

The BRAINS Program: Transforming Career Development to Advance Diversity and Equity in Neuroscience

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In order to better prepare trainees and advance diversity in neuroscience, career development must move beyond scientific skills. The BRAINS Program's continuous professional development model positively impacts participants' careers by fostering a sense of community and creating a counterspace for critical conversations.

Career Development: Moving Beyond Scientific Skills

Many have eloquently advocated for embracing diversity in biomedical science and broadening the participation of individuals from underrepresented groups (URGs) (e.g., the Fall 2016 special issue of *CBE Life Sciences Education*). Indeed, efforts to foster diversity in neuroscience have been ongoing for decades (Nishi et al., 2016). Even so, the percentage of neuroscience graduate students from racially and ethnically underrepresented minorities is low ($\leq 12\%$) (Sved, 2013). According to the National Science Foundation's Survey of Earned Doctorates (2001 through 2013), of 10,000 neuroscience PhDs earned by US citizens and permanent residents, only about 8.5% were awarded to persons from URGs (NCSES and NSF, 2015). While there are no definitive data on the number of neuroscientists with disabilities and their career paths, of the 96,345 PhDs awarded from 2003 to 2012 in the biological sciences or psychology (common fields for neuroscientists), only 2% (2,102 degrees) were awarded to persons with disabilities (NSF and NCSES, 2014). At the next career stage, less than 5 percent of the postdoctoral scholars and tenure-track faculty in neuroscience are members of URGs (Sved, 2013).

Efforts to increase diversity in science must not only focus on exposure to science and acquisition of research and sci-

entific skills; they must also address broader professional development topics. After all, successful scientists need much more than scientific skills and expertise to thrive in their careers. Communication, time management, strategic planning, networking—these professional and career development skills are part of the large suite of tools and experiences that individuals need to successfully navigate their scientific careers. Unfortunately, much of professional development in the scientific domain is offered ad hoc and often as an a la carte menu, resulting in periodic and isolated professional development experiences that are accessed by only a subset of researchers. In addition, there is currently little in the way of professional development training on how to navigate the social and cultural landscape that is embedded within the science community. This type of training is particularly relevant to individuals from URGs, who often lack access to the informal networks where scientific and career-cultural information is exchanged. We posit that the scientific enterprise, writ large, will benefit greatly from more strategic, integrative, intentional, and continuous professional development training at all career stages. To advance equity and diversity in the biomedical sciences, we must do better to prepare all scholars, particularly those from historically underrepresented groups, with a holistic suite of profes-

sional development skills that focus on retaining talented scientists in the field.

We have taken this approach with a professional development program aimed at neuroscientists called BRAINS: Broadening the Representation of Academic Investigators in NeuroScience. BRAINS is an NIH-NINDS-funded national program that seeks to support the success of early-career, post-PhD neuroscientists from URGs, specifically racial and ethnic minorities and persons with disabilities (www.BRAINS.washington.edu). Founded in 2011, BRAINS is a cohort-based program that offers ongoing, community-centric professional development and fosters conversations specific to the experiences of people from URGs in neuroscience. BRAINS participants are post-docs, researchers, and assistant professors. A total of 59 early-career neuroscientists have participated in two BRAINS cohorts to date, with over twice that many likely to participate over the next five years.

Factors Impacting Success: Lessons from Social Science Research

So, what works when it comes to professional development interventions, particularly when targeting individuals from URGs? Social science research has identified a suite of factors related to career success for individuals from groups underrepresented in STEM (see Williams

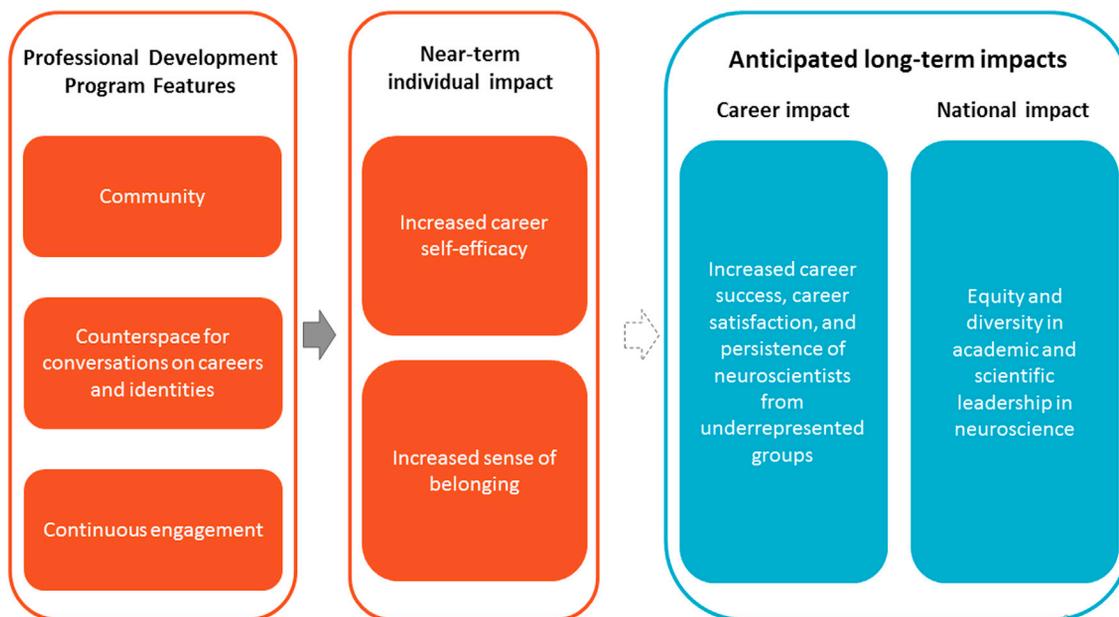


Figure 1. Three Key Recommended Features for Professional Development Interventions and the Near-Term and Anticipated Long-Term Impacts

et al., 2016 and Pfund et al., 2016 for an overview). Programs that are intentionally designed to address these factors have the potential to increase the probability of success for individuals as they navigate their scientific careers. Here we highlight two of these factors: self-efficacy and sense of belonging.

Self-efficacy (Bandura, 1977) refers to an individual’s belief in their ability to successfully perform particular tasks to produce a specific outcome. Increases in self-efficacy are related to increases in motivation and a range of performance measures, and self-efficacy is an important mediator of commitment to science by persons from URGs (Chemers et al., 2011). For example, an individual with high self-efficacy has a higher probability of both trying and successfully performing a set of skills than does an individual with the same skills but lower self-efficacy. We focus on self-efficacy because individuals develop their sense of self-efficacy from personal performance, learning by example, social interactions, and how they feel in a situation.

In addition to self-efficacy, sense of belonging (the subjective sense of affiliation with the scientific community) is an important mediator of an individual’s persistence in scientific careers for scholars from URGs (Chemers et al.,

2011; Estrada-Hollenbeck et al., 2011). Sense of belonging to a scientific domain, such as neuroscience, involves feeling accepted and valued by members of one’s academic community (Good et al., 2012). For example, sense of belonging metrics might ask about the extent to which an individual feels like part of the family in the field or the extent to which an individual identifies with the field or profession (Goodenow, 1993).

Putting Theory into Practice: Three Strategies from the BRAINS Program

We have applied our understanding of the relevant social science research to inform the BRAINS Program. Moreover, we have learned a lot from our BRAINS program participants about what works to support the careers of early-career investigators from groups that are underrepresented in neuroscience. Perhaps the biggest take-home finding to date is that professional development content best serves scientists from URGs when offered within a community, so that individuals both expand their career skills and feel empowered in their careers. This strategy directly builds on the social science research insights previously mentioned. We have documented some of the impacts and outcomes of the BRAINS pro-

gram elsewhere (Margherio et al., 2016). Here we focus not on specific outcomes but rather on what we know about why BRAINS is working and how the neuroscience community might use this perspective to think about professional development more broadly. In particular, we share three specific insights that are important to transformative career development training (see Figure 1).

First, professional development cultivated in a community context helps develop levels of trust that allow individuals to seek feedback about their new skills and increase their engagement with resources and relationships developed during a professional development program (Horner-Devine et al., 2016; Nishi et al., 2016). For BRAINS, community is developed in several ways. Our 4-day symposium is held on an island outside of Seattle. The retreat-like atmosphere allows participants and senior panelists to get away from daily distractions and deeply connect with each other on a variety of topics through panels, small group work, individual reflection time, skills practice, and communal meals. The community ties are also strengthened by intentionally engaging in conversations that address both personal and professional topics and identities. These conversations offer opportunities to resonate

with a wide variety of stories and experiences, such that everyone is able to see a bit of themselves in each other. Moreover, hearing the broader context in which advice, tips, and tools are given allows individuals to better determine what might work for them given their own particular context and emboldens them to actually implement their new skills and tools. Beyond what happens at the symposium, the BRAINS program explicitly nurtures the community connections through three primary mechanisms: 1) early-career peer mentoring groups that are established after the symposium, 2) a BRAINS community listserv that sees regular traffic long after a symposium has concluded, and 3) a reunion and booth at the Society for Neuroscience conference. Each of these community “touches” are an opportunity to renew connections, encourage accountability, solicit feedback and advice, and reduce doubts about the ability to embrace and implement the new skills. As noted by a participant in the program’s annual evaluation survey, “It was very encouraging to become a part of the BRAINS community because it is a far more supportive environment. I think having access to a supportive community like BRAINS makes it easier to branch out in the larger neuroscience community, as one has a ‘homebase’ that can help sort out difficulties in the more aggressive neuroscience arenas.”

Second, community connection combined with confidentiality and a shared social identity among participants (i.e., career stage, race, ethnicity, ability status, gender, etc.) sets the stage for establishing “counterspaces” for meaningful conversations about topics that may feel taboo, but are incredibly relevant to professional development and career success. A counterspace is a space and opportunity that promotes positive self-concepts among individuals from URGs; it invites each person to combine their social identities with their professional science identity without question and to participate as their whole selves (Solo-zano, 1998; Case and Hunter, 2012; Johnson et al., 2011). The BRAINS program’s counterspace supports explicit discussions about how one’s experience in science is influenced by one’s gender, racial or ethnic identity, ability status, and other historically and socially signifi-

cant identities. These conversations are often “the elephant in the room.” When tips and tools are suggested without acknowledgment of how issues like identity impact individuals’ experiences, they can fall flat, go untapped, or even feel like an extra burden. Creating a space to have authentic conversations about careers, professional development, and life allows professional development tips and tools to be taken in context and then applied in real life. Indeed, BRAINS participants have said that BRAINS “[p]rovided a safe space in which to network and ask tough questions.” and offered “a safe environment to speak my mind without the fear of being judged.” The BRAINS models creates these spaces and raises these conversations through the use of storytelling and cross-career perspective sharing. Senior panelists are encouraged to be as open as possible in sharing their career and life stories. Their openness invites participants to be open and authentic about their concerns and questions. When one member of the community puts themselves out there, others soon follow. Indeed, we have seen both panelists and participants being more vulnerable and open as the symposium progresses, the trust level increases, and the community connection strengthens.

Finally, professional development must be viewed as continuous rather than as a one-off topical workshop. When individuals are exposed to any new skill or are trying to improve an existing skill, they need time to process what they have learned and a chance to practice applying the new skill. This holds true for professional development skills such as time management and communication skills, since those skills must also be incorporated into an existing context of experiences and perspectives. The BRAINS Program is specifically designed to address professional development within the context of personal experiences and to provide continuous opportunities to engage in the material learned through the program. The continuous element is critical in allowing each participant to adapt new skills into their individual context in an ongoing manner, and it leverages the impact of the strong community connections as well as the conversations that stem from the counterspace

created at BRAINS. The BRAINS peer mentoring circles, which launch after the multi-day symposium, are explicitly designed as mechanisms for participants to continue their connection to the BRAINS community, set personal goals, discuss professional concerns, and receive constructive feedback. This ongoing professional development space allows participants to revisit strategies, tips, and tools from their symposium experience as they face particular and often new challenges or decisions in their day to day life. Such continuous engagement increases the “stickiness” of the tips and tools introduced at the symposium and thus allows content to be woven throughout participants’ careers rather than remaining isolated to a workshop. Continuous engagement also provides opportunities for relationships and trust to deepen among community members. Participants re-engage with professional development as it becomes relevant to their own experience. In this way, they apply the tips and tools to new challenges with the support of a strong community.

In summary, our experience has demonstrated that, when professional development is offered in a continuous fashion and grounded in community and relationships through a counterspace, participants’ self-efficacy and outcome expectations change, allowing them to better pursue their careers with confidence, clarity, and satisfaction. The experiences help individuals apply new tips, tools, and skills so that they work for them, in their context. Moreover, participants have a community on which to lean that offers support, encourages accountability, and celebrates their contributions and accomplishments. By creating counterspaces to address professional development while actively acknowledging the impact of the personal (whether it be race, gender, ability status, parental status, or something else) on the professional, we can increase the uptake of new and improved skills, build trust and community, and help scientists, particularly those from URGs, thrive in their careers.

Recommendations: Things to Try in Your Own Contexts

How can you put these three ideas into practice? Community, continuous

Table 1. Sample Professional Development Topics to Explore at an Institutional or Individual Laboratory Level

Sample Topics	Description	Sample Resources
Moving from time management to life management	Move from thinking about what is urgent and how to get more done to thinking about what is important and how to have the most positive impact with what you do	Steven Covey's <i>First Things First</i> and <i>The 7 Habits of Highly Effective People</i> Robert Boice's <i>Advice for New Faculty Members</i>
Thriving when you are one of a few	Examine how to create community and relationships that encourage discussions and acknowledgement about social identities at work	Kerry Ann Rockquemore's and Tracey Laszloffy's <i>The Black Academic's Guide to Winning Tenure—Without Losing your Soul</i>
Getting the mentoring you need to succeed	Explore the importance of developing a mentoring network with relationships beyond the traditional junior-senior relationship	Ellen Daniell's <i>Every Other Thursday: Stories and Strategies from Successful Women Scientists</i>
Understanding leadership and work styles	Understand our own leadership styles and the styles of those with whom we work and manage to improve communication, relationships, and productivity	Christopher Loving's <i>Loving Leadership: Rekindling the Human Spirit in Business, Relationships, and Life</i>

engagement, and counterspaces for conversations about social identities require trust—trust among participants and also between participants and their facilitators, community members, and institutions. In June 2015, Professor Claude Steele spoke to the National Academy of Sciences (NAS) Committee on Women in Science, Engineering, and Medicine (http://sites.nationalacademies.org/PGA/cwsem/PGA_167298) and highlighted that “the first thing that has to happen is trust” in diverse settings and communities in order to lay the groundwork for people to believe in their abilities and their future in science. He posits that the scientific enterprise must make people from underrepresented backgrounds feel “like people are interested in them and pulling for them, and that people believe in their ability.” A 2016 New York Times article (Colón Ramos and Quiñones-Hinojosa, 2016) calls for a similar effort, specifically with regard to the field of neuroscience. How do you create a culture in your scientific community where trust is central? This is a critical issue to resolve, for it opens up the possibility of developing the community, ongoing engagement, and conversations about social identities.

In neuroscience research, one of the most effective strategies for solving complex problems is to take a multilevel and integrative systems approach. This approach has been fundamental to the success of BRAINS. With this in mind, to increase and retain diversity in the neuroscience workforce, we similarly suggest a multipronged approach that includes system-wide and individual laboratory com-

ponents. At a broad systems level, a sense of community and trust can become institutionalized if leadership embraces the view that having a more diverse workforce is a very effective mechanism for growing excellence rather than a duty or mandate to meet some type of numerical goal. With this view, diversity and inclusiveness do not compete for resources at the expense of excellence; rather, they serve as facilitators of resources and excellence. Entire organizations can then develop policies, procedures, and practices that are geared toward enhancing community and trust among all, but especially URG personnel. An example of such a practice could be institutional support for the formation and continuation of groups that bring young scientists from URGs together with a smaller number of more senior scientists who have experience and/or interest in diversity-related issues. If needed, these groups can draw from different departments—for example, including other types of science departments—in order to generate a critical mass of graduate students, postdoctoral students, or early-career faculty. These early-career groups are noted here because they represent the career stage associated with the largest attrition of diverse scientists. A goal of such groups might be to share experiences, challenges, and solutions that have worked for others. Embedded in these counterspace discussions is professional development skills training that assists URG scientists in navigating science research and teaching careers. Table 1 offers several

professional development topics and related resources that we address in the BRAINS program. These community groups should be encouraged to continue with regular meetings and/or the development of peer mentoring circles, since continuous engagement and “touches” with discussions of identity and career are essential to retain URG members in science.

What can be done on the scale of individual laboratories? This is a critical issue, as the laboratory environment is the immediate home for an individual. If you have never discussed personal challenges to science careers in your laboratory group meetings, the thought of doing so may seem daunting. However, as a good scientist, you might take the view that you have to experiment and consult with the relevant literature or experts in the field to learn what is known about potential questions of interest. Then you can start small by essentially running a pilot study within your own laboratory group to explore these questions or topics.

What type of specific question might you pose for your pilot study? Some suggestions include the following: What is one thing you can do to build a sense of community in your laboratory? Or, how can you encourage and inform lab members to learn more about how our individual backgrounds affect experiences in science careers, particularly if one is a member of an URG? You can also solicit feedback from your trainees to learn more about the type of professional training they need and then follow up on those needs by paying particular attention

to how professional training might be made more effective after considering an individual's personal needs. Don't stop at your first attempt to create community, build trust, and/or offer ongoing professional development. Figure out what did not work and why, then try something different at the next lab meeting. Don't just rely on your own assessment of how things went. Ask your trainees. That exchange helps to build community, especially if you have trainees from diverse backgrounds. Each of these interactions is an opportunity to increase trust and conversation in your community. Eventually, you may even find yourself or others raising topics that previously seemed taboo. Sharing relevant research articles about particular career concerns is a good entry into a conversation. Being honest about what you do and do not know and being open to learning together also builds trust. Creating a space to catalyze conversations about careers and identities takes time, but it is a worthy investment.

It will take time, but collectively we can create institutional and individual laboratory cultures that cultivate a sense of community, offer opportunities for continuous professional development, and engage trainees not only in terms of their scientific identities but also in terms of the other identities that contribute to their total experience in science. In doing so,

we can shift the professional development culture toward one that more intentionally addresses the training gaps experienced by early-career scientists, particularly those from URGs. All scientists will be well served by this shift, as we will collectively create and retain a stronger and more diverse scientific workforce. Ultimately, diversity, inclusion, and equity can and should be internalized by the entire neuroscience community rather than simply endorsed.

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