# Next Steps for Mind, Brain, and Education

## Strengthening Early-Career Development

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# Next steps for Mind, Brain, and Education: Strengthening early-career development

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## Abstract

An increasing number of scholars are being trained in the field of Mind, Brain and Education (MBE), yet discussions of trainees' needs and how to meet them are rare. We, the inaugural International Mind, Brain and Education Society (IMBES) Trainee Board, identify three broad needs of MBE trainees: guidance and support, greater access to and connections among the MBE community, and professional development. We report a first step to address these needs: a daylong trainee conference, which included sessions to foster connections among trainees, provide mentorship from MBE leaders, and provide knowledge and skill building for careers. Attendees' survey results suggest the conference successfully supported trainees' development. As substantial trainee needs remain, we offer specific ways that principal investigators, institutions,

funding agencies, future IMBES trainee boards, and the MBE community can further address trainees' needs to support early-career development and strengthen the MBE field generally.

*Keywords*: *Outreach, Social Behavior, Adult*

## Introduction

Mind, Brain, and Education (MBE) is the interdisciplinary study of human learning, development, and teaching by leveraging knowledge from education research; the experience of education practitioners and policymakers; and social, developmental, cognitive, and affective psychology and neuroscience (e.g., Fischer, 2009). Through a collaboration among these stakeholders, individuals in MBE attempt to understand learning across basic and applied settings, gain further insights into the functioning of the human mind and brain, and improve education. Some scholars refer to this field as Educational Neuroscience (EN), or use MBE and EN synonymously. We argue that MBE is broader and encompasses EN work, which attempts to use cognitive neuroscientific methods—sometimes in conjunction with behavioral methods—to understand how the human brain learns (Szűcs & Goswami, 2007; Varma, McCandliss, & Schwartz, 2008).

The nature of MBE work requires an interdisciplinary approach. Young people's bodies, brains, minds; and familial, community, and global contexts change and interact as young people develop. Due to the numerous and complex ways in which society may improve how it supports youth development, a single discipline or area of practice is inadequate for studying development and learning. Rather, the path towards understanding and fostering healthy development is made possible through the integration of tools, perspectives, and theories, and the reciprocal exchange of

knowledge among stakeholders across MBE fields. Indeed, interdisciplinary approaches to research are increasingly common and impactful (Van Noorden, 2015). Trainees in interdisciplinary fields must be prepared to address complex challenges, but also need multiple potential career paths through which they could specialize and contribute. To date, articulated visions for how MBE trainees can prepare for this work are rare.

Conceptual writing about the field of Mind, Brain, and Education (MBE) has centered on debates about the merits of the field (Bowers, 2016b, 2016a; Gabrieli, 2016; Howard-Jones et al., 2016), affordances and risks of conducting MBE work (Carew & Magsamen, 2010; Christodoulou & Gaab, 2009; Stein & Fischer, 2011), and characterizations of the state of the field (Bruer, 2016; Schwartz, 2015; Thomas, Ansari, & Knowland, 2018). Although MBE work aimed towards training scholars in the field is beginning to emerge (e.g., Schwartz & Paré-Blagoev, 2018), relatively rare are discussions about how best to train MBE professionals who will conduct, utilize, or translate MBE research. These professionals would be grounded in and work across the neuro, psychological, and educational sciences (Fuller & Glendening, 1985; Gardner, 2008; Sheridan, Zinchenko, & Gardner, 2005) or conduct interdisciplinary research on learning and development (Fischer, Goswami, Geake, & the Task Force on the Future of Educational Neuroscience, 2010). Conceptions of training for such professionals have ranged from bidirectional approaches where cognitive neuroscientists and educators train each other (Ansari & Coch, 2006), to

interdisciplinary training in faculties of education to focus on multiperspectivism and translational science (Blake & Gardner, 2007; Fischer et al., 2010), to unique educational neuroscience programs, rather than interdisciplinary training across MBE fields (Pincham et al., 2014). As this literature shows, at present there is no consensus on a broad approach for preparing MBE trainees (i.e., postdoctoral researchers, graduate students, undergraduate students, and preservice and early career educators) or an understanding of their needs.

Within this context, how do MBE trainees acquire their training? Internationally, formal training programs exist, a subset of which illustrate the current interdisciplinary and multifaceted nature of MBE training. Educational Neuroscience or MBE programs may be housed in psychology departments (e.g., University College London, University of Graz, East China Normal University) or education schools (e.g., University of Texas at Arlington, Harvard Graduate School of Education, Johns Hopkins University, University of Alabama), or may be interdisciplinary across neuroscience and education departments (e.g., Vanderbilt University). Programmatic foci span research with neuroimaging, practitioner training, and applications of MBE research in educational contexts. Informal programs also exist, such as the Latin American School on Education and the Cognitive and Neural Sciences (LA School), which provides a retreat on research and considerations for MBE work (e.g., Bruer, 2014). Beyond these opportunities, many trainees, like the MBE scholars in the generation before them, learn

to conduct MBE research from within more established fields, with primary affiliations in the education or psychological sciences. Trainees may be one of few MBE-oriented scholars in their departments or schools (several of us serve as examples). The diverse range of training paths for graduate students or preservice educators in MBE provides varied entry points for trainees from diverse backgrounds and produces scholars with different constellations of skills that span and integrate the mind, brain, and education sciences. These are strengths of the field, yet in practice they pose substantial challenges for mentors and trainees to identify the necessary field-specific skills for productive MBE careers, for trainees to acquire those skills, and for trainees to build networks of peers and advisors in MBE.

As such, the MBE field could benefit from guidelines for field-specific opportunities to support trainees. We, as the 2016-2018 IMBES Trainee Board, argue here that MBE trainees have three broad needs: guidance and support, access to and connections within the MBE and trainee communities, and development of skills and knowledge for productive workforce entry. After detailing each need, we provide an example of an initiative we undertook to address those needs: a daylong trainee preconference at the 2018 IMBES Conference that we designed and executed in partnership with Jacobs Foundation. We conclude by offering suggestions for how principal investigators, institutions, funding agencies, and the MBE community can support trainee needs moving forward. Addressing these needs is vital to supporting the

development of MBE trainees and strengthening the field of MBE as it continues to mature.

## MBE Trainee Needs

To acquire proper MBE training, trainees need guidance and support, access to community, and professional development opportunities. These needs are not unique to MBE trainees; however, they may manifest in unique ways given that the field is young and interdisciplinary. Successful training in MBE entails, at a minimum: (1) basic knowledge of the subfields of MBE; (2) an appreciation of why an MBE approach to studying learning, development, and teaching is fruitful; (3) the ability to use the research tools of at least one MBE subfield; and (4) fluidity in integrating ways of knowing across MBE disciplines.

### Trainees Need Guidance and Support

To navigate the unique challenges of MBE training, trainees require support from peers who share common training challenges and experienced mentors who can support trainees' development. Peers contribute to one another's training by providing emotional fortitude and fresh perspective that can facilitate knowledge integration from across MBE fields. Mentors provide domain expertise in MBE fields, ways of refining skill in synthesizing across fields, and wisdom about the value of an MBE approach.

**Peer connections.** Peers play a critical role in trainees' career development, especially in a field as interdisciplinary as MBE. Peers may learn, publish, and attend

conferences together. Peer discussions expose trainees to new ideas or surface previously overlooked weaknesses in their research (Flores -Scott & Nerad, 201

Peer connections also facilitate socialization into the academic, university, or departmental culture; information sharing about relevant opportunities; or psychological support for graduate school challenges (Grant-Vallone & Ensher, 2000; Weidman, Twale, & Stein, 2001). Indeed, trainees may place greater importance on peer support than faculty support (Gardner, 2007). Further, emotional support from peers may be critical to the health and well-being of trainees. Approximately forty percent of graduate students suffer from moderate to severe anxiety and depression, and more than half who report having an unhealthy work-life balance, which can be compounded by a lack of peer connections, experience these mental health issues (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018).

Peer connections may be especially valuable for trainees whose identities are traditionally underrepresented in academia. Trainees are more likely to have diverse identities in common with each other than with faculty, given that a majority of tenure-track faculty in the U.S. are male and nearly three-quarters are white ("Digest of Education Statistics," 2017), a trend that is likely similar for MBE faculty. Faculty can support trainees from underrepresented groups by understanding the challenges they face, helping them navigate those challenges, and helping trainees capitalize on their unique strengths in their career (e.g., the Spelman model (Jackson & Winfield, 2014)).

Nonetheless, many faculty members have not had first-hand experience with some of the identity-based challenges that trainees experience. As such, peer connections may be especially valuable in MBE, in which there may not yet be established channels for identity-based supports (for an example initiative, see “Increasing Women in Neuroscience (IWiN),” n.d.).

Based on our experience with working with MBE trainees, they may be the sole MBE scholar in their school or department. This suggests that it may be more challenging for MBE trainees to benefit from peer connections, such as knowledge sharing across diverse experiences and skills. Given the roles that peer connections play during training (e.g., mental health support, socialization, identity-based support, collaboration), the potential for such connections to persist throughout one’s career, and the particular value of peer connection for MBE trainees, it is crucial to emphasize peer connections in MBE training.

**Mentorship.** Mentorship is crucial to trainee success. It is associated with academic retention, improved attitudes toward academics, faster degree completion, and improved career and employment outcomes (Eby, Allen, Evans, Ng, & DuBois, 2008; Sambunjak, Straus, & Marusić, 2006; Valero, 2001). The relationship doctoral students have with their advisors[1] may be the most important professional relationship of their training (Baird, 1995) and yet the quality of these relationships is quite variable (Golde, 2005; Johnson, Koch, Fallow, & Huwe, 2000). Especially as the nature of the

professoriate changes, trainees may need more support in early career stages to promote success and foster a sense of professional identity (Austin, 2002). Both government and private research funds aim to support diverse types of mentoring initiatives (Rhodes, 2005). Mentorship skills can be enhanced with evidence-based mentorship guides for faculty (Wilson-Ahlstrom, Ravindranath, Yohalem, & Tseng, 2017) and tools for assessing effective mentorship (Berk, Berg, Mortimer, Walton-Moss, & Yeo, 2005). Yet, because faculty are typically not rewarded as highly for mentorship as for research, it can be challenging for faculty to devote the time to mentorship that they might wish and that trainees need.

As a nascent field, MBE has additional mentorship considerations. Most current MBE professionals were not trained in MBE per se (rather, they launched the field). As such, MBE trainees may not have sufficient examples of how to intentionally navigate a trajectory for a successful career in MBE (Immordino-Yang & Gotlieb, 2017). Therefore, MBE trainees might need especially intensive and creative mentorship, such as with peers, across disciplines, and further into early-career stages. Effective mentorship in MBE needs to align with the essential elements of MBE training. As such, it must span crucial knowledge and expertise, skill development, and professional networking and career exposure within and outside academic contexts (especially as MBE careers increasingly occur outside of academia). Just as one of the main intellectual tasks of MBE professionals involves synthesizing across levels of analysis, so too must MBE

mentors help their mentees think across time and levels of detail about how to do impactful MBE work.

**Trainees Need Access to and Connections among the MBE Community**

Equitable and productive MBE training necessitates access to the aforementioned key elements of training for all trainees and aspiring trainees (i.e., qualified individuals wishing to enter a graduate program), regardless of country of residence, racial- ethnic- or gender-minority status, or type of MBE stakeholder. We laud the efforts that have been made since the inception of IMBES to serve its international mission, to embrace diversity, and to bring together researchers and practitioners. For the benefit of MBE trainees and the community more generally, we need to remove additional barriers to access and to further promote connections among MBE stakeholders.

**Access to the MBE and Trainee Communities.** As the flagship organization for MBE work, IMBES has strived for international inclusiveness and connection building (e.g., Fischer et al., 2007), including with the LA School and the Neuroscience and Education Special Interest Group of the European Association for Research on Learning and Instruction (EARLI). Indeed, the IMBES conference in 2020 will be jointly hosted with the EARLI special interest group. IMBES, with the support of the National Science Foundation, has also created opportunities for U.S. trainees from racial and

ethnic minority groups to engage in MBE work or to showcase MBE work about racial and ethnic minorities.

These efforts have successfully engaged the IMBES membership (including trainees) in North America, and trainees across Latin America and Western Europe. We have connected with trainees around the world (e.g., Malaysia, Turkey, Iran) who are eager to participate in the IMBES community. Clearly, MBE continues to broaden in its international representation through IMBES and other scientific societies based in different parts of the world.

For this internationality to flourish and in light of sociopolitical and historical contexts, the MBE community must reach trainees from currently underrepresented populations. Factors such as country of origin or racial/ethnic background may impact opportunities for MBE training or work. As examples, logistics or high costs may limit opportunities for these trainees to gain experience with some of the most commonly used tools in MBE research (e.g., fMRI) or attend a conference that requires international travel. To address this inequity, and because the entire IMBES community benefits from increased connectedness with these international scholars, trainees outside of North America and Western Europe need additional ways to engage with MBE training.

**Connections among research, policy, practice, and community.** A central goal of MBE work is to foster connections among researchers and educational

stakeholders, as a way to produce usable knowledge and educationally-relevant insights (Christodoulou, Daley, & Katzir, 2009; Fischer, 2009). Accordingly, successful training in MBE can include learning from and being trained to become diverse stakeholders and conducting work that can advance theory and contribute to education policy, classroom practice, and modes of community engagement. Yet, forging connections across disciplines and professions can be challenging because of non-overlapping knowledge, different vocabularies, and different goals. Based on our experience in and with the trainee community, MBE trainees rarely receive formal or explicit instruction in how to build connections outside the university or how to communicate ideas to practitioners and policy-makers. Unsurprisingly, changes in education practice have been slow, despite a proliferation of knowledge in the learning sciences and awareness about how to support decision-making about scientific evidence (Newcombe, 2013). Training scholars in how to effectively produce and consume research is critical to the success of MBE, yet challenging to do.

**Trainees Need Professional Development**

Successful training in MBE should prepare trainees for successful employment. As such, MBE trainees need to build both skills to do MBE work and knowledge of potential employment opportunities.

**Skill development.** There are several challenges to skill-building in MBE. The field spans various disciplines (i.e., at least psychological and biological sciences, and

educational research and practice) with epistemological, ontological, and methodological gulfs among them (e.g., Stein, Connell, & Gardner, 2008). Consensus on the MBE-specific skills that are most useful for MBE trainees to develop may be difficult to attain because of the inherent variability in MBE work and its connection to discipline-specific advancements, policy and practice goals, and international and cultural contexts. Partly due to the wide range of skills and large body of knowledge that is applicable to MBE work, it may often be unclear to trainees where or how to pursue opportunities for successful skill development. Trainees may also face opposition when pursuing opportunities outside of their home department (e.g., a department administrator may question whether a cognitive neuroscience graduate student needs to learn educational research methods). For successful MBE training, trainees need support in identifying the skills to cultivate from one or more of the MBE subfields, finding opportunities to develop those skills, and actively developing them.

**Career development.** The interdisciplinarity of MBE work makes navigating career pathways both within and outside of academia challenging. Across fields, opportunities for academic jobs are becoming rarer and trainees have limited knowledge about other career options (Golde & Dore, 2001; McAlpine & Emmioğlu, 2015). For MBE trainees specifically, finding academic jobs may involve additional challenges: job descriptions may not specify that a position would be suitable for someone with MBE training, and relevant jobs may be housed in varied university

departments or schools. Likewise, MBE-related jobs outside of academia may be difficult to identify and explaining the benefits of MBE training to a potential employer may be challenging. Therefore, MBE trainees need support to identify potential avenues for employment inside and outside academia, and to convey the value of their specific MBE training.

## Trainee Preconference

During our tenure, we sought to identify the above needs so we could better address them. To address these needs, we worked on behalf of IMBES and with Jacobs Foundation to design and execute a daylong preconference entitled, “Navigating Mind, Brain, and Education: A Preconference for Aspiring Leaders,” which preceded the IMBES 2018 Biennial Conference in Los Angeles, CA, USA. In what follows, we describe the preconference and the ways in which it met trainee needs.

The four preconference goals aligned with trainee needs, and included 1) Connection building among MBE trainees, 2) Mentorship from MBE leaders, 3) Opportunities for connecting with diverse MBE groups, and 4) Knowledge-building related to career trajectories and career-relevant skill building. The preconference included: a career panel and breakout session, two sets of award presentations, a lunch with MBE leaders, a peer mentorship session, and a communication workshop.

**Attendees**

Nearly 80 trainees attended the preconference. Roughly two-thirds were doctoral students and roughly a quarter were post-doctoral researchers. The remaining attendees included undergraduate students, Master's students, and recent graduates from MBE programs. Attendees hailed from 14 different countries, including countries traditionally underrepresented at IMBES, such as Malaysia, Mexico, and Brazil. About two-thirds of conference attendees, roughly representative of the attendees overall, completed an online post-conference survey. We draw on this survey to discuss how the preconference addressed trainee needs.

**Providing Guidance and Support**

**Peer connections.** We integrated peer connections throughout the preconference. First, a peer mentoring session provided an opportunity for trainees to discuss affordances and challenges of MBE. Attendees were paired in advance of the conference on the basis of: 1) a novice trainee seeking advice from an advanced trainee; 2) shared research interests; or 3) similar challenges as a function of having an underrepresented aspect of identity in academia (e.g., people of color in neuroscience). We encouraged peer pairs to exchange emails before the preconference and provided pairs with suggested discussion questions. In the post-conference survey, 87% of respondents reported the peer mentoring session as a valuable opportunity to give or

receive mentorship, and 75% believed their peer connection was likely to persist beyond the conference.

Second, we recognized trainees doing exceptional work consistent with the IMBES mission through "Exceptional MBE Trainee" Awards in research, and policy and practice. We purposely selected six presenters who would expose trainees to peer-reviewed, high-quality MBE trainee work from different countries and disciplinary backgrounds. Almost all (94%) respondents agreed that the presentations offered an opportunity to learn about exemplary trainee work, showcased a diverse range of MBE scholarship, and reflected impressive, rigorous research. These examples reinforced the notion that all trainees can produce rigorous and impactful research.

Third, we hosted an informal social gathering at a pub at the end of the day. This event was intended to promote social bonds between trainees and facilitate professional and personal connections within the MBE community. We encouraged trainees to follow-up on conversations from the preconference and meet other trainees without having a work-related agenda.

**Mentorship.** We designed two discussion-based events to connect trainees with potential mentors. First, in groups of about 25, trainees met with one of three mid-career scholars with MBE backgrounds working as either a) an education policy researcher at a research organization, b) a head of research at an education technology start-up, or c) an assistant professor and non-profit director. Discussions focused on potential career

trajectories and how to pursue them. Second, trainees had lunch with one of eleven MBE leaders from academia, funding agencies, and a non-profit science translation organization. Attendees signed up in advance and connected to their leader via email before the preconference. We limited group size to about six, to facilitate personal connections.

These sessions were extremely well received. Many trainees and lunch table leaders expressed that the Lunch with Leaders session was a highlight of the entire IMBES conference. Around 95% of attendees found the lunch discussions valuable to learn about a topic of interest, and to connect with an MBE leader. These sessions were so popular and the need for mentorship so great that the primary feedback was a request that future such events be longer to provide more time with mentors.

**Providing Access to and Connections among the MBE Community**

**Access to the MBE and trainee communities.** We used social media and other technologies to increase access to preconference content for trainees who were unable to attend in person because of financial restrictions, health concerns, or other personal factors. In many cases these initiatives spanned the preconference and main conference, which provided trainees access to both the trainee and larger IMBES communities. Specifically, we broadcast trainee award presentations and main conference keynote sessions on Facebook Live. Live-streamed videos were also saved on the official IMBES Facebook page for later viewing, which further accommodated

trainees across time zones and facilitated interactions via a comment thread for each session. One week after the conference these videos each had about 400 views. To connect with the main conference, we created a poster repository viewable by all IMBES members, in which presenters (often trainees) could upload PDFs of their posters. This initiative aimed to facilitate the exchange of knowledge and research dissemination among trainees and with other IMBES members. Finally, we included preconference and conference funding support for five international trainees, including from under-resourced countries and countries historically under-represented at IMBES.

**Connections among research, policy, practice, and community.** Across multiple preconference events, we consciously engaged MBE scholars who shape educational policy and practice. Three of our exemplary trainee presenters conduct research with teachers. The career panel and lunch discussions likewise featured leaders with policy and practice experience. However, we found engaging policy-makers and practitioners challenging. Despite a wide call and personal outreach efforts for the policy and practice trainee awards, we received few applications-- about one-sixth of the applications as from researchers. Similarly, our research into possible MBE leaders in policy and practice to invite to trainee sessions yielded a small pool of candidates. These challenges underscore the need for greater policy and practice representation in the trainee community and in MBE more broadly.

## Providing Professional Development

**Skill development.** The preconference included a scientific communication workshop that focused on communication across disciplines, an essential part of MBE work that applies to most potential career paths. The workshop introduced trainees to principles of translational writing, included advice about best-practices for communicating research to a general audience, and provided captivating examples of the perils of communicating science ineffectively. Ninety-eight percent of survey respondents thought the session effectively provided concrete skills for communicating with an interdisciplinary audience across diverse venues. Many indicated that they would like to see similar events at future conferences. A few trainees showcased their effective communication skills by contributing blog posts on Jacobs Foundation's Blog on Learning and Development (Albelda, 2018; Brookman-Byrne, 2018; Kim, 2018).

We further supported trainees' skill development during the trainee award application process. We provided all applicants with extensive, individualized feedback on the strengths of their application and areas for improvement. Additionally, we provided awardees with guidance for effective presentations.

**Career development.** To support trainees' career development, we included a career panel with the three mid-career scholars mentioned above (i.e., education policy researcher, education technology start-up researcher, assistant professor/non-profit director). The panelists discussed their paths, careers, and fit with MBE. Nearly all

survey respondents (96%) thought the career panel offered new insights into the range of MBE career paths; 92% believed it offered concrete advice about the skills needed for MBE careers, and over 85% thought the career panel provided concrete leads to investigate for employment opportunities. Trainees found the panelist who was a recent graduate to be especially relatable and valued her insights into research opportunities outside of academia, since attendees reported experiencing a cultural taboo around discussing career options outside of academia.

We also connected trainees to potential employment opportunities during the main conference. We provided conference badge identifiers that job seekers could wear to indicate that they were looking for opportunities. We also provided badge identifiers to potential employers (e.g., advisors accepting new graduate students, lab managers, or post-docs; employers whose organization was hiring). Such initiatives may promote, or remove barriers to, discussions about potential career development opportunities.

**Support for Trainees Moving Forward**

The trainee preconference was one way to strengthen early-career development in MBE. Trainees unanimously reported that the preconference effectively fostered connections among trainees and provided mentorship from MBE leaders, and almost all (94%) thought the preconference helped them build career-related knowledge and skills. Future trainee boards will continue addressing these and related trainee needs through some of the aforementioned initiatives, as well as by starting new ones.

We also invite principal investigators, colleges and universities, funding agencies, and the IMBES community and leadership to further emphasize support for trainees, and consequently bolster the health of the MBE field more broadly. Here we offer suggestions for how interested stakeholders may address trainee needs, so that together we can make great headway in supporting MBE trainees' development. Importantly, we do not aim to prescribe what stakeholders should do nor argue that these suggestions are all new. Rather, we hope these suggestions will act as a springboard for how interested parties may support early-career development. Below we highlight a few of the most promising ideas for guidance and support, access to the community, and professional development (for a full list, see Table 1).

**Improving Guidance and Support**

There are several ways the IMBES community can support trainees' development. Future Trainee Boards could continue to support trainees' peer connections by building upon existing initiatives such as fostering discussion between peer partners and reinvigorating online trainee discussion groups. As a new initiative, the Trainee Board could create a database of abstracts for in-progress theses to connect trainees across universities and countries who are studying similar topics. A similar model at a large research university led to productive cross-departmental research and formation of writing groups (Flores Serrato, 2012).

Principal investigators (PIs) are the primary people to serve as mentors. As such, they are crucial actors for improving the state of mentorship for MBE trainees. Resources such as the William T. Grant Foundations' guide for mentoring junior scholars (Wilson-Ahlstrom et al., 2017) can support PIs who seek to develop their mentorship skills. Consistent with others' (e.g., Barnes & Austin, 2009) calls, we urge university deans to clarify advisor expectations and put high value on mentorship to incentivize PI investment. We further encourage universities to provide more opportunities for joint advising. For example, a Ph.D student might be advised by one PI based on a shared research interest and one PI who enculturates the trainee into academic life. Universities and funding agencies might consider funding such programs that help trainees that diversify their support network. For example, funding mechanisms for developing secondary advisors outside of the school and/or field with which the trainee is primarily affiliated can foster multiple perspectives a wider network of colleagues. The Scientific Research Network on Decision Neuroscience and Aging offers a career transition award that could serve as an example.

**Improving Access to and Connection among the MBE Community**

We offer several suggestions for stakeholders in higher education to increase the diversity of trainees within MBE. Improving educational experiences is a central goal of MBE. One of the most important ways to do so is by addressing educational inequities, which requires greater diversity among MBE trainees, who as researchers and

practitioners can address opportunity and achievement gaps. PIs need space to evaluate trainee candidates holistically. Oftentimes professors state that they value diversity in graduate school applicants, but to minimize risk they make decisions based on criteria imbued with long-standing inequities, such as whether an applicant attended an an elite school or obtained an unusually high GRE score (Posselt, 2016). IMBES leadership could work with funding agencies and philanthropic organizations to increase access to IMBES conferences for trainees from historically underrepresented countries or demographic groups. As one example, Jacobs Foundation supported preconference awards with travel support to the 2018 IMBES conference for international trainees traditionally underrepresented in IMBES.

Connecting research, policy, practice, and community is challenging, and yet since its inception, IMBES has been an intellectual and professional home for many researchers and practitioners. We encourage future Trainee Boards and IMBES to work together to continue such efforts and create analogues that explicitly engage trainees. Recent examples, such as the Wellcome Trust 2016 IMBES preconference that facilitated dialogue among stakeholders and the 2018 IMBES conference call for symposia that encouraged researcher-practitioner collaborations could be adapted for, or explicitly target, the trainee community. As another example, PIs could involve trainees in connection-building events. Trainees could join PIs at events where they speak to non-academic audiences, provide teacher professional development, inform

education not-for-profit organizations about emerging work, or present to the general public. Perhaps advanced trainees can join PIs in speaking to these audiences. When MBE leaders accept these invitations, trainees benefit from seeing the example the leaders set of honoring the important work that takes place outside the academy.

**Improving Professional Development**

To support skill-building, IMBES leadership and the Trainee Board could co-develop guidelines on skills that are most relevant for MBE training. Although such an undertaking would require substantial consensus building and flexibility, a framework of broad, key MBE skills could empower trainees to take charge of their training. We offered here a preliminary set of key elements for successful MBE training. This set could serve as a starting point for a consensus statement from MBE experts that would clarify and provide a framework for the minimum elements of MBE training.

The Trainee Board and MBE leaders could also co-create systems to connect trainees with career opportunities, such as a career guide that details potential career trajectories for MBE scholars both inside and outside of academia. Funding agencies could consider supporting initiatives to develop this content.

## Conclusion

The establishment of the IMBES Trainee Board and a preconference focused on trainees were valuable first steps to strengthen early-career development in MBE. Harnessing this momentum requires a concerted effort among the Trainee Board,

IMBES leadership, PIs, institutions, funding agencies, and the broader MBE community. A continued investment in MBE early-career development is crucial for a strong and sustainable field that will prepare current trainees to train a third generation of MBE scholars.

MBE will benefit from providing trainees with guidance and support, access and connection to the MBE community, and professional development. Through stronger connections with peers and more comprehensive mentorship, the field can implement findings from MBE research on the importance of social relations to learning (e.g., Immordino-Yang, 2015). Increased access to MBE, especially for historically underrepresented groups, can expand our community's understanding of how cultural perspectives shape views of how people learn. Strengthened connections among researchers, practitioners, policy makers, and communities will better position MBE to realize its mission as a translational science. Subsequently, as MBE trainees successfully enter the workforce, relationship building among stakeholders will be easier because trainees will have experience cultivating the necessary skills. In sum, greater investment in early-career development not only supports trainees, but also moves MBE closer to its goal of supporting learning and healthy development informed by the cross-talk among our bodies, brains, minds, and cultural contexts.

[1] Academic mentors may or may not be official advisors to a trainee. Here we conceptualize mentorship as going beyond approving coursework and managing the logistics of training to include guidance and socialization.



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Table 1.

Suggestions for how various MBE stakeholders may address trainee needs.

| | MBE Community and Leadership | Principal Investigator | Institutions | Funding Agencies |
|---|---|---|---|---|
| | **Improving Guidance and Support for Trainees** | | | |
| **Peer Connections** | • Strengthen peer mentoring (e.g., facilitate communication between conferences)<br>• Promote online discussion groups<br>• Host a database of abstracts for in-progress theses to connect trainees | • Design research groups to include trainees with varied backgrounds and foster a culture of collaboration<br>• Explicate the value of building strong peer relationships, both for research endeavors and for combating emotional challenges.<br>• Introduce trainees to colleagues at other universities | • Create additional MBE programs within colleges and universities | • Support trainee-led/trainee-focused events that include peer mentorship, such as trainee workshops, conferences, and summer schools |
| **Mentorship** | • Participate in online and in-person IMBES Trainee Board events to provide professional development or discuss research<br>• Host and/or attend a Lunch with Leaders (like at the preconference)<br>• Host a speed networking session for trainees to meet with MBE leaders (e.g., use the Social and Affective Science society event as a model) | • Meet with trainees often to discuss their research and possible career paths<br>• Connect trainees with colleagues who could provide relevant mentorship<br>• Encourage trainees to seek out additional mentors<br>• Reflect on mentorship practice and consult resources (e.g., Wilson-Ahlstrom, et al., 2017) | • Clarify advisor expectations and incentivize mentorship<br>• Assign trainees more than one advisor | • Fund initiatives for trainees to develop secondary advisors across school or field (e.g., see model from The Scientific Research Network on Decision Neuroscience and Aging[1]).<br>• Continue to require that grant applications emphasize high-quality mentorship<br>• Add accountability measures for deep and authentic mentorship |

[1] This is an international network of scientists supported by a US National Institute for Aging grant to Dr. Samanez-Larkin at Duke University.

| | Improving Access to and Connections with the MBE Community | | | |
|---|---|---|---|---|
| **Access to the MBE and Trainee Community** | ● Financially support (e.g., grant funding) some trainees from countries that have not previously attended IMBES<br>● Continue using technology to make conference materials available and to leverage the existing MBE community on social media platforms<br>● Explicate the value IMBES places on having a diverse membership and seek funding opportunities to support underrepresented racial/ethnic minority trainees | ● Engage with trainees from countries that have historically been underrepresented within IMBES when they seek support (e.g., through email)<br>● Make lab resources or video recorded talks available online<br>● Conduct a holistic review in considering applicants to admit and support as trainees<br>● Guard against risk-aversion and reliance on criteria associated with long-standing inequities (e.g., elite school attendance, unusually high GRE scores) when making admissions decisions | ● Create online degree granting programs and host content from in-person degree programs through organizations such as EdX or Coursera<br>● Conduct an equity assessment of university language and practices.<br>● Diversify the faculty on admissions committees to promote diversity in admitted candidates | ● Support travel for trainees in countries that have historically been underrepresented in the MBE community |

| | | | | |
|---|---|---|---|---|
| **Connections among Research, Policy, Practice, and Community** | ● Continue to host events that integrate practitioners into the community and facilitate dialogue among stakeholders<br>● Continue to call for symposia proposals that feature researchers and practitioners, and provide guidance about how these groups might connect.<br>● Invite education media reporters (e.g., from EdWeek) to present at IMBES conferences<br>● Encourage trainees to gain experience in policy or practitioner roles during their academic training by hosting competitive internship programs in which Ph.D. students apply MBE work in policy or practitioner roles (e.g., The American Psychological Association's policy internship program might serve as a model). | ● Accept invitations to speak to non-academic audiences to set an example for trainees of honoring the important work that takes place outside the academy.<br>● Invite trainees to join when they speak to these audiences, and provide opportunities for advanced trainees to speak to these audiences. | ● Incentivize faculty and trainees to engage with others in the community by encouraging them to do so, lauding them when they do, and providing funding to facilitate these interactions. | ● Invest in opportunities for trainees to pursue work with practitioners and policymakers. |
| | **Professional Development** | | | |
| **Skill Development** | ● Host conference sessions or virtual meetings in which trainees learn about broadly applicable MBE skills (e.g., interpreting multi-method research)<br>● Develop guidelines about MBE relevant skills and how different constellations of these skills can prepare trainees for different types of work | ● Advise trainees about which skills, among the broad and diverse MBE-relevant skills, might be most important to build during their training<br>● Provide opportunities to practice skills and advise trainees about resources that are useful when developing new skills | ● Remove barriers to students taking courses outside of their primary department | ● Provide detailed feedback to trainees about their grant proposals |

| | | | | |
|---|---|---|---|---|
| **Career Development** | • Create an MBE wiki page for MBE jobs, much like the psychology job wiki<br>• Create a list of careers outside academia that might be relevant for people with MBE training organized by degree type and research focus<br>• Invite organizations looking to hire MBE trainees to hold booths at the IMBES conference | • Encourage broad thinking about and early investigation of career options<br>• Destigmatize the pursuit of careers outside of academia<br>• Broker relationships between trainees and relevant colleagues | • Host job fairs and post a publicly available list of companies and organizations who attend them | • Consider hiring MBE trainees |

# Next steps for Mind, Brain, and Education: Strengthening early-career development

Short title: Next steps for Mind, Brain, & Education

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