



FASEB

Federation of American Societies
for Experimental Biology

Representing Over 115,000 Researchers

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Ericka Boone, PhD
Director of the Division of Biomedical Research Workforce
6700B Rockledge Dr, Rm 2306
National Institutes of Health
Bethesda, MD 20817

Dear Dr. Boone,

The Federation of American Societies for Experimental Biology (FASEB) congratulates you on your recent appointment as the National Institutes of Health (NIH) Director of the Division of Biomedical Research Workforce. As the largest coalition of biological and biomedical researchers in the United States, representing 28 member societies and over 115,000 individual scientists, we are eager to work with you and your team to promote safe, inclusive research environments to attract and retain a diverse biomedical research workforce. FASEB is resolutely invested in the wellbeing of trainees and invites you to reinvigorate and expand upon past NIH recommendations that focus on the biomedical workforce.

Below in bold are detailed actionable recommendations FASEB urges NIH to implement to understand and address current biomedical workforce needs. These include:

- Publishing Requests for Information pertaining to underrepresentation of scientists from historically excluded backgrounds.
- Collecting and analyzing data pertaining to trainee stipend and salary levels, and adjusting policies to ensure no trainee is vastly underpaid or loses access to benefits.
- Reevaluating the definition of “success” for training grants to further embrace trainees pursuing careers outside of the traditional path.

Overview of Existing Data and Additional Evidence Needed

In recent years, there have been few efforts to collect information about the needs of current biomedical research trainees. The scientific workforce and ecosystem are evolving, and NIH must be vigilant in attempts to understand pertinent issues. The 2018 [Next Generation Researchers Initiative \(NGRI\) Working Group Report](#) underscores the importance of monitoring the talent pool in Recommendation 4.2, support further research on assessments of workforce capacity.

Workforce Related Requests for Information, Working Groups, and Targeted Solutions

Troubling trends have emerged from recent data from the National Science Foundation’s (NSF’s) Survey of Earned Doctorates (SED), Survey of Graduate Students and Postdoctorates in Science and Engineering, Survey of Doctorate Recipients (SDR), and special tabulations from these surveys presented in the Science and Engineering Indicators and Women, Minorities, and Persons with Disabilities in Science and Engineering (WMPD) reports. FASEB recommends **NIH issue several workforce related Requests for Information to**

Full members: The American Physiological Society • American Society for Biochemistry and Molecular Biology • American Society for Pharmacology and Experimental Therapeutics • American Society for Investigative Pathology • American Society for Nutrition • The American Association of Immunologists • American Association for Anatomy • Society for Developmental Biology • Association of Biomolecular Resource Facilities • The American Society for Bone and Mineral Research • American Society for Clinical Investigation • Society for the Study of Reproduction • The Endocrine Society • American College of Sports Medicine • Genetics Society of America • The Histochemical Society • Society for Glycobiology • Association for Molecular Pathology • Society for Redox Biology and Medicine • Society For Experimental Biology and Medicine • American Aging Association • Society of Toxicology • Society for Leukocyte Biology • American Federation for Medical Research • Environmental Mutagenesis and Genomics Society • Shock Society • **Associate members:** The American Society of Human Genetics • The Society for Birth Defects Research & Prevention

better understand the problems underlying these quantitative data. Furthermore, FASEB recommends NIH assess clinician-scientists in training, as it is not possible to extract this subset of graduate students from the publicly available NSF data. Additional evidence is necessary to understand persistent issues and create novel solutions to address these barriers.

Underrepresentation of Female PhDs in the Workforce and Disproportionate Financial Burden

Although more females have been earning life science PhDs than males for a decade (SED table [14](#)), this may come at a disproportionate personal cost. Female life science PhD recipients use more of their own resources to support educational and living expenses during graduate school than their male counterparts (SED tables [35](#) and [36](#)). Additionally, of all PhD recipients in 2020, more females graduated with \$30,001 or more in debt than males, and the mean graduate debt was approximately 50 percent higher for females than males (SED table [40](#)).

Female life science PhD recipients are underrepresented compared to males in all employment categories except other educational institutes (SDR table [13](#)). Despite gender parity in recent years for life science doctorate recipients, the workforce is still male dominated. At four-year educational institutions there are fewer life science female PhDs than males at all faculty ranks (SDR table [17](#)), and female salary at every rank is lower than salary for male faculty (SDR table [62](#)) for all recorded race and ethnicity categories (SDR table [50](#)). Perhaps most troubling, of all PhD recipients that are not employed or seeking work almost three-quarters are female (SDR table [2](#)).

While the quantitative data collected by NSF are incredibly valuable, none measure reasons for these outcomes. Thus, FASEB recommends **NIH issue calls for stakeholder input on factors that lead to female PhDs being underrepresented in academic research environments and stalling career progression.**

While there are many facets to explore, an initial sample may include questions such as: For those in the NIH workforce that anticipate becoming unemployed by choice or not seeking work, why is that? Why are jobs at other educational institutions, such as community colleges, technical schools, and high schools, more appealing than other work sectors? What are factors that contribute to the disproportionate financial burden taken on by female PhD recipients? Additionally, FASEB has [previously recommended](#) NSF expand data collection on gender identity beyond the binary of male and female. As NIH explores factors negatively impacting female PhD recipients, it is similarly prudent to examine experiences of nonbinary scientists.

Doctorate Recipient Debt Disparities Across Different Racial and Ethnic Backgrounds

Debt disproportionately affects females compared to males, and there are stark contrasts in debt levels among doctorate recipients with different racial and ethnic backgrounds. Notably, across races and ethnicities, graduate debt outweighs undergraduate debt (SED table [40](#)) and there are clear disparities. For example, 2020 doctorate recipients who are Black or African American graduate with three times as much graduate debt as white PhDs (SED table [40](#)). While data confidentiality limitations prohibit examining debt by race and ethnicity in only life science PhD recipients, a special tabulation revealed that between 9.5 (Asian) and 32.3 (Black or African American) percent of science doctorate recipients between 2015 and 2019 used personal or family funds as their primary source of support (WMPD table [7-23](#)). FASEB is grateful for your work as Director of the Division of Loan Repayment promoting NIH's [Loan Repayment Program](#) to help address aspects of debt for doctorate recipients, and for the recent expansion in eligible areas via the [Research in Emerging Areas Critical to Health](#) program. Still, FASEB is concerned about overall debt levels and the clear additional burden based on race and ethnicity for some scientists. **Therefore, NIH should investigate if cumulative debt has deterred talented individuals from going to graduate school or pursuing an academic research career and explore solutions to remove this barrier.**

Underrepresentation of PhDs with One or More Disabilities and Lack of Centralized Resources

Approximately 9.1 percent of life science doctorate recipients residing in the United States have one or more disabilities (SDR table 7); estimates of the U.S. population with one or more disabilities range from approximately 13 to 27 percent (NSF, [Centers for Disease Control and Prevention](#), U.S. Census Bureau [Survey of Income and Program Participation](#) and [American Community Survey](#)). Disability status is voluntarily disclosed; thus, statistics on the life sciences workforce with disabilities may be underreported. **There is an opportunity for NIH to lead a robust effort to collect information on barriers for scientists with disabilities.** Key questions of interest include, but are not limited to: What makes research environment spaces inaccessible? What supports are lacking?

As NIH investigates barriers for scientists with one or more disabilities, additional actions can be taken to support scientists with disabilities currently in the workforce. First, as the primary funding agency for biomedical research, **NIH is optimally suited to create a central hub of accessibility resources useful in research environments.** The Department of Defense hosts the [Computer/Electronic Accommodations Program](#), and NIH should act in a similar capacity for biomedical researchers with accessibility needs. Many research advisors are willing to help and be supportive, but simply do not know where to start. There is a need for NIH to act as a conduit for successfully supporting scientists with disabilities by collating and distributing useful tools and resources for biomedical research environments. FASEB is pleased to see that the NIH Office of Equity, Diversity, and Inclusion is [developing a webpage for accessibility resources at NIH](#), and encourages considerations for extramural scientists to be included. Most importantly, NIH must lead by example. The main NIH campus requires substantial infrastructure [updates and repairs](#). As renovations are underway, **NIH can be the standard bearer in creating accessible research environments and influence extramural institutions to do the same.**

Ensure Trainees have a Voice on NIH Working Groups and Committees

As NIH addresses critical concerns underlying equitable access to productive careers, working groups or committees may be tasked with developing recommendations. **FASEB urges NIH to include relevant stakeholders in these groups such as current graduate students, postdoctoral scientists, and dual-degree trainees** to ensure that the populations being spoken for are represented in decision making bodies. Furthermore, it is vital that trainee members feel respected and heard, and that their input is valued. NGRI Recommendation 5.4, appoint scientists from across career stages and life experiences to NIH working groups and committees, highlights the importance of representation on these NIH groups.

Salary, Stipends, Benefits, and Debt

As previously noted, debt accumulated during graduate school may be a significant impediment to sustaining a diverse and highly skilled biomedical research workforce. Debt is inextricably linked to stipend or salary level, as well as other financial considerations such as availability of benefits.

Lack of Salary Support Data from NIH Grants and Ability to Sort Trainees in RePORTER

NGRI Recommendation 2.9 is to **conduct a detailed analysis of salary support derived from NIH grants within one year.** It has been over three years since this recommendation was released, and results of the analysis have not been made publicly available. In general, it is impossible to make data informed policy recommendations without the salary support data itself. FASEB urges NIH to implement this recommendation.

Additionally, there is no publicly accessible data from NIH on trainees supported by grants. Data collected on source of financial support, including traineeships, fellowships, or grant research dollars, are via NSF. Through NIH RePORTER data are available on trainees supported on training grants and fellowships;

however, the majority of graduate students and postdoctoral scientists are supported from research grant dollars. This population of trainees is effectively invisible in RePORTER.

Furthermore, support for clinician-scientists is of interest. Similar to NIH RePORTER limitations for PhD and postdoctoral scientist trainees, we lack the ability to identify dual degree holders in the database. It is difficult to assess the strength of the clinician-scientist workforce without this degree filter available as a variable for investigation in RePORTER. FASEB recommends NIH **update the RePORTER database to increase the usability by adding capability to sort by degree earned and data on trainee effort on research project grants.** This additional information will greatly aid in the development of sound, data driven policy recommendations.

Another related area of interest to FASEB members is the impact on training grant participants by the training grant Principal Investigator and/or Program Director. Organizing training programs is an enormous task, and lack of sufficient salary support may disincentivize faculty from pursuing these opportunities. Additionally, for minority faculty that take on additional service burdens like mentoring and leading a training program, this lack of salary support just furthers the burden of the minority tax. Robust salary support analysis may reveal trends about faculty leading these training programs. Limiting the pool of faculty who can lead training programs due to salary support restrictions may result in less diverse mentors for trainees.

Reevaluate Stipend and Salary Levels and Enact Minimum for Trainees Paid from Grants Scale for Predoctoral NRSA Stipend and Increased Base Amount

The [2022 predoctoral stipend level](#) for Ruth L. Kirschstein National Research Service Award (NRSA) recipients was \$26,352 before taxes. FASEB noted this stipend amount does not reflect the cost of living in much of the country. Additionally, this amount is less than what many research institutions offer to graduate students, around \$30,000 per year. Postdoctoral NRSA stipends increase slightly per year to reflect expertise gained, and stipend increases stop after seven years. FASEB recommends implementation of **a similar scaled stipend for predoctoral awardees** to help alleviate a small portion of graduate debt accrued. Such a scale would implement a soft cap on years supported by NIH funds in graduate school. FASEB does not support a hard cap, as suggested in the 2012 [Biomedical Research Workforce \(BMW\) Working Group Report](#), where the working group recommends NIH funds cannot support a graduate student for more than six years. However, implementation of a stipend scale for predoctoral NRSA awardees would support the ethos of this recommendation—encouraging timely completion of graduate degrees.

Additionally, NRSA stipends cannot be supplemented with other NIH funds. Therefore, if a PhD student receives an NRSA at a university that has a standard stipend level higher than the NRSA award amount then the research advisor must identify a source of non-NIH discretionary money, or the trainee simply loses out on several thousand dollars a year. Increasing the NRSA predoctoral award stipend level would alleviate this challenge greatly. **FASEB encourages NIH to reevaluate the current NRSA predoctoral stipend level to increase the base amount**, one that reflects the norms at many extramural institutions, and implement a stipend scale akin to the postdoctoral NRSA stipends.

Minimum Salary Levels for Trainees Paid from NIH Research Grant Dollars

FASEB regularly hears disturbing anecdotes of trainees, both graduate students and postdoctoral scientists, being paid far less than the NRSA levels. Often, evidence points to trainees being taken advantage of due to a vulnerable identity, such as visa status. Furthermore, some institutions simply do not follow NRSA levels for any trainee being paid from research grant funds. For example, 29 percent of institutions surveyed by the National Postdoctoral Association in 2019 were still [compensating postdocs at the 2017 NRSA level](#). **FASEB recommends NIH conduct a thorough analysis of grant research dollars being paid to trainees to assess the range of stipend and salary levels.** Although we do not currently have quantitative data on precisely

how widespread the issue of research trainees being underpaid is, it is disconcerting; this likely also contributes to unsustainable debt levels, and discourages individuals without additional financial support from pursuing graduate school and a career in the biological and biomedical sciences.

For trainees with fellowships or traineeships the stipend level is set, but for all other graduate students and postdoctoral scientists being paid from NIH grant research dollars there are usually only guidelines from NIH and the extramural institution to follow. To ensure no trainee is being grossly underpaid, **FASEB recommends NIH explore the possibility of setting a minimum stipend level for trainees being paid from research grants.** There already exists a [maximum salary cap](#) for faculty; a minimum guaranteed stipend or salary for PhD students and postdoctoral researchers would be in the same vein. FASEB recognizes that this may pose legal challenges and may ultimately require a regulatory (rule) change. While this work would be a huge undertaking, resulting implementation would help protect the most vulnerable trainees from being further taken advantage of. This is a laudable goal, and FASEB would appreciate the chance to support this effort.

Benefits for All Postdoctoral Scientists Regardless of NIH Funding Mechanism

When a postdoctoral researcher is awarded a prestigious NIH fellowship, they may be faced with the decision to sacrifice their benefits for this career milestone. Postdoctoral associates, who are employees, typically receive employee benefits from their institution such as health care, time off, parental leave, and sometimes access to retirement accounts. Once postdoctoral scientists are awarded a fellowship they are no longer employees, and therefore often lose access to some, if not all, employee benefits. Talented trainees should not be asked to choose between a career advancing fellowship and basic needs like health insurance. Consistent with the BMW report, **FASEB urges NIH to adjust policies so all NIH-supported postdoctoral scientists, regardless of funding source, have access to benefits that are comparable to other employees at their institution.** Additionally, echoing issues with the predoctoral NRSA, NIH fellowships cannot be supplemented with other NIH funds to help finance full benefits for all postdoctoral scientists. FASEB recognizes the complexity of this issue, and a solution may need to involve other agencies such as the Department of Labor and Internal Revenue Service. The NRSA Act of 1974 may also be limiting. If a new rule needs to be proposed, FASEB supports these endeavors to ensure all postdocs have access to benefits. Without change the current system perpetuates inequities among postdoctoral scientists between institutions across the nation, and even in the same laboratory.

Training for Mentors and Adjusting Grant Review to Value Trainee Success in All Careers

FASEB applauds NIH's efforts to promote the use of evidence-based trainings and evaluation to assess programmatic impact on trainees. However, additional considerations, and implementation of past recommendations, may strengthen this work and further improve outcomes.

Update the Definition of Success in Training Grant Evaluation to Include All Careers

FASEB commends NIH for evaluating and updating various training grants to better reflect the needs of the current workforce. For example, recent changes to the [National Institute of General Medical Sciences Medical Scientist Training Program T32](#) and [Parent NRSA T32](#) emphasize the trainees and their development over the reputation of the extramural institution, and highlight the importance of mentor training. However, additional widespread changes to the ethos of training grant evaluation would promote a healthier environment for PhD students. **FASEB fully supports the BMW report recommendation to change the definition of "success" in the evaluation of training grants and recommends NIH include this modification in review criteria.** The BMW recommendation focuses on exit pathways for PhD students who do not wish to continue on a research-intensive career track; FASEB also would like to see stronger support for trainees who choose to finish their PhD and pursue a career outside of academic research. "Success" should not be limited only to research-intensive careers when science PhD recipients positively impact society through a variety of careers

in research administration, core facilities, teaching, policy, program management, fundraising, consulting, and more.

Career Outcomes Tracking for All Trainees Across All Career Sectors

Assessing the impact of professional development programs cannot stop once the trainee leaves the institution; many extramural institutions undertake efforts to follow trainees throughout their career beyond the institution. This usually includes tracking trainees that leave research-intensive careers, further bolstering the need to update the definition of “success” in the evaluation of training grants. Although NIH training grants are limited to a select number of trainees, programming is often open to all in the department or institution. Echoing the recommendation from the BMW report, FASEB agrees that **peer review criteria for NIH training grants should consider outcomes of all students in relevant PhD programs at the institution, not only those supported by the training grant.** However, recognizing the vast administrative burden of career outcomes tracking, this should be made optional, as less well-resourced institutions likely do not have administrative support to accomplish this task. A longer term goal could instead be **NIH itself adopting tools for assessing the strength of the biomedical workforce and tracking career development and progression**, as recommended in the 2014 [Physician-Scientist Workforce Working Group Report](#). FASEB appreciates [recent analysis](#) of Medical Scientist Training Program and T32 awardees. However, the primary outcome tracked is receipt of an NIH research project grant. Expanding tracking to include all trainees and additional measures of a successful career would alleviate administrative burden for individual research advisors that coalesce training grant application materials and create a more equitable playing field for under-resourced institutions.

Mentor Training for All Research Advisors with NIH Funding

Some Funding Opportunity Announcements require a plan for faculty training on topics such as mentoring and unconscious bias, which is fantastic progress towards implementation of NGRI Recommendations 3.3 and 3.8 that suggest both mentors and trainees participate in professional development and training on unconscious bias. However, these are only mandated in training grants and fellowships. This structure ignores the graduate students, clinician-scientists in training, and postdoctoral scientists under research advisors that are being paid from NIH research grant dollars. **FASEB suggests NIH expand these mentor and bias training requirements to all research advisors with NIH funding that has any percent effort from trainees in the laboratory.** Professional development training, as in the NGRI recommendation, can be interpreted many ways. FASEB strongly suggests professional development training focus on improving the relationship with all members of the research team; for example, trainings on cultural competency, management skills, conflict resolution, and mentoring may be impactful.

Future Endeavors

Several prior NIH working groups have put forth recommendations to improve the trainee experience over the past decade that have not seen meaningful engagement. FASEB looks forward to your leadership and ushering in a new era of implementing trainee-focused recommendations to foster safe, inclusive environments and support the next generation of biomedical researchers.

Sincerely,



Kevin C. Kregel, PhD
FASEB President

cc: Tracy Downtin, Executive Assistant to the Director of the Division of Biomedical Research Workforce