NINDS Strategic Planning Discussion Panel

Training and Diversity Panel Meeting Summary
Neuroscience Trainees

August 14, 2020

Table of Contents

Introduction

Approximately 50 people attended the meeting, including NINDS staff members. Dr. Nina Schor, Deputy Director of NINDS, opened the meeting by describing the NINDS Strategic Planning Discussion Group series. The NINDS Leadership has formed taskforces designed to identify operational objectives that will enable NINDS to fulfill its overall mission. Among these taskforces is a group dedicated to identifying actionable areas of improvement toward NINDS' goal to "be a model of excellence for funding and conducting neuroscience research training and career development programs and ensuring a vibrant, talented, and diverse neuroscience workforce." The purpose of this discussion group was to give trainees (i.e., PhD students and postdocs) a voice in defining the challenges and opportunities for training and diversity that NINDS will address over the next 5- to 10-year period.

Scientific Training

The trainees were polled regarding their formal training in statistics and experimental design during graduate school and beyond (see Appendix A for poll results).

Formal Training Requirements

Formal training (e.g., course work) in quantitative analytical methods, experimental design, and research ethics varied among doctoral and postdoctoral trainees. Most trainees reported that either courses in these areas were not required by their programs or institutions, or the available courses were inadequate; for experimental design in particular, no trainees reported that a standardized course exists in their programs. Instead, scientific training appears to emphasize an "organic learning process" based in the lab versus the classroom. As described by one trainee, graduate programs promote a "hurry up and get done" mentality regarding course work to more quickly move trainees into the lab.

This "get [it] done" approach to course work may come at the expense of meaningful comprehension of the material, particularly when courses are relegated to the first 1 or 2 years of doctoral training (often before a lab or project is chosen) as opposed to being readily available over time. Trainees emphasized two problems with this frontloaded model: First, too much time between formal training and application of skills can lead to a substantial degradation of knowledge, and, second, training before a project is chosen hinders a student from pursuing the most relevant course available because they are less likely to understand what skills will be required for success. The availability of formal courses later in training would lessen both concerns. It would also allow more senior trainees to acquire skills that they deemed unnecessary early in their careers but now would benefit from (e.g., programming). However, the success of this change would be contingent upon mentors creating an environment that encourages learning outside of the lab, which a few trainees noted is not always the case, particularly during a postdoc.

Many trainees expressed strong support for more formal training in statistics, programming languages, and experimental design. One trainee also noted that formal training in science communication and the dissemination of research to the public is not generally available, despite being important aspects of scientific training. Several participants noted that not every student will require all of the courses

suggested during this meeting (e.g., programming or statistical analysis in "niche" areas), and as such these courses should be more widely available but not explicitly required. Several trainees highlighted the importance of access to statistical software for effective training. Some students can use institutional site licenses for certain programs, but other students rely on grant money or institutional allowances to purchase individual licenses. Formal training supported or offered by NIH could achieve both the standardization of course material and access to resources such as analytical software.

Focus and Scope of Formal Training

A common sentiment among trainees was that the value of formal training often lies in its applicability to the trainee's project or particular lab environment. Their examples of positive statistical training shared the common theme of a focused relevance to the trainee's work. Two trainees had access to a statistical consultant who could support analysis directly related to their projects. Other trainees were receptive to this approach, provided the consultant had sufficient familiarity with the types of research projects they were supporting. One trainee completed an advanced statistics course in which students worked on their own data and found that specificity to be "extremely helpful."

Likewise, examples of less effective formal training shared the common theme of a lack of focus. In many cases, this lack of focus stemmed from overly general content that was not directly relevant to the trainee's project. In one example, the statistics course available to trainees was so broad that principal investigators (PIs) in that graduate program actively encouraged trainees to skip the course. Another participant expressed that a generalized curriculum can "pull trainees into different directions"—that is, they learn a statistical concept or method in the classroom only to encounter a different set of standard quantitative practices in the lab. This lack of consistency undermines the overall effectiveness of the course, and participants supported standardized training in more "niche" areas that is more directly relevant to a given trainee's project, such as statistical analysis methods in big data, electrophysiology, or neuroimaging. Trainees suggested that institutions would be more motivated to offer such "niche" courses if F and T grant mechanism applications required a formal statistical review of preliminary data.

Several trainees attributed inadequate formal training to poor instruction quality. One trainee specifically highlighted an ethics course that employed a "parade of PIs" model, in which a different PI presented a lesson each week, as being particularly unhelpful because no individual instructor was invested in focusing the course content.

Mentorship

The trainees were polled regarding their relationships with their mentors (see Appendix B for poll results). Most participants reported that they drive interactions with their mentor and that those interactions are respectful and honest and occur on a regular basis.

Mentor/Mentee Relationship

Several trainees expressed that taking initiative in the mentor/mentee relationship is especially beneficial to senior trainees, who tend to feel more comfortable conducting independent work and driving scientific discussions. However, participants also noted that such empowerment may be diminished or even completely lost for junior trainees, and that students in the first 2 years of doctoral

training would likely benefit from a more proactive mentor. Overall, trainees strongly supported the notion that mentorship is not "one size fits all," and several trainees shared that their mentor's demeanor or mentorship style played a direct role in joining the lab.

Many trainees have completed an Individual Development Plan (IDP) to help define their career trajectories, and several noted that the IDP is a requirement of their graduate program or their funding source. Participants expressed mixed opinions regarding the usefulness of the IDP. For most, the IDP does not play a prominent role in training and is not consulted by mentors. However, many trainees discuss their progress and objectives with their mentors informally outside the context of the IDP. Although the IDP itself may not receive much attention from mentors or mentees in general, the valuable professional development conversations that the IDP is meant to encourage still tend to occur.

More than half of the trainees reported that their mentors primarily encourage training and professional development opportunities that are directly related to the trainee's research. However, trainees highlighted a need for mentors to focus on holistic training as a scientist (i.e., the role of scientists outside academia and beyond the bench). To this end, participants suggested that training programs include seminar series that focus on nonacademic careers and encourage mentors to introduce trainees to scientists outside academia. Furthermore, funding decisions should place less weight on the number of trainees from a given program that pursue academic careers in order to de-incentivize programs from "pushing people into academics."

Mentorship Training

Most participants agreed that formal mentorship training is necessary. They expressed broad support for incentivizing mentorship training by linking it to funding opportunities. Several participants suggested that NIH offer mentorship training that in turn influences the allocation of NIH funds. This training could be reflected in a scored section on F and K grant applications for trainees that wish to become PIs, and could also be explicitly requested for inclusion in the biosketches of the current PIs who are sponsoring those proposals or applying for their own R grant award mechanisms. Training milestones could be included in grantee progress reports, similar to how progress in data collection is reported. One trainee explained that their HHMI Gilliam Fellowship requires their mentor to participate in formal mentorship training through the University of Wisconsin's Center for the Improvement of Mentored Experiences in Research (CIMER). This trainee shared that improvements in mentorship quality have been evident. Likewise, participants in a mentorship breakout group with direct experience with formal mentorship training expressed universally positive sentiments.

A trainee endorsed a CIMER course's ability to teach trainees what qualities to seek in a mentor and how to approach their PI to discuss the mentor/mentee relationship. Several participants agreed that, although broaching the topic of mentorship qualities with one's mentor can be challenging due to implicit power dynamics, a bidirectional relationship in which the mentee assumes some ownership for the mentored experience is important (e.g., by setting expectations for both the mentor and the mentee). Formal training that covers these power dynamics may help PIs to encourage feedback from their mentees and create an avenue for an effective bidirectional relationship.

Trainees noted that a mentee's ownership of their role in relationships with a mentor could also take the form of seeking out additional mentors beyond the primary PI when more support is needed. The creation of a group of mentors can be incorporated into F and K award mechanisms, in which PIs can be incentivized to include different mentors in various roles to provide further advice to the trainee. Participants further highlighted that a bidirectional relationship with a mentor or group of mentors may have added benefit for senior postdocs, because they are often both a mentor and a mentee at once and as such can learn from frank discussions about mentorship with their PI or others in mentorship roles.

Mentorship Evaluation

Participants acknowledged that "good scientists can be bad mentors" and discussed ways to hold PIs accountable for poor mentorship. Power dynamics and financial ties can make operationalizing a fair definition of an uncaring or bad mentor exceptionally difficult for a university or funding agency to achieve. Trainees discussed using the number of students who leave a program or lab as a signal of poor mentorship, but several expressed concern about the effectiveness of this metric: First, a trainee's reasons for leaving a program or lab are not always straightforward or related to the mentor, and, second, trainees (particularly in large labs) can succeed in spite of bad mentorship.

Trainees emphasized that poor mentorship exacerbates the mental health issues experienced by graduate students and postdocs. Participants suggested that institutions offer a support structure for trainees who want to switch labs because the mentor does not meet their needs. More generally, trainees expressed that mentors set the tone for lab environments and that unrealistic expectations can drive poor work–life balance and isolation among trainees, which in turn worsen symptoms of anxiety and depression. One trainee added that financial instability, which may create a financial barrier to therapy, further deepens mental health problems. Another trainee suggested that funding agencies should evaluate an institution's availability of affordable mental health services to underscore the importance of trainee mental health, and furthermore that NINDS could provide money for mental health services as part of training grants.

Trainees generally agreed that mentee voices should be centered when evaluating a mentor. Formal exit surveys completed by trainees would enable academic institutions to evaluate PIs in a trainee-centered way, and the pooled results of these surveys can highlight effective mentorship and thereby mitigate the difficulty of identifying bad mentors in favor of rewarding good ones. Over time, evaluations from both trainees and colleagues could be standardized and used to create "mentorship profiles" that would be reviewed by departments for tenure proceedings and submitted to grant agencies for funding considerations. Several trainees emphasized that standardization should not be quantitative, because such metrics tend to favor larger labs.

Mentorship profiles could also include efforts outside of the lab, such as outreach initiatives, which a caring mentor is more likely to value and engage in. In support of this idea, one trainee highlighted that experience does not hinge on required formal training: "many graduate students (especially those of diverse backgrounds) mentor frequently and thoroughly in their graduate careers," and forgoing such opportunities is "often a choice on the part of the trainee."

Diversity and Inclusion

Trainees strongly agreed that formal mentorship training should include lessons specifically designed to teach mentors how to support mentees of diverse backgrounds. These lessons should address intersectional issues, barriers faced by first-generation students, immigrant experiences, and knowledge of the unique financial burdens that underrepresented groups may face. This training is essential to the promotion of diversity, equity, and inclusion in science, and one trainee expressed that without this training even a well-intentioned mentor "can cause more harm than good." Mentors should understand that a training plan must embrace the mentee's background and individual needs. Participants suggested that NIH offer training on inclusion, anti-racism, and intersectionality to all of its funded PIs, and that NINDS could sponsor workshops or forums dedicated to these issues.

Special funding mechanisms can also encourage diversity and inclusion in NIH-funded spaces. Funding pipelines can be established with Historically Black Colleges and Universities (HBCUs), tribal colleges, and Hispanic-serving institutions to alleviate some of the barriers to entry for students at these schools who want to pursue scientific training and careers. One trainee who participated in the NINDS Health Disparities in Tribal Communities Summer Internship Program shared that the internship has been helpful for dozens of American Indian trainees and suggested that extramural programs with the same mission be implemented.

Trainees also expressed support for graduate programs and funding agencies to place greater value on outreach efforts, which are meaningful endeavors in the realm of diversity and inclusion but necessarily take time away from scholarly work. Participants suggested the creation of grants for trainees who engage in outreach work and evaluation of a PI's efforts to promote diversity, equity, and inclusion during grant review.

Participants especially noted the fact that this discussion panel occurred during a time of large-scale protests and discussions surrounding racial injustice. They emphasized that NINDS should promote conversations surrounding the mental health and wellbeing of trainees from diverse backgrounds as current events and pressures from scientific training intersect and amplify each other. Trainees further acknowledged that problems faced by graduate students and postdocs at any time (e.g., financial instability, poor mentorship, imposter syndrome) are always shaped by an individual's unique background and that these issues are intersectional.

Training and Diversity Panel Roster – Trainees

Beatriz Alvarado, MS
PhD Graduate Student
University of California, San Francisco

Alec Calac, BS
MD/PhD Graduate Student
University of California, San Diego
San Diego State University

Sara Fenstermacher, PhD
Postdoctoral Research Fellow
New York University

Brielle Ferguson, PhD
Postdoctoral Research Fellow
Stanford University

Tavita Garrett, BS
PhD Graduate Student
Oregon Health and Science University

Evan Goldstein, PhD
Postdoctoral Research Fellow
Children's Hospital Health System

Michael Hanna, PhD
Postdoctoral Research Fellow
Yale University

Elizabeth Hanson, PhD
Postdoctoral Research Fellow
Baylor College of Medicine

Jane Hartung, PhD
Postdoctoral Research Fellow
University of Pittsburgh

Dylan Iannitelli, BS
PhD Graduate Student
New York University

Timothy Machado, PhD
Postdoctoral Research Fellow
Stanford University

Jennifer Magnusson, PhD
Postdoctoral Research Fellow
University of Michigan

Amanda McQuade, BA
PhD Graduate Student
Institute for Immunology
University of California, Irvine

Alexis Mobley, MS
PhD Graduate Student
The University of Texas MD Anderson Cancer Center

Katrina Nguyen, BS
PhD Graduate Student
Carnegie Mellon University

Nadia Khan, PhD
Postdoctoral Research Fellow
Icahn School of Medicine at Mount Sinai

Penny Lam, PhD
Postdoctoral Research Fellow
University of Utah

Lakeisha Lewter, PhD
Postdoctoral Research Fellow
The University of Texas at Dallas

Christine Liu, BS
PhD Graduate Student
University of California, Berkeley

Lucas Pinto, MD, PhD
Postdoctoral Research Fellow
Princeton University

Anny Reyes, MS
PhD Graduate Student
University of California, San Diego
San Diego State University

Rodney Ritzel, PhD
Postdoctoral Research Fellow
University of Maryland, School of Medicine

Lester Rosario-Rodríguez, BS
PhD Graduate Student
University of Puerto Rico, School of Medicine

Ubadah Sabbagh, BS
PhD Graduate Student
Virginia Tech

Tayler Sheahan, PhD
Postdoctoral Research Fellow
University of Pittsburgh

Savannah Sims, BS
PhD Graduate Student
West Virginia University

Kaela Singleton, PhD
Postdoctoral Research Fellow
Emory University, School of Medicine

Darryl Watkins, BS
PhD Graduate Student
Indiana University School of Medicine

Ashley Williams, BS
PhD Graduate Student
Duke University

Lyndsay Young, BS
PhD Graduate Student
University of Kentucky, College of Medicine