known throughout the scientific community for the [travel awards](#) it provides to trainees and faculty from underrepresented groups; since 1991 it has provided over 5,000 travel awards to FASEB member societies' meetings. For the 2017 Experimental Biology meeting, for example, FASEB MARC supported 41 travel awards, 88 percent of which went to racial/ethnic minorities. Moreover, 61 percent of awardees reported that they would not have been able to attend the meeting without the MARC travel award. Another example is the [ASHG/FASEB Mentored Travel Awards](#) for Underrepresented Trainees, which provide complimentary registration plus travel funds for the ASHG annual meeting to undergraduate and graduate students, postdocs, and medical students from minority institutions and historically black colleges and universities, as well as underrepresented individuals at majority institutions. Each awardee is paired with a peer mentor for the meeting who helps him/her navigate the meeting and network and provides career advice. In

addition, the mentors themselves are often postdocs from underrepresented groups, and receive support to defray their own travel costs. Awardees of the ASHG/FASEB Mentored Travel Awards report increased confidence in themselves and in reaching their career goals.

SOT offers funding for graduate students to participate in an activity/experience to supplement the training provided through their graduate programs; those planning academic careers have put the funding towards training in computation and other research techniques. Along similar lines, the FASEB DREAM program has supported travel awards to AAI summer courses in immunology. Although not yet funded, APS has submitted a grant application to NIH to support its Career and Professional Development Fellowship program. The two-year fellowship would allow graduate students or postdocs from underrepresented groups to develop research and career development skills while receiving mentoring from APS members. Finally, as part of its recent strategic planning activities, the American Association of Anatomists (AAA) has planned to develop a program by 2019 to fund travel and/or research activities in Anatomy by trainees from underrepresented groups.

Leadership Experiences. The American College of Sports Medicine (ACSM) created its [Leadership and Diversity Training Program](#) in 2006-2007. Participants receive mentorship from ACSM Fellows, with the goal of increasing the diversity of society leadership. The [ASHG/JAX Conference to Career Program](#), a collaborative effort between ASHG and The Jackson Laboratory, seeks to enhance the professional and career development of graduate students and postdocs. Through a face-to-face session at the ASHG annual meeting along with monthly webinars, participants focus on optimizing their time at meetings with effective networking and communication skills. [The Vanguard Lecture at the AAI annual meeting](#) is presented by a member from an underrepresented population who has demonstrated noteworthy scientific achievement and career success. SOT has graduate student and postdoc representative positions for each of its regional chapters, specialty sections, and special interest groups; these representatives aid in the planning and organizing of activities. This group of trainee representatives also elects officers that plan sessions for the SOT annual meeting. Most APS committees have a slot specifically for a trainee member, and for the [Porter Physiology Development and Minority Affairs Committee](#), this is reserved for a past Porter Fellow. Additionally, the APS recently submitted a grant to NIDDK to support its Career Advancement through Skills Development, Society Involvement and Leadership (CASSL) program. One of the few programs described here designed specifically for scientists from underrepresented groups and those with physical disabilities, CASSL would provide early- and mid-career researchers with additional training in research and leadership skills. Participants would increase their role and visibility in APS as well as their home institutions. One of the long-term goals spelled out by AAA in its diversity and inclusion plan is to increase the representation of individuals from diverse and underrepresented groups in its leadership, with the objective of achieving parity with, or exceeding, the diversity in the general membership by 2025.

B. Coordination

Coordination to sustain and maximize impact of programs such as those described above could be done through alliances and/or consortia. The recently-initiated [Alliance of Scientific Societies for the Development of the Next Generation of Scientists](#), which aims to coordinate efforts among scientific societies to understand effective interventions to build a more diverse and inclusive workforce, is an excellent example. Having secured three years of support from the National Science Foundation, the Alliance will develop best practices and evaluation metrics, and a database of STEM diversity programs, and make them available to the entire scientific community. A non-professional society example is the [Big Ten Academic Alliance](#), which has a grant through NRMN to train facilitators for a mentor training curriculum (“Mentor Training for Clinical and Translational Researchers”). This alliance serves the dual purpose of providing faculty with mentor training and ensuring high standards and practices across Big Ten campuses. Participating faculty have reported changing their mentoring style as a result of the training and found it a valuable use of time. Similar efforts surely exist in other academic conferences and for other research and training purposes and can be used to broaden the use of best practices throughout research institutions.

FASEB itself, through the OSPDGA and its member societies, can disseminate identified best practices concerning diversity and inclusion. Indeed, three of the six founding members of the Alliance of Scientific Societies are FASEB member societies: ASBMB, ASPET, and the Endocrine Society, and there is the possibility that more could join. The [Experimental Biology meeting](#), which serves as the annual meeting for five FASEB member societies, could be a testing ground for sharing information and best practices across societies, and for piloting multi-society diversity initiatives. Similarly, best practices could be shared more widely at meetings of the FASEB Diversity Roundtable Discussions Groups, which comprises minority affairs committee chairs and/or staff from OSPDGA and most FASEB member societies.

4. Current strategies that have been successful in promoting the transition of postdoctoral scientists from underrepresented groups into independent, tenure-track faculty positions.

The programs showcased are all intended to impart trainees with additional, specialized skills and knowledge that will enable them to succeed in their chosen career path. Additionally, participation in these programs is not limited—in some cases not even open—to postdoctoral scientists. However, qualitative evaluations from these programs indicate that past participants consider their involvement to have been a contributing factor in them achieving faculty status.

The [“Future Leaders Advancing Research in Endocrinology,”](#) or FLARE, program from the Endocrine Society was created specifically to promote transitions of graduate students, postdocs, and clinical fellows from underrepresented groups to independent research careers. Begun in 2012 with support from NIDDK, FLARE features a two-day leadership training workshop and a choice of two “tracks:” the internship path or the mentorship path. During the workshop fellows focus on networking with their peers, program

leaders, and invited speakers; they also attend skill-building sessions on securing funding, time and team management, negotiation, and marketing oneself. Those who choose the internship path undertake one year of service on an Endocrine Society committee or apply to participate in the Keystone Symposia Fellows program; these experiences increase the trainees' networks and teach them about associations/non-profits. The mentorship path allows for more in-depth mentoring from an accomplished biomedical or clinical scientist who is not the fellow's academic mentor, providing support for both in-person and virtual mentoring sessions. FLARE boasts more than 100 fellows to-date. **Of the first three cohorts of FLARE fellows (2013-2015), 36 percent successfully transitioned from postdocs to academic junior faculty positions.**

The [American Physiology Society's \(APS's\) Porter Physiology Development Fellowship](#) provides one-to-two years of support for full-time graduate students from underrepresented populations to pursue their doctorates in the physiological sciences. The Fellowship provides an annual stipend equivalent to the NIH National Research Service Award (NRSA) predoctoral fellowship, mentoring by members of the APS Porter Physiology Development and Minority Affairs Committee, access to a wealth of online networking and skills development resources, and opportunities for professional service, including K-12 outreach. The Porter Fellowship has been in existence since 1967, and has supported 140 Fellows (through 2017). An impressive 63 percent of Fellows identify as African American/Black, with 34 percent identifying as Hispanic/Latino, 2 percent American Indian/Alaska Native, and 1 percent Native Hawaiian/Pacific Islander. In addition, over half (55 percent) are female. **73 percent of Porter Fellows report being employed in academia and 60 percent describe their area of employment as research.** Anecdotally, there are numerous assistant, associate, and full professors among them. But there are no precise data on career path or current title, so it is unclear how many were successful in the postdoc-to-faculty transition.

[SOT's Undergraduate Diversity Program](#) has been working with students from underrepresented groups, as well as those from Academic Research Enhancement Award (AREA)-eligible schools, for 30 years. Students are funded to attend the SOT annual meeting, where mentoring groups are formed. In addition, students learn about graduate school and careers in toxicology, and are encouraged to network with toxicology professionals (including academics). After the annual meeting, program participants are encouraged to find internships to gain and/or focus research experiences. Mentors in the Program are instrumental in identifying internships for the students, and importantly, SOT provides matching support or internship hosts. While many participants go on to careers in industry and government, **as of 2004, at least 27 student participants had earned their PhDs, and at least 4 have gone on to faculty positions.** The actual numbers for both doctorates earned and faculty alumni could be higher; SOT, like many professional societies, lacks sufficient funding to track program participants as frequently and at the level of detail as it would prefer to do.

The [FASEB MARC PPI](#), a workshop to help early career researchers understand and transition to independent careers, is another example of an intervention offered by FASEB with a demonstrated track

record of promoting the postdoc-to-faculty transition. PPI is open to anyone, although trainees from underrepresented groups are encouraged to apply, and travel awards are available to legal U.S. citizens and residents. Participants receive one-on-one help with their CVs/resumes, and have opportunities to network with fellow trainees and invited speakers. They hear presentations on career development skills such as preparing competitive job and grant applications, interviewing, and negotiating, and are introduced to careers outside academia. **As of June 2018, 25 out of 88 2014 PPI participants, and 8 of 82 2016 participants, have transitioned to Assistant Professor positions.** Moreover, in a 2016 survey of 2014 participants, 93 percent of respondents (56 percent response rate) said the knowledge and skills they gained at PPI contributed to them transitioning out of a postdoc position (although not necessarily into a faculty position).