Forming a Neural Network: National Institute of Neurological Disorders and Stroke Diversity Research Education (R25) Grantee Meeting
April 11–12, 2016

Day 1: Monday, April 11

Welcome and Opening Remarks

Michelle Jones-London, Ph.D.
Director of Diversity Training and Workforce Development
National Institute of Neurological Disorders and Stroke (NINDS)

The NINDS Diversity Research Education (R25) Grantee Meeting was held on April 11 and 12, 2016, in Bethesda, Maryland. Dr. Jones-London opened the meeting by welcoming attendees, including the principal investigators (PIs) of the NINDS R25 diversity education grants. Dr. Jones-London said that this is an opportunity for the PIs to:

- Establish a network among the R25 PIs.
- Identify successful approaches to recruit, train, and retain diverse individuals in the neuroscience workforce.
- Integrate the efforts of the R25 programs to strengthen them.
- Suggest ways that NINDS can more effectively promote a diverse workforce.

The number of individuals earning their doctorates in neuroscience has been growing rapidly. Neuroscience trainees and fellows are more racially and ethnically diverse now than they were 20 years ago. The increase in diversity may provide a tipping point to introduce even greater diversity into the field.

Dr. Jones-London presented the following quote from Sondra Thiederman, Ph.D.: “Diversity is not an imposition, it’s an advantage. Inclusion is not a problem, it’s a solution. Working together is more than a good idea, it’s essential to individual and organizational success.”

How Is NIH Leadership Addressing Diversity in the Scientific Workforce?

Enhancing Scientific Workforce Diversity: Imperative for Institutional Excellence

Hannah A. Valantine, M.D.
Chief Officer for Scientific Workforce Diversity
National Institutes of Health (NIH)

Dr. Valantine said that she was pleased to speak to the PIs, because they are working directly with the communities who are underrepresented in science and because they are in a position to increase the diversity of the science workforce. Her talk would focus on why diversity matters, would outline some of the challenges to achieving diversity, and would describe how diversity strengthens science.

The number of men and women from underrepresented groups decreases as one looks up the career ladder, from associate’s degree to full professor. The same is true for white women, although there are more white women at all stages of the career ladder. Although women represent more than 50 percent

of those who earn a doctorate, fewer than 20 percent are full professors. If the number of women becoming full professors continued to grow at the current rate, it would take 48 years for women to reach parity with men. It would take even longer for underrepresented groups to achieve parity.

A study released in 2011 found that African Americans were less likely to receive an R01 grant compared to White investigators. As a result, NIH made recommendations to address the racial disparity in grant awards.

Diversity matters to everyone because diversity encourages innovation, leads to excellence, broadens the scope of inquiry, and produces solutions to complex problems. Diversity in the workforce will help reduce health disparities and will make use of the entire pool of intellectual capital.

Dr. Valantine said that her mission as the Chief Officer for Scientific Workforce Diversity was to enhance the diversity of the scientific workforce by using evidence-based research. To date, there is not much evidence about what steps are likely to increase diversity. Her goal is to expand the body of evidence, to make inclusion standard policy and practice, to enhance biomedical career advancement for those from underrepresented groups, and to promote the value of diversity in research excellence.

Dr. Valantine and NIH Director Francis S. Collins, M.D., Ph.D., wrote a perspective article for the *Proceedings of the National Academy of Sciences* on how NIH would address the science of diversity.

They highlighted four questions as follows:

- Does diversity affect the quality or quantity of research?
- What are the psychological and social factors that could help reduce the barriers to workforce diversity?
- Which approaches to training would keep underrepresented groups in the biomedical research field?
- How can we develop a strategy to increase diversity in the scientific workforce?

Studies have shown that a diverse group of problem solvers outperforms groups of high ability but more homogenous problem solvers. The diverse group came up with better solutions to complex problems.

An analysis of 2.5 million scientific papers found that papers written by a diverse group of investigators, as measured by the surnames of the authors, received more citations and published in higher-impact journals. The same is true of papers written by men and women.

To reduce bias in hiring, NIH has instituted implicit bias interventions for NIH search committees. NIH will also test the use of anonymized peer reviews of grant applications to determine whether bias in peer review contributed to African Americans being funded at lower rates compared to white applicants.

Dr. Valantine cited the work of Augustus A. White, III, M.D., who documented unconscious bias in health care. For example, women and African Americans are less likely to have their complaints of chest pain taken seriously than white men.

Everybody has biases. They develop early in life, and they can affect our judgment on an unconscious level. When asked to draw a scientist, most children drew an older white man in a lab coat. The older the child, the more likely he or she drew a white man. Women who looked more feminine were deemed less likely to be scientists but more likely to be teachers.

Science professors were asked to evaluate the application materials of an undergraduate science student applying for a laboratory manager position. The scientists were all given the same resume, but half the resumes had a male name and half a female name. Both men and women scientists were more likely to choose the male student, rate the male more competent, and offer him a higher salary.

A Stanford University study led by Dr. Valantine found that when department chairs gave a talk on implicit bias to a hiring committee, more women were hired. Faculty attending the talk showed lower levels of implicit bias in postintervention testing. This suggests that people can make decisions based on the data when they are aware of their biases.

Dr. Valantine is running an implicit bias intervention pilot study of the NIH Stadtman Tenure Track Investigators search. She hypothesizes that the search committee members who are given the implicit bias talk will select a more diverse group of candidates.

There is evidence that research experience and mentoring are important to career success. NIH has a range of biomedical research training programs for all levels from undergraduates up to early-career researchers. These programs include the Building Infrastructure Leading to Diversity (BUILD) program and the National Research Mentoring Network (NRMN).

Ten BUILD programs were funded at underserved institutions. The programs were partnered with research-intensive institutions. Each set up their own metrics of success. A Coordination and Evaluation Center (CEC) has been established to evaluate the success of NRMN and the 10 BUILD programs. The CEC will track which approaches produce more diversity in the workforce.

Dr. Valantine provided further information about NRMN. There are five cores:

- Administrative
- Mentorship and Networking
- Mentor Training
- Professional Development
- Recruitment and Outreach

To increase the success rate of members of underrepresented groups who receive research grants, NRMN provides grant-writing training to postdoctoral fellows and to junior faculty. The training takes place at four universities and aims to help people write better grant applications. The program helps guide the mentees through the grant submission process and gives them an opportunity to receive a presubmission review.

NIH is using targeted recruitment approaches to find diverse candidates, including by targeting current intramural research fellows, previous diversity supplement recipients, and previous recipients of K awards.

NIH is also taking inventory of existing diversity programs and evaluating them. There are many programs that have been successful at achieving diversity at an institution, but other institutions do not adopt them. In addition, NIH is building public-private partnerships to address the problematic transition points in career progression.

Dr. Valantine presented an integrated national strategy for scientific workforce diversity. The goal is to eliminate transition barriers. The transition from postdoctoral fellow to independent researcher is

where a large dropout of underrepresented minorities is occurring. This would be a good point to try some new interventions.

Dr. Valantine said she feels optimistic about increasing the diversity of the scientific workforce. The preindependent stage is full of great candidates from underrepresented groups. Once the scientific workforce taps into that pool, the benefits of diversity will follow.

Discussion

Speaker 1 said that he has benefitted from diversity programs. He was a fellow of the NIH Maximizing Access to Research Careers (MARC) program. He said that the term "underrepresented group" should be used, rather than "underrepresented minority." The term minority is diminutive. He also said that it is important that people from underrepresented groups not become isolated on faculties in which there is little diversity.

Dr. Valantine agreed that "underrepresented group" is preferable. She also said that faculty members from underrepresented groups need support to counteract the isolation they may feel.

Speaker 3 raised the issue of unconscious bias in the hiring process, including in the ways that recommendations are written. The adjectives assigned to men versus women are often different and stem from gender bias. How can NIH help institutions address this bias in the application process?

Dr. Valantine said that the first step is to tell those on the hiring committee that everybody has unconscious bias. People who are aware of their biases can counteract them. It also helps to have "counter-stereotypes" on the hiring committee. Members of the hiring committee should take an implicit-association test and then talk about potential biases before interviewing candidates. Leaders in the institution should talk about this issue and should help with antibias trainings.

Speaker 4 said that it has been difficult to help high school students who are members of underrepresented groups to get into college. Some are promising students, but they need more mentoring to succeed. Her institution has been unable to establish a program that would help.

Dr. Valantine said that programs that use hubs, such as those used in the BUILD and NRMN programs, can be helpful. For undergraduates, this would be a network of programs that are linked to graduate programs. The undergraduates would receive additional mentoring through their college years.

A participant noted that implicit bias develops very early and is difficult to reverse. She asked how long the positive effects of the implicit-association test last. Dr. Valantine said that there is not enough data to say how long the positive effects last, but she posited that it is unlikely to persist for longer than a month without reinforcement. In regard to the issue of the early onset of bias, Dr. Valantine said that one approach is to support K–12 diversity programs. Some programs, including a few of the BUILD programs, are working with younger children to encourage them to become scientists.

Speaker 5 said that the historically black colleges and universities (HBCUs) are important to diversifying the sciences, but the investment in training programs at HBCUs has dropped precipitously. Efforts to diversify the sciences should focus more on these institutions because that is where the diversity is. Dr. Valantine said that funding has dropped off at the HBCUs and that her office is working to involve them more. Two of the HBCUs have a BUILD program, and they are successful programs.

Speaker 6 said that her university has implemented a variety of diversity programs. The programs serve students from high school through medical school. The university also is receiving NIH funding to run the

programs. There have seen successes. For example, the number of underrepresented medical students tripled in just 2 years. One problem has been that faculty members are too busy to volunteer to mentor high school students. She also noted that developing scientific curiosity is a key part of their programs because it builds enthusiasm for science.

Dr. Valantine said that it is important to focus on the curriculum. She also said that the will to do these programs comes from the leadership of the institutions, as is evident at Speaker 6's university.

What Matters in Research Mentoring: Research Self-Efficacy and Cultural Responsiveness in Trainees' Success

Angela Byars-Winston, Ph.D.

Dr. Byars-Winston is an expert on cultural influences on academic and career development. She is co-leading a study of how mentors and mentees define cultural awareness and how important this awareness is to the mentoring relationship.

Dr. Byars-Winston said that she would discuss the key factors that play a role in the development of a science career, including the role of mentoring relationships. She would discuss what makes mentoring work using the concepts of self-efficacy and cultural diversity in research mentoring relationships. Finally, she would discuss the implications of these concepts for R25 graduate training programs.

The first step to study mentoring is to define it and to find out what makes a mentoring relationship successful. If researchers can identify the underlying mechanisms of a successful relationship, can quantify it, and can understand from the mentor and mentee's perspective what the important elements are, then they could use that information to train great mentors.

Dr. Byars-Winston has been investigating this issue since 2009. Her research draws on the experiences of more than 200 students from historically underrepresented groups who participated in summer research opportunities. Because these programs have been in effect for a number of years, they have longitudinal data for each of the students. The students rated their mentors at the end of the trainings. Dr. Byars-Winston and her co-investigators found a strong quantitative relationship between the students' perception of their mentors' effectiveness, how they perceived of their own abilities, and whether they pursued a graduate degree.

Having the mentor show an interest in the mentee's project, having a mentor who appreciated the mentee's contributions to the work of the laboratory, and feeling included in the laboratory were the best predictors of a positive outcome. Mentees who had strong self-perceptions (were confident in their abilities) were the most likely to go on to a doctoral or medical degree.

Based on these results, the investigators then developed a new module of the Entering Mentoring program, "Increasing the Research Self-Efficacy of Your Trainees." This training session takes between 60 and 90 minutes. The goals of the training are to have the mentors learn what self-efficacy is, be able to identify self-efficacy in the research tasks, be able to articulate their role in fostering self-efficacy, and practice ways to build the mentees' self-efficacy.

The investigators held multiple workshops to train 75 mentors. One of the key points that mentors reported learning was the importance of giving the mentee tasks that are at the correct level of challenge. If the task is too challenging, the mentee's sense of self-efficacy may be deflated.

Underrepresented groups may feel less included. They may receive subtle messages that they do not belong.

Cultural diversity was viewed as something that can get in the way of the work. Mentors focused on how their student's culture affected the student's science. The mentors did not think about how their own culture affected their science.

Mentors and mentees disagreed about whose role it is to bring up issues related to diversity, even though it can be difficult for the mentee to raise the issue. Mentors and mentees agreed that addressing cultural diversity is complex, and they do not have the training to do so.

One survey found that many underrepresented minority students want to talk with their mentors about how race and ethnicity might affect their career development and how they can overcome those barriers. The mentors were often unaware of the racial realities of their trainees, and they thought they should treat everybody the same.

Dr. Byars-Winston has developed a scale to measure cultural diversity awareness, which includes recognition of one's culturally shaped beliefs and awareness of cultural differences between self and others. The attitudes that mentors and mentees bring to their training will shape their openness to training.

A study of 1,000 undergraduates in science, technology, engineering, and mathematics found differences among mentees on whether it is important to consider racial or ethnic background in the mentoring relationship.

White mentees were much less likely to agree that race and ethnicity affect the relationship between a mentor and mentee than Asians, African Americans, and Hispanics. African Americans were more likely to agree that it is important for mentors and mentees to discuss how race and ethnicity affect the mentees' research experience.

Dr. Byars-Winston trains mentors how to be more aware of cultural differences and to acknowledge them with the mentee.

Culturally responsive mentoring starts with the mentor becoming culturally aware. It requires that the mentor develop the confidence and skills to broach conversations about race, ethnicity, and culture. It requires a commitment to systems-level thinking so that the mentor can ensure the environment makes each student feel included.

Dr. Byars-Winston and her group developed a 2-hour mentor training on cultural awareness. After her school became an NRMN mentor-training core, they expanded the module to a 6-hour training. The training covers cultural awareness, self-efficacy, strategies and behaviors, commitment to ongoing learning, and cultivation of a cultural mindset to promote equity in research. Dr. Byars-Winston is working to give the trainings at BUILD sites around the country.

Dr. Byars-Winston and her colleagues have also begun conducting train-the-trainer workshops and have trained more than 100 facilitators so far. The training includes training manuals for mentors and mentees.

The signature piece of the diversity program is that all the training materials are available for download at www.nrmnet.net. The website provides an online grant writing course, work-life integration training, and other types of training. They are available at no cost and are downloadable.

Discussion

Speaker 1 asked whether mentoring somebody from a different racial or ethnic background benefits research. He said that his own experience in mentoring people from other backgrounds is that this takes skill.

Dr. Byars-Winston said that these relationships are difficult to navigate, particularly when the mentor is from the underrepresented group. The training module uses the concept of the third cultural space. It is the space that is created by two people from different backgrounds to allow for intercultural communication.

Speaker 8 asked how to convince faculty members that they should come to the trainings. The leadership at some institutions does not signal the value of the training.

Dr. Byars-Winston said that the first step is to provide the data showing that the training will produce a worthwhile result. It is important to show interest convergence, that is, both the underrepresented group and the majority group will find value in the training. Science will lose very talented individuals if bias is not reduced or eliminated. The second step is to convince university leaders to value and encourage mentor training. The Howard Hughes Medical Institute requires faculty to take this training. Third, start by training the good mentors to be better. This can create a positive peer pressure because these mentors are likely to produce mentees who are happy and productive.

Speaker 9 said that mentoring is often described as a one-on-one relationship. He asked whether a mentee having multiple mentors had been studied.

Dr. Byars-Winston said that she has studied only dyads. It is difficult to study group mentoring because of the research design complexities. Richard McGee, Jr., Ph.D., of the Northwestern University Feinberg School of Medicine, is studying alternative models such as peer mentoring and coaching models.

Speaker 10 asked whether it is helpful to include students from the majority background in programs aimed at underrepresented groups.

Dr. Byars-Winston said that the goal is to have everybody comfortable working in diverse groups. She conducted a study in 2010 with a group of 200 students from underrepresented groups to determine their comfort working with majority groups. The study found that the more comfortable a student was in working within the majority, the better their academic performance. Studies have shown that exposure to different groups in a structured way is a predictor of success.

Speaker 11 said that it is important to define the word “mentor.” Many students think it is the same thing as having an advisor. He also asked about evaluating the long-term impact of the mentor-mentee relationship. Are the mentees successful in their careers?

Dr. Byars-Winston said that she is studying longer-term impacts now. The study involves 10 campuses, 5 of which have a treatment and 5 a control. The study will continue until 2018.

Speaker 12, asked what data she should be collecting now that would be baseline data for future studies.

Dr. Byars-Winston said that some of the important variables to collect are the mentee’s degree of self-efficacy, career commitment, and career clarification. The CEC is creating a repository of useful metrics.

Creating Sustainable Mentoring Networks in Neuroscience Panel

Moderator: Rae Nishi, Ph.D.

Dr. Nishi said that this session would present three different examples of mentoring networks: the Neuroscience Scholars Program (NSP), the Mentoring Institute for Neuroscience Diversity Scholars (MINDS) program, and the Broadening the Representation of Academic Investigators in Neuroscience (BRAINS) program. The aim is to identify the challenges and gaps across the programs and to identify opportunities.

Neuroscience Scholars Program at Society for Neuroscience

Gina Poe, Ph.D. and Julio Ramirez, Ph.D.

Dr. Poe, a co-PI of NSP, said NSP is a program of the Society for Neuroscience (SfN). It began as a travel fellowship 35 years ago. NSP provides networking, mentoring, and professional development opportunities with a goal to diversify the field of neuroscience. More than 600 scholars have participated since 1981.

Eligibility criteria include having a disability or having social, cultural, or economic disadvantages. Nearly half of the participants are Hispanic, 30 percent are African American, 3 percent are white, 3 percent are Hawaiian Native/Pacific Islander, 2 percent are Asian, 2 percent are Native American, and 10 percent are of more than one race. Nearly 62 percent of participants are women.

The program has led to career success for trainees through mentoring, networking, enriching scientific knowledge, and enhancing professional development skills:

- 77 percent of scholars and alumni said that mentoring advanced their professional goals.
- 85 percent said NSP gave them opportunities to develop their professional network.
- 80 percent of scholars published in a peer reviewed journal during their fellowship, and the same percentage continued to publish after completing their fellowship.
- 70 percent received grant support during and after their fellowship.

Of NSP alumni who responded to a survey, about 75 percent are in academia.

Because there are many more applicants for the program than there are slots, NSP has developed three tiers of support. The first tier includes those accepted into the full program. They receive access to professional and research-enhancement workshops and webinars, networking opportunities, and financial support. The second tier is an associate's program. They receive access to webinars on neuroscience research and career skills, and they have access to online diversity forums and to networking events. The third tier of the program is to motivate NSP alumni to participate in webinars and online diversity sessions and to provide networking and mentoring opportunities.

Mentoring is the most difficult part of the program. Some of the students report having great experiences with their mentors, and others have never met them. To make the experience the best possible, each fellow is given a peer advisor and a class advisor. The fellows choose their own senior mentor. A member of the Diversity in Neuroscience Committee checks in with the fellow twice annually to see how they are doing.

In 2015, the program enrolled 15 new fellows and 52 associates. The fellows are graduates and postdoctoral fellows. The program provides professional development workshops and a summer

program in neuroscience ethics. NSP is recording lectures that can be provided for online professional development. The program is also working to motivate alumni and diverse neuroscientists to remain engaged with the program.

The program's next steps include the following:

- Monitor resources to create lasting mentoring relationships
- Identify new ways to involve NSP alumni in the program
- Use data from evaluations to provide for the career needs of the fellows
- Ensure that programming at the SfN meeting involves fellows, associates, alumni, and partners
- Identify online chat and webinar topics
- Strengthen partnerships

Mentoring Institute for Neuroscience Diversity Scholars

Gonzalo Torres, Ph.D.

Dr. Torres said that MINDS is a professional development program for junior faculty that began in 2014 and is funded by NINDS. The junior faculty level is a point in the career pipeline where there are few supports. The program aims to reduce career dropout at this stage.

The goals are to identify up to 10 promising junior faculty members from underrepresented groups per year. The program provides assistance that is keyed to the faculty member's individual needs. The program identifies at least two mentors for every mentee. The mentors are chosen based on research affinities and individual needs. The program establishes a 1-year educational program that includes a mentoring team to help the junior faculty members refine their career development plans.

The program includes two weekend workshops. The mentees receive help based on their stated needs, including preparing a grant, paper, or presentation or undergoing a mock review. They receive funds to attend meetings and receive help to expand their professional networks. The mentors and mentees attend weekend workshops together, at which they receive time for the mentor and mentee interactions.

Broadening the Representation of Academic Investigators in Neuroscience

Claire Horner-Devine, Ph.D. and Joyce Yen, Ph.D.

The BRAINS program is focused on the postdoctoral fellows and early faculty. It is between the career stages served by NSP and the MINDS program. The goals are to plug leaks in the pipeline at this stage using a community-centric professional development program geared to those who are at risk of leaving the field.

The components of the program include a national symposium, mentoring circles, and a continuous career invention program. The symposium is a 4-day retreat that includes panel discussions and topical skills workshops. The mentoring circle helps individuals learn how to solve their own problems and get the resources they need. The peer-mentoring circles meet every other week over the telephone using a structured protocol. A small number of the individuals in BRAINS also take part in the continuous career invention program. This is an intensive program in which the mentee has an advisory board that meets with the mentee via telephone three times to provide advice and guidance.

BRAINS helps mentees navigate the academic science cultural landscape by giving them additional tools and skills such as developing a sense of belonging, career self-efficacy, peer mentoring skills, and professional development skills.

The program is fairly new, but the preliminary results are good. Participants in BRAINS are considered at risk of leaving their academic careers, but 55 out of the 56 participants are still in science. Forty-three percent are in tenure track positions. The participants have been in their research careers and are advancing up the academic ladder.

In addition, there is an increased sense of belonging, better self-efficacy, and an increase in mentoring and networking activity.

The challenges the program faces is the use of a mentoring model that is counter to the traditional mentor model of a junior faculty member as the mentee and a senior faculty member as the mentor. Evaluating the impact of the program is a challenge, as is the long-term time scale needed to see success.

The BRAINS program collaborates with NSP and MINDS programs. The three programs are working to find shared metrics of success.

Discussion

Speaker 13 asked whether the programs work with trainees on rebuttals on NIH grants. Speaker 11 said that participants in his program worked on a grant that NIH had rejected. The participants made suggestions, and the grant is being resubmitted.

Speaker 7 said that having a strong science identity is a strong predictor of success. She asked whether the programs are assessing science identity as an outcome of the programs.

Joyce Yen, Ph.D. said that BRAINS includes mentees who were at risk of losing their science identity and at risk of leaving science. The program has helped them remember how much they love science. That is qualitative evidence, but finding a way to quantify that is difficult.

Julio Ramirez, Ph.D said that that the NSP PIs assumed that immersing mentees in the trainings and the networks would reinforce their science identity. It would be preferable to have the data to show it is true.

Speaker 16 asked the MINDS PIs how they target individuals at risk but who also show promise.

Dr. Horner-Devine said that they look for statements within the application, including where the candidate predicts she will be in 5 years, whether she intends to be a tenure-track career investigator, and whether she sees a place for herself in neuroscience. The PIs score the applications and get an idea of the candidate's science identity, but they need a better way to code and quantify the answers.

Speaker 10 asked how the PIs frame the programs and what language they use. Members of diversity programs may be viewed as not as good as other students.

Dr. Ramirez said that NSP has had more candidates than the program could fund. NSP expanded the number of mentees by creating the associate trainees. They have access to the online programming and some of the same face-to-face activities as the full mentees.

Dr. Poe said that one of the challenges of having the associates is that they may feel like second-class citizens because they are in the second tier. She said that if meeting attendees had suggestions, NSP PIs would be interested to hear them.

Dr. Yen said that their mentees and mentors come from many different backgrounds. When they meet for the national symposium, they try to have conversations about race and gender that can be very difficult to have.

Speaker 6 said that it is necessary to define science identity. It may be the excitement and joy of discovery, which can be defeated by stresses such as funding pressures.

Breakout Group Sessions and Reports

The attendees formed breakout groups, with each group discussing one of three areas: challenges, opportunities, or collaboration in enhancing diversity across career stages. Following the breakout discussions, the groups reported back to discuss these three areas. The following challenges were named:

- Balancing the time needed for laboratory science with the time needed for mentoring. When an institution has a solid reputation for mentoring, it helps recruit the next generation of students.
- What to do with a bad mentor. The institution may not have the backbone to deny a bad mentor additional mentees. Mentors should be required to undergo mentor training, and mentors must undergo evaluation by outside evaluators. Training grants should be pulled if the mentor is not doing a good job.
- How to empower students to seek out mentors and to be responsible for their own mentoring relationships. Faculty members should show students how to find mentors and how to ask them for a mentoring relationship. For example, faculty members can help by having the student address them by their first names and by asking the student how they want to be addressed. The title may be imposing a barrier between the mentor and the student.
- Teaching students to ask questions and to embrace what they do not know.

The following opportunities were mentioned:

- A clearinghouse to inform audiences interested in training opportunities at all levels of neuroscience is an opportunity. There could be one clearinghouse for trainees and one for trainers. The clearinghouse would have drop-down menus that would give a list of resources. There should also be a clearinghouse for high school students who want information on research opportunities. One issue is who would host the clearinghouse. Suggestions for hosts included SfN and NINDS.

The following collaborations were listed:

- Create a visual graphic of a career path. Clicking on a particular stage would provide information about that stage, including where all of the training programs are located and further information about each of the programs. This would provide an overview of career development that would also give it continuity.
- Create a Facebook page or set up a LinkedIn account to help collaborate.
- Define the programs that are available the entire length of the career pipeline. This will allow faculty to see where their students come from and which programs they are likely to continue on to.

Addressing and Enhancing Neuroscience Diversity Across Career Stages

Moderator: Lauren Ullrich, Ph.D.

This portion of the meeting consisted of panels on recruitment, transition and training, and retention. Each panel had three presenters who discussed challenges, opportunities, recommendations, and priorities. Each panel was followed by a question-and-answer session.

Recruitment: Summer Programs for High School and Undergraduate Students

Forming a Neural Network: Diversity Across Career Stages

Marlys H. Witte, M.D.

Dr. Witte discussed the summer neuroscience research programs at the University of Arizona. They are full-time immersion programs that include community outreach. They are designed to get students in the pipeline.

The Summer Institute on Medical Ignorance program embraces "medical ignorance" as a learning tool. The approach focuses on what is known, what is not known, and what we think we know but do not know. The paradox is that the more one knows, the less one knows. Students learn about "ignoramics" and developing ignorance maps. All learning is framed as beginning with a series of questions and then discovering which questions were answered at the end of the project.

Since 1987, the High School Student NeuroResearch Program has enrolled 615 high school students from Arizona, including all of the reservations. Many disadvantaged students have attended. Local teachers do the recruiting. Half of the students are Hispanic, 13 percent are American Indian, 8 percent are black, 13 percent are Asian or Pacific Islander, and 14 percent are white and from disadvantaged backgrounds; 67 percent are female.

Of the 615 students, 20 are still in high school and 558 have either gone on to, or have graduated from, a university; 55 have gone on to medical school, and 23 have gone on to graduate school.

At the end of the programs, the students have learned how to ask questions and are less afraid to do so. Many students said they had not realized that their teachers did not know all the answers.

Dr. Witte said that challenges at the gap junctions are as follows:

- Lack of information, advising, and assistance for students
- Financial, educational, and social disadvantages
- Scarcity of diverse mentors
- Discontinuous pipeline of opportunities

The opportunities for diverse action potentials are as follows:

- Capacity building in curiosity, knowledge, communication, and collaboration. Curiosity is as important as knowledge.
- Nonleaky career pipeline
- Community outreach

Recommendations for a neural network are as follows:

- Clearinghouse of opportunities and resources
- Mentor networks
- Transportable models
- Partnerships between communities and institutions
- Ignorance mapping (Submit questions to neuro.curiosityforall.org)

The Jackson Laboratory Summer Student Program

Michael McKernan

Mr. McKernan discussed recruitment for the summer student programs at two Jackson Laboratory campuses.

The challenges in recruitment include the large number of applications that the laboratory receives; about 900 students apply for 46 slots. His office reads all applications and gives each investigator 10 students from which to choose.

The opportunities in recruitment include being able to discuss with the students the unique characteristics of each program, the beautiful environment, the strength of the residential program, and Jackson Laboratory's unique research program. Genetics is the main focus at Jackson Laboratory, which is a draw for many students.

Mr. McKernan has the following recommendations to other recruiters of summer students:

- Market the program. Jackson Laboratory produced three student profile videos last year and had a 10 percent increase in the number of underrepresented students. Choose students to profile based on the program's needs. If the program wants more women in bioinformatics, profile a student who fits the profile.
- Ensure a quality research experience. Select mentors carefully, be responsive to student suggestions, and help students develop non-research–related career materials, including a professional photo for their LinkedIn profile.
- Ensure a quality residential experience. It builds the alumni base and provides a buffer for students who may be outside their comfort zone when in the laboratory.

Opportunities in the Biomedical Sciences at the University of Minnesota

Robert Meisel, Ph.D.

Dr. Meisel discussed the Life Sciences Summer Undergraduate Research Program at the University of Minnesota, which was established in 1989. It is a 10-week research-intensive program focused on students who want to obtain a Ph.D. or enter an M.D./Ph.D. program. The students do a research project and are encouraged to present the project at a national conference.

The summer program contains six training programs. The programs can change based on funding. Students attend an orientation off campus at a state park where the university has a biological field station. Students are encouraged to network and are told about the importance of networking to their careers.

There are several eligibility requirements for the program, but the most important are that the student is interested in a career in the life sciences and that they commit to the full 10-week program.

The university pays for a full-time recruiter. The recruiter attends national conferences, including the Annual Biomedical Research Conference for Minority Students. The university also has relationships with other schools and institutions that have a diverse student body.

The 2015 student class came from 34 institutions; 57 percent were underrepresented minorities, and 61 percent were from schools with limited research opportunities. Most of the students in neuroscience were freshmen and sophomores. The earlier students participate, the more likely they will consider neuroscience as a career.

The keys to recruiting are familiarity and trust, including a history of commitment to research, a track record of integrity, and having a long-term commitment to the program, which would include funding at least a portion of the program internally. Every program should show their examples of success, and every program should listen to what those involved say about it. Finally, be persistent.

Discussion

Speaker 8 asked how much value is given to previous research experience and to grades during the admissions process.

Mr. McKernan said they look at academic performance and grades on the first pass. But if a student self-identifies as an underrepresented minority, they do not use grades as a criterion. Applicants are asked to write short answers to a series of questions. Admissions is looking for students who really want to come to their program. They also want students who have a clear career goal and can discuss it in their applications. Also, students should be persistent. Jackson Laboratory has accepted students who were rejected twice before.

Dr. Meisel said that having previous research experience is not important. However, the grades are important. His program is looking for students who want to go to graduate school. A student with poor grades is unlikely to be able to do that.

Speaker 8 said that she understands their rationale about grades, but good grades are more difficult to achieve for some students because of their backgrounds. She also raised the issue of letters of recommendation. Some faculty write very good letters, and some write terrible letters.

Dr. Meisel said that his program wants the student to be able to state why they want the program and would not hold it against the student if he or she did not ask the faculty member who writes the best letter.

Dr. Witte said they ask the students to write an essay on why they love science. They rely on teacher letters, and they conduct group student interviews. They also do Skype interviews for students who are unable to make it to campus because of the expense. These interactions help the program administrators judge the students, and the process also has value to the student.

Speaker 17 asked how they get students interested in these programs. Many students do not even know that they would love the program. How do we motivate students to apply? Dr. Witte said she has not seen a student who could not write the “why I love science” essay. Students do have exposure, even if it is through television programs such as *CSI.*

Speaker 17 said that she finds many underrepresented minorities are interested in medicine, but fewer are interested in science. Is there a way to get them into the laboratory? Dr. Witte said that is an issue but not a problem. Some who are interested in medical school will also say they want to do research, for

example, to find a cure for cancer. And she said that wanting a career in medicine is a good goal. Dr. Meisel said that the summer program is only one component of getting students interested in a science career. Other components will target students earlier.

Mr. McKernan said that YouTube is a powerful motivator to students. Jackson Laboratory's videos show students who are doing science. Those videos will encourage more students to engage.

Speaker 10 said that her program in undergraduate research is for those students who want to go into a Ph.D. program. If a student says they are curious about career choices, the program may accept them. But what should they do about students who are more interested in obtaining an M.D.?

Mr. McKernan said that students who are interested in basic research are given a higher priority. That statement comes through in the essays. The students are not specifically asked.

Dr. Witte said her program does not hold an interest in medicine against them. It is important not to exclude them from science so early in their careers. Science is a big part of medicine. We have cancer hospitals because of what we do not know.

Speaker 10 said that her institution has programs geared to a variety of careers. They try to steer students to the programs more geared to their interests.

Dr. Jones-London said that some programs have very specific goals, for example, getting more students into doctoral programs. Those programs will be judged on how well they meet those goals. But programs must leave room for students to change their minds about what they want. Some students who say they are interested in medicine may become interested in science. Some students who thought they wanted a science career will discover that it is not for them. That is an acceptable outcome.

Speaker 9 noting the large number of applications the programs are receiving, asked whether it is possible to channel the applicants to other programs. Dr. Meisel agreed that should happen and said that there are a lot of opportunities for students who want them.

Speaker 16 asked whether mentors receive training to ensure the student has a positive experience. Dr. Meisel said students fill out a survey at the end of the program that includes detailed questions about the mentor. If the program receives a poor evaluation for a mentor, they talk to the mentor. If it happens a second time, they remove the mentor from the program.

Recommendation: Speaker 17 suggested asking those who do not get into the programs whether their names could be entered into a national repository for recruitment. Speaker 6 said that a good model to adopt would be the residency matching program. The student names the programs they want, and the programs name the students they want. Many times a match occurs.

Speaker 11 asked how candidates who say they want to go into industry would be evaluated. Mr. McKernan said it would not be a problem. They also have other types of programs, including a science writing program. Jackson Laboratory is open minded about student career choices.

Dr. Jones-London said that programs are set up to achieve a particular result. Programs NINDS funds are aimed at encouraging a career in neuroscience. But there is an understanding that students will make other choices along the way, and that is fine.

Recommendation: It would also be good to have some common data elements in a central registry. This would help to relieve the burden for faculty who are being asked to write multiple references for the same student.

Speaker 15 said that the nation must make an investment to transform our educational system at all levels to inspire the next generation of scientists.

Transition and Training: Programs to Promote Transition to Graduate School

Hunter College and New York University Blueprint Program for Enhancing Neuroscience Diversity Through Undergraduate Research Education Experiences

Regina Miranda, Ph.D.

Dr. Miranda said that the Hunter College and New York University Blueprint Program for Enhancing Neuroscience Diversity Through Undergraduate Research Education Experiences (BP-ENDURE) program partners with T32 programs at Brown University, the University of Michigan, and Vanderbilt University.

Dr. Miranda outlined the program's goals as follows:

- Develop an outstanding cohort with diverse backgrounds dedicated to neuroscience research.
- Provide scientific skills and research experience through research placement with actively funded neuroscientists.
- Develop academic and curriculum enhancement activities rooted in students' research.
- Maintain an effective administrative core to support students' needs and development.

The students are eligible if they are from an underrepresented minority, are economically disadvantaged, are a first-generation college student, or have a documented disability. Program outcomes are to have at least 85 percent receive acceptance to graduate school and to improve students' academic achievement, science writing, oral presentations, and quantitative skills.

The students receive summer research experience at one of the T32 institutions and do research during the year. They attend a weekly seminar that covers a variety of skills, including writing grants, making oral presentations, and preparing for graduate school. They also are required to present at a local or national conference. The faculty meet with the student one on one each semester, and there is an external evaluation to measure whether the program is meeting its goals.

The program has 29 graduates; 25 of them have applied to graduate school and 24 were accepted. Four of them have received National Science Foundation Graduate Research Fellowships.

The lessons they have learned are as follows:

- The program aims to change how science is conducted so that it represents the diverse approaches of a diverse U.S. population.
- The program aims to have students keep the big picture in mind. What questions do they want to answer? What are they passionate about?
- The program aims to help students to become independent thinkers. The program encourages them to stay in touch with mentors and to publish with their mentors.
- Students should have access to PIs from underrepresented backgrounds who can share their own experiences with the student.

- Past cohorts positively affect current cohorts. When one graduate gets into a Ph.D. program, those in the program see it as a possibility for themselves.
- Hard work trumps raw talent.
- Students should be encouraged to pay it forward on this opportunity.

BP-ENDURE Atlanta: Engaging Undergraduate in Neuroscience Research

Kyle Frantz, Ph.D.

Dr. Frantz said that the program is known locally as Atlanta's Neuroscience Education and Training Program. The two research-intensive universities are Georgia State University and Emory University. They have partnered with Agnes Scott College and Spelman College.

Students apply for the program in their sophomore year. They begin their research experience in their home university. Before their junior year, they take part in a summer research program and complete a second summer internship at another university the following summer.

Dr. Frantz discussed the program's outcomes so far. They have enrolled 52 students. Forty-six students have either completed or are on track to complete the program. The number of students who are either in or planning to apply for a Ph.D. or M.D./Ph.D. program has risen since the program began. It is possible that program administrators are more accurately identifying students who would go on to research.

Dr. Frantz noted a study by McGee et al. found that nontraditional predictors of retention in research careers include curiosity, enjoyment of problem solving, and a high level of independence. Her program has begun a retrospective analysis of their alumni using program applications, annual progress reports, and career status. There were complete data on only 17 students, but they did see that their students who went on to research careers did display some of the nontraditional predictors described by McGee et al.

The program asked students in an exit survey to rate themselves on their growth in research and leadership self-efficacy, science identity, reduction in science anxiety, scientific enjoyment, and commitment to science. They indicated gains in all areas, with the greatest gains in science identity and research self-efficacy.

The program selects potential mentors, holds speed interviews between potential mentors and mentees, holds a lunch for a longer meeting between mentors and mentees, and requires regular meetings between the two when the program begins. Students are allowed to change mentors using a standardized request form. Mentor assessments of the student's research skills are done using a standardized form and over the telephone. This ensures the mentors complete the assessment. The mentors are also more candid on the phone.

The students name the strengths of the program as having the research opportunity, having an opportunity to do poster and slide presentations, and having the summer internship at the partner T32 university. Challenges include having time for research and eliminating the gap year that many students who have gone through the program take. Dr. Frantz said that they are now considering establishing a "research semester" to help reduce the burden of doing research with a full academic schedule and developing a postbaccalaureate program to replace the gap year.

Health Disparities in Neuroscience-Related Disorders Master of Science Program, Wake Forest University

Carol Milligan, Ph.D.

Dr. Milligan said there is a need for greater diversity in neuroscience. Disparities in neurological disorders are well documented, but neurology lags behind other fields in explaining these disparities. There are racial and ethnic disparities in health care but there is little diversity in the health care workforce.

There are few doctoral and postdoctoral students in neuroscience who are from underrepresented populations. There are many reasons why they do not go into neuroscience, including financial burden. A 5-year training program may seem impossible to the student. The Wake Forest master's degree program provides a "psychological stepping stone" to a career in neuroscience. The program is 2 years, has reduced tuition, and has education supports such as tutoring and mentoring. The goals are to interest the students in a career in neuroscience and to encourage them to move into a Ph.D. or M.D. program.

She listed some of the current student projects, including an analysis of stroke outcomes by ZIP code and nontherapeutic pain management in sickle cell patients.

The program administrators are still learning the best recruiting strategies. The program sends emails and brochures to all colleges and universities in North Carolina that have a neuroscience undergraduate program. The first class began in 2015 with five students, all of whom have completed their first year. One of their challenges for next year is to increase the number of applicants.

Discussion

Speaker 3 asked whether Dr. Frantz intends to publish her program assessment data. He also asked whether the BP-ENDURE programs should pool their data given the small number of students they have. Speaker 21 said they do intend to publish. The ENDURE PIs had attempted previously to work out how to share assessment instruments. Because of schedule conflicts, that project has not come to fruition. She said that the PIs should try again. She also said that she would share her program's tools. In terms of a meta-analysis, the more they can ask the same questions, the better it would be.

Recommendation: Speaker 21 said that the white paper from this meeting could include suggestions about common metrics for the BP-ENDURE programs. Speaker 22 said her program would also be interested.

Speaker 8 said that she was happy to learn about the health disparities program that Dr. Milligan described. Her students at the University of Puerto Rico would be interested in this program. Dr. Milligan offered to send her program's emails and brochures to those students.

Speaker 8 asked what other participants think about postbaccalaureate programs. Given that it is an extra year of schooling, is it appropriate to encourage students to enroll?

Dr. Miranda said she encourages students who do not get into graduate school to enroll in a postbaccalaureate program. Dr. Frantz said the postbaccalaureate is terrific for students who have difficulty balancing all the requirements of their senior year. Her hesitation is that it is important to move students more quickly through the science workforce training period, which is quite long. She would also like to know whether the postbaccalaureate keeps more underrepresented minorities in science.

Speaker 23 said that her desire is to build a semester-long research program for undergraduates at her institution. The idea would be to learn how to do a research project from the beginning, including developing the hypothesis, the aims, and the methodology to test the hypothesis. The student would write the paper at the end. She asked whether participants could help her strategize how to do this.

Dr. Frantz said she likes the idea, but she said one thing to consider is how students can earn the appropriate number of academic credits so that they do not fall behind their classmates. The institution would need to develop a solid curriculum and would have to be prepared to deal with hundreds of applicants.

Dr. Jones-London said that the issue of the postbaccalaureate is tricky. Some students lack scientific self-efficacy and will not have the confidence to apply for a doctoral program, although they are qualified. Those students should be encouraged to apply for graduate school, not the postbaccalaureate. For students who need more training, or who are not ready for graduate school for other reasons, the postbaccalaureate is a sensible move.

Speaker 24 said that postbaccalaureate programs can be very good preparation for graduate training. The National Institute of General Medical Sciences (NIGMS) has a postbaccalaureate program in which students spend 75 percent of their time in the laboratory working as technicians. The remaining time is spent in career development. The postbaccalaureate is useful for students who have the potential but were unable to get into a graduate program. Also, some students do not feel ready for graduate school, and the postbaccalaureate could be appropriate for them.

Speaker 8 said her students say they want to do a postbaccalaureate as a way to strengthen their research background and their ability to get into graduate school.

Retention: Programs to Maintain Engagement of Graduate to Junior Faculty in the Neuroscience Workforce

University of Alabama at Birmingham Neuroscience Roadmap Scholars

Farah Lubin, Ph.D. and Lori McMahon, Ph.D.

Dr. Lubin said that this program is focused on the transition from graduate school to postdoctoral fellow. Postdoctoral fellows often have less structured support. This is a stage at which members of underrepresented groups can feel isolated. Dr. Lubin is a graduate of NSP.

Dr. Lubin summarized the result of a recent survey in which minority graduate students were asked about reasons they may leave science. Among the reasons students gave were a lack of cultural and social support, feeling like the “token,” feeling isolated, having to work twice as hard as majority students, and the financial pressure from their families.

This program provides a road map to students, showing them the steps they should take to move through graduate school and into a postdoctoral position. The program enriches the student through a series of courses and workshops.

The program includes an individual development plan for each student and participation in a weekly lunchtime seminar at which they discuss issues such as work-life balance, how to balance a budget, and implicit bias. They take courses in critical thinking, experimental design, and grant writing. They have a mock study section. They learn elementary neuroscience laboratory skills, including how to keep a

notebook. They also offer workshops on what it means to go to the postdoctoral and assistant professor levels. Students are more likely to continue to the next career step when they have this training.

The students are also given teaching experience. They learn peer-to-peer mentoring. They mentor each other and undergraduate neuroscience majors. The students also attend the National Enhancement of Underrepresented Academic Leaders meeting.

The program has included 45 trainees from other schools. They have had very positive feedback on their surveys.

Congruent Mentorship to Reach Academic Diversity in Neuroscience Research

Girardin Jean-Louis, Ph.D.

The Congruent Mentorship to Reach Academic Diversity (COMRADE) in Neuroscience Research program, although it is new, has trained 110 junior faculty from New York University and elsewhere. The goals are to help participants achieve academic promotion, publish papers, make presentations, submit grant applications, and mentor others. The program's core competencies include research skill, responsible conduct of research, management and leadership skills, and communication skills.

Dr. Jean-Louis presented the conceptual framework of the program. The elements consisted of the academic environment (including access to training from well-resourced centers), mediators (including academic self-efficacy), and academic success (including peer-reviewed publications).

COMRADE addresses difficulties experienced by junior investigators in establishing independent careers through the academic ranks. The program establishes partnerships between mentors and mentees based on research interests. The program includes a summer institute.

The mentee receives monthly and mid-year progress reports, and they attend an NIH session in which they receive guidance on grants and career development. They also meet with NIH staff.

Mentees are required to do the following:

- Dedicate 5 percent of their time to writing a research proposal.
- Attend monthly webinars.
- Contact primary and secondary mentors on alternating weeks. Mentees are paired with mentors who guide them through the grant application.
- Attend both summer sessions. The second summer session is to finalize the research proposal.

How to Retain Postdoctoral Fellows and Junior Faculty in the Neuroscience Workforce

Peter MacLeish, Ph.D.

Dr. MacLeish said that retaining postdoctoral fellows in the neuroscience workforce is a challenge. The transition from postdoctoral fellow to assistant professor is difficult. One problem is that the fellows are often working on their mentor's project. It is important to help the mentee identify the research questions that are important to them and to be able to develop and "own" that project. This should be a fundable project that the mentee would take with them when they move to a faculty position.

Junior faculty must know how to obtain a good financial package when they obtain their first position, enough to support their research. They may need a few years of support to get the preliminary data necessary to obtain a grant.

Junior faculty should seek relief from teaching and administrative duties for their first 3 years to give them time to jumpstart their scientific career. Junior faculty should give talks and poster presentations to make their names as scientists.

Junior faculty should be receptive to critiques. They should embrace new technologies. They should develop a trusting mentoring relationship with at least one established investigator. Junior faculty must learn to take criticism from their mentors.

Discussion

Speaker 5 said that many postdoctoral fellows who are members of underrepresented minorities are going into teaching instead of research. Is there something that could be done to steer more into a research career?

Lori McMahon, Ph.D. said that one of the key factors is that many fellows lack self-confidence. Her program developed a "postdoc school," during which the fellows met as a group to discuss their challenges and fears. There was a transformation in many of the students by the end of the training. Continuing support and guidance are needed at these career stages.

Dr. MacLeish reiterated that junior faculty must focus on research to make a place for themselves.

Speaker 17 enumerated reasons an individual would choose a teaching position at the undergraduate level over a postdoctoral fellowship. Part of the problem is that there is no guarantee of a job or funding at the end of the postdoctoral training. Mentors who are very positive can be helpful here. Another possibility is to develop a partnership with industry that would enable the fellows to obtain funding at the end of their fellowship. This would help them bridge the gap to a faculty position.

Dr. Lubin said that science is not always fun. Sometimes it is good to go out and do outreach, but students should know that it is a career. No career is going to be easy.

Speaker 3 asked whether it would be possible to create projects that would be of interest to members of specific underrepresented groups. This may encourage more to enter research careers.

Speaker 23 asked how to give students training in rigor and experimental design, while also encouraging them to be on the cutting edge. Dr. Jean-Louis said that his program includes group sessions that are designed to do that. Students should not pursue only one idea. It is important for them to think about questions that are fundable and will be around for the longer term.

Dr. Lubin said her program exposes the students to famous scientists, many of whom took unexpected turns on their career paths. She tells her students that they have to create their own paths.

Dr. MacLeish said faculty at his institution, which is an under resourced institution, may move to a new university when they receive their first R01. The university suffers from losing the talent, but at the same time, it can be viewed as a success.

Speaker 13 said that one of the key criteria for receiving tenure is to have a research portfolio. His university provides training to faculty members who do not have a research grant or program. Some of

those faculty members have since received research awards, making tenure a much stronger possibility. This is a step that institutions can take internally.

Speaker 31 said that some junior faculty had mentors who had large datasets that they opened to the trainees. One of the major problems for clinical scientists is that it is difficult to get access to a large dataset.

Dr. Lubin said junior faculty should have a mentor within their department. That is something that should be implemented for all faculty members.

Dr. Jones-London said that there are two awards that can help with the faculty transition: the K22, which is a diversity award, and the K01. Even at the faculty level, people need mentors. It is difficult for faculty members to ask questions, because they fear being judged negatively. Mentors provide a safe space to ask questions.

Speaker 17 said that the mid-career level requires the faculty member to learn new skills, so mentors are needed at this level, too.

Day 2: Tuesday, April 12

Opening Remarks

Dr. Jones-London said that the previous day's presentations provided an overview of the diversity programs in place. The discussions also produced some recommendations, such as the clearinghouse hub. The second day of the conference provides an opportunity to develop next steps, new concepts, and interventions. This is the time to brainstorm everything from blue-sky ideas that take a wider and deeper perspective to ideas that could be quickly implemented. She encouraged participants to come up with ideas that are feasible and that have wide-ranging support.

Once NINDS has the list of ideas, staff can organize further meetings, perhaps via teleconference, to plan the next steps.

Breakout Sessions

Attendees chose one of three breakout sessions to attend. Each had a set of questions participants were asked to discuss, as follows:

- **Fixing Gap Junctions,** moderated by Sherilynn J. Black, Ph.D., Duke University. How can we influence graduate admissions and affect institutional buy-in?
- **Increasing Action Potential,** moderated by Anna Han, Ph.D., NIH Office of Scientific Workforce Diversity. How do we address nonresearched factors that impact diverse trainees while leveraging attributes like resiliency?
- **Wire Together, Fire Together,** moderated by Alison Hall, Ph.D., National Institute of General Medical Sciences. How can we use our programs to facilitate transition of trainees across career stages?

Breakout Reports

Following the breakout sessions, the three groups returned to report their results.

Fixing Gap Junctions: How Can We Influence Graduate Admissions and Affect Institutional Buy-In?

Speaker 28 discussed her experience talking to students and faculty regarding diversity issues. Faculty members said that the students from underrepresented groups were not prepared for the academic work. Students said alienation and isolation were their biggest challenges, not academics. Speaker 28 found that the problems lay more with the faculty than the students.

Group members discussed challenges on their own campuses and suggested strategies to overcome them. One problem is that the T32 grants come with the expectation that the institution will graduate students within 5.5 years. Minority students are more likely to be seen as an academic risk, providing a disincentive to include them in the program.

How can these perceptions be changed? The key is to give scientists the data on diversity. Some faculty members are fully committed, some believe in diversity but think they do not have the tools to be effective mentors, and some are interested only in science and not in diversity.

Institutional change will not come about until members of the institutions recognize the problem. Some people do not recognize that there is a problem of lack of diversity. Speaker 28 brought in NIH grants staff who explained that investigators will not succeed on grant applications if they do not address the issue.

Speaker 28 also referenced Dr. McGee from Northwestern University, who provided data showing that the Graduate Record Exam is not a predictor of success in graduate school. Institutions must remove that requirement. The admissions committees must look at students in a more holistic way.

Her institution has trained faculty using role-playing and theater-based, experiential diversity training. Some faculty members are not comfortable with that type of training, so alternative types of training are needed.

Her institution also uses an approach they call “bitter dessert.” One faculty member gets together with students to talk about the challenges they have had to overcome in their careers. The faculty member cannot talk about their science. The faculty members who did this were able to recruit the best students for their laboratories. That has prompted other faculty to volunteer. There is now a waiting list of faculty who wish to do this.

Her institution takes a team approach to mentoring. The student is assigned one mentor who is not directly responsible for the student’s academic career.

Faculty members go on recruiting trips, including to reservations, to talk about science. Scientists present the programs in a better, more appealing way than an admissions officer could.

Other suggestions this breakout group developed included the following:

- Work with the university development office to identify other opportunities to support diversity. For example, companies sometimes set aside money to work on diversity efforts. The development office will know of these opportunities.
- Share diversity program successes through the university media office.
- Apply for R01 diversity grants that are available through NIGMS to measure the success of the diversity program.

- Do not allow fear to prevent program officials from discussing diversity and working on a diversity program.

Speaker 28 said that faculty fear of engagement could be overcome by framing these efforts in terms of professional development and enhancement of the science. She does not frame her mentor training programs as a diversity effort, but the trainings have a strong diversity component. This works better to bring in scientists who might be fearful about discussing diversity issues.

Dr. Jones-London asked whether the group had discussed how PIs could balance training mentees when they have so many other pressures related to funding and running their laboratories.

Speaker 28 said that her institution received feedback from PIs that they did not know how to develop individual career plans for their mentees. Her institution provided funding to the offices that could help with that effort. People from those offices partnered with PIs to help develop the plans. One advantage of this approach is that the career plans are standardized across mentees. Her institution has used this partner approach on other aspects of the diversity program to ensure that quality is maintained and standardized.

Speaker 17 said that her institution's graduate students expressed an interest in receiving training in other fields such as journalism and public health. The students can take courses from other departments and receive a certificate. It is something that they can put on their resume.

Speaker 29 said that some institutions have not bought in to the diversity effort. NIH should mandate the programs. Then the institutions will put the money in.

Speaker 28 said that she invited NIGMS staff to meet with faculty and department chairs. NIGMS asked about the progress of their diversity efforts. Faculty could see that diversity was an important factor in grant applications, and there was much more buy-in after that.

Dr. Jones-London said that approach works when the institution is receiving funding from NIH. When NINDS visits its T32 programs, they tell them that NIH is considering diversity efforts in funding. But they also tell them of the trainings they can attend to obtain more information. When faculty members begin attending trainings and meeting potential students, they are much more open to diversity efforts.

Increasing Action Potential: How Do We Address Nonresearch Factors That Impact Diverse Trainees While Leveraging Attributes Like Resiliency?

This discussion group made the following points:

- Members of underrepresented groups may lack confidence and perseverance in the face of rejection. NIH is looking at people who do not resubmit a grant following a rejection to see whether these applicants have anything in common.
- Those in neuroscience are often judged on their laboratory pedigree as opposed to their individual merits.
- Mentors can help their mentees by telling them about their own failures. Science is not easy, and everybody fails at times.
- Trainees need to learn soft skills. Speaker 29 had a financial advisor talk to her students. Trainees can also benefit from training in things such as conflict resolution.

Action items:

- Make implicit norms explicit. Some students may not realize that they must dress more formally for a presentation or that they should go to the professor during office hours if they are having difficulty in class. Tell students about these implicit norms from the outset to prevent unnecessary slipups.
- Identify that everybody has their own biases.
- Provide formal training for PIs and other faculty. Helpful websites include the Entering Mentoring and Office of Intramural Technology and Education websites.
- Create a website that links to all of the best trainings.
- Create webinars to help address implicit bias through NIH or SfN for PIs, faculty, and students.
- Ensure that students have more than one advisor.
- Provide constructive feedback, but couch criticisms in terms of external factors, not personal attributes.

Speaker 27 said that some students from underrepresented groups do not want to apply for an F31 diversity fellowship. Her students have the opinion that the summary statements received in the diversity fellowship are "different in tone."

Speaker 5 said that NIH should not have one grant program containing diversity and non-diversity arms. There should be separate programs that are judged separately.

Speaker 27 also said that the points that Speaker 29's group had raised are true of all students, and the action steps could benefit all students. Diversity training is not an add-on but something that enhances science.

A participant said that she liked the idea of having webinars available. Webinars could assist mentors and mentees through some difficult conversations and create better understanding.

Wire Together, Fire Together: How Can We Use Our Programs to Facilitate Transition of Trainees Across Career Stages?

Most of the discussion focused on the undergraduate-to-graduate transition, but there was also discussion of the transition from graduate to postdoctoral fellow and from postdoctoral fellow to early career. The following are recommendations to help ease the transition from the undergraduate to the graduate level:

- Build relationships among institutions, linking research intensive universities to those with fewer resources. Have reciprocal visits from students and faculty in both institutions.
- Create a summer research experience. Plan what the program should include and the data that will be used to evaluate the program. Market the program and gradually increase the number of students in the program while maintaining program quality.
- Build self-efficacy. Empower students to become better scientists and to have the confidence to apply for the next career level.
- Train students to get the most out of their mentoring relationships.
- Coach realistic goals. Students need to understand the baby steps needed to reach these goals.
- Coach students about the career pathways through the entire scientific career.
- Help students understand the types of social relationships that are common in science so that they take steps to fit in. Mentors should simultaneously take steps to welcome them into those relationships.

The group also recommended steps to be taken between the undergraduate and graduate levels:

- Encourage postbaccalaureate and internship experiences that provide immersion in research. Collect data on how well the programs are working.
- Reshape the admissions process. Graduate admissions committee members must be trained in cultural competence and should be familiar with nontraditional predictors of success.
- Make better use of diversity supplements. Diversity supplements apply at all stages of the career path and are underused. There are a variety of diversity supplements available, including for women who are re-entering the workforce or transitioning to the junior faculty level. Build institutional capacity to write diversity supplements.
- Learn the important data sources and data sharing sites, including the Understanding Interventions that Broaden Participation in Science Careers Conference. The group that organizes the conference also has online resources, including a collection of best practices to promote science careers. Other good resources include those from NIGMS and the Postbaccalaureate Research Education Program and MARC programs.
- Create internal datasets. Collect data on alumni outcomes and continue to track alumni. Use data to highlight outcomes in programs. Make the data available to prospective students.

The transition from the graduate to postdoctoral levels is a relatively easy transition. There are a sufficient number of postdoctoral fellowships available, and networking during conferences has been effective at pairing investigators and postdoctoral fellows.

Postdoctoral fellows and junior faculty benefit from team mentoring. The F32 program is a model that works.

The group focused on the undergraduate-to-graduate transition, because it is the foundation of the trajectory to junior faculty. It is important to continue to focus on building skills and confidence, even into the junior faculty level.

It is important to increase supports available for the postdoctoral-fellow-to-faculty transition, to help achieve work-life balance, and to encourage the development of a science identity. One university has tried to free up time for trainees and junior faculty by providing vouchers to get their house cleaned.

Discussion

Speaker 11 said that mentors should be honest with trainees about how hard they will have to work to succeed. It is not a 9-to-5 job if one wants to be successful. He also said that many of the suggestions made so far would help all mentees, which means that they would not close the gaps in career outcomes. The key is to find the interventions that will close the gap.

Speaker 17 said that sometimes students drop out of the career pipeline at a transition because they cannot envision how to take the next step. It is important that trainees learn about the entire pipeline early so that they can see the entire path. It is also important to let them know that they will have mentors all along the way.

Recommendation: Speaker 17 suggested creating a database so that trainees are not required to renew their applications for each new program. The database would contain their applications and their recommendations.

Dr. Jones-London asked whether a subcommittee of attendees should work on a common application that could be shared across the R25s and later more widely. This would eventually be a database that serves as a clearinghouse of information of trainees from underrepresented groups.

Speaker 24 expressed concern that students would not update their information and that it would remain a database of R25 trainees and would not widen to a larger selection of underrepresented minorities.

Dr. Jones-London suggested starting this out in a controlled environment as a beta test. Speaker 16 suggested forming a group within LinkedIn. People do update their LinkedIn profiles. Speaker 24 said that she supports the idea of using LinkedIn and noted that NIGMS already has a LinkedIn group for an R25.

Dr. Jones-London said that NINDS has a diversity training group in LinkedIn, but her proposal is different. This proposal would help the trainees find the right programs. When program directors receive applications, they see how many wonderful people they must turn down because of a lack of available slots. This would allow directors to refer the trainees to other programs that would be a good fit.

Speaker 5 said that the Leadership Alliance has a common application that students submit to be considered for summer programs. The students list their top choices of programs.

A participant said that she prefers to receive an application specifically for her program. It allows her and her institution to get a better handle on the applicant. She also recommended that NIH create a request for applications to help institutions integrate the programs that they already have along the career pipeline.

Speaker 9 said that it is important for NIH to continue to support the diversity programs it already has, including the R25 programs.

Speaker 12 said NIH should help the current PIs with professional development. NIH could also help PIs find new ways to improve their programs. This would extend beyond sharing metrics. It would bring PIs together to form communities of practice to take a hard look at what is working and not working. This would be an opportunity for the PIs to share ideas and to critique their programs. This would require funding.

Speaker 15 said that SfN might present an opportunity to meet there. Speaker 16 said that he would like to have a way to get all of the program directors in the room together. Perhaps that would be possible at the Understanding Interventions conference.

Speaker 28 said that she has taken members of her institution's graduate admissions committees to the Annual Biomedical Research Conference for Minority Students and to the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science conference. Admissions committee members viewed posters and saw their promise as scientists before seeing an application. The number of trainees from underrepresented groups shot up after that.

Speaker 28 also said that the study by Donna Ginther, Ph.D., showing that African American grant applicants were much less likely to receive a grant has discouraged underrepresented minorities from becoming PIs.

Speaker 14 said that if there are future R25 PI meetings, she would like to hear from experts in the social science field who could tell the PIs what works, what does not, and what could be harmful.

Dr. Jones-London asked about the establishment of an information clearinghouse. Would this duplicate what other organizations have done? NRMN is one such organization. And if there is a need for a neuroscience diversity clearinghouse, what information should be included? Some possibilities are grant opportunities, job postings, a pipeline visual, and a speaker resource. A speaker resource could be valuable, and those individuals could be invited to, for example, Center for Scientific Review workshops and R13 meetings.

Speaker 28 asked whether SfN had a diversity speaker list on their website. There was general agreement that there is no updated list available at the website. Speaker 12 said that one of the evolutionary biologists created a Google doc of evolutionary biologists from underrepresented groups. People add their own names and links to their websites. It is voluntary and simple.

Dr. Jones-London said it may be possible for NIH to develop a similar list, as long as it is voluntary. It would be helpful to have those who include themselves to also list whether they are alumni of programs such as NSP.

Speaker 21 recommended that NIH have another option for gender in addition to male or female. Some NIH forms cannot be completed without checking one of those boxes. That is not appropriate.

Speaker 17 asked whether there is a plan to create the visual representation of the pipeline system. Who could assemble a clickable visual graphic? Dr. Jones-London said that a group of people could create the graphic, but a website would be needed to house it.

Speaker 24 suggested developing a wiki that would contain a list of diverse undergraduate and graduate students. But the wiki would have to be collectively owned so that it is constantly updated. Speaker 12 suggested requiring an individual update their entry in the wiki at the time of their grant review. Speaker 16 suggested beginning with individuals who are in the neuroscience programs. That is a manageable project. Those who work on it could expand the list at a later point.

Dr. Jones-London said that she would send participants to fill out their evaluations. They will be asked to name the top three actions that appear to be feasible. She will also ask participants to volunteer on one of the workgroups that will be forming.

Speaker 6 asked participants to send their unanswered questions to neurocuriosityforall.org. She will archive those and share them.

Dr. Jones-London enumerated a number of things she will share with the group, including links to some of the websites they had discussed. NINDS will disseminate a synopsis within 3 months.

Adjournment

The meeting adjourned at noon.