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## Insights from the Inclusive Environments and Metrics in Biology Education and Research Network: Our Experience Organizing Inclusive Biology Education Research Events

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In contrast to efforts focusing on improving inclusion in STEM classrooms from kindergarten through undergraduate (K–16), efforts to improve inclusion in scientific meetings and conferences, important hubs of STEM culture, are more recent. Markers of inclusion that are sometimes overlooked at these events can include the composition of panels, how workshops are run, the affordability of conferences, and various other mechanisms that maintain pre-existing hierarchies and norms that limit the participation of early-career researchers and individuals of minoritized cultural, linguistic, and economic backgrounds. The Inclusive Environments and Metrics in Biology Education and Research (iEMBER) network coordinates efforts of researchers from many fields interested in diversity and inclusion in biology education. Given the concerns regarding inclusion at professional meetings, iEMBER has developed and implemented several practices in planning and executing our meetings to make them more inclusive. In this report, we share our experiences developing inclusive meetings on biology education research and discuss the outcomes of such efforts. Specifically, we present our approach to planning and executing the iEMBER 2019 conference and the National Association of Biology Teachers iEMBER 2019 workshop. This report adds to the growing body of resources on inclusive meetings, provides readers with an account of how such an attempt at implementation might unfold, and complements existing theories and work relating to the importance and functioning of such meetings in terms of representation in STEM.

### INTRODUCTION

The diversity of the U.S. population and general workforce is not reflected in the current composition of the STEM workforce. Only ~10% of STEM-based jobs are held by individuals from minoritized groups (1–3). According to McCarty (4), “minoritization” (5) refers to the processes of

structural inequality arising from the attribution of unequal statuses, opportunities, and roles (6, 7). The minoritized groups in STEM that we refer to here are those which are underrepresented as noted by the National Science Foundation (NSF). Such underrepresented minority (URM) groups include African American/Black, Latina/o, and American Indian or Alaska Native peoples. NSF also considers women and people with disabilities underrepresented in STEM.

Understanding the underrepresentation of minoritized groups in STEM benefits from a nuanced perspective. For instance, women remain underrepresented in STEM occupations even though women and men earn more similar proportions of STEM degrees today than they earned in the past (3). Furthermore, there is still a lack of gender parity in the type of degrees awarded (including more advanced degrees) and the specific fields in which degrees are earned.

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Likewise, while the share of African Americans, Latina/os, and American Indians who have been awarded STEM degrees has increased, there is still racial and ethnic underrepresentation in STEM degree and job attainment (3).

Diverse perspectives are crucial in STEM, and the current underrepresentation of minoritized groups in STEM throughout these various levels of the academy and in the workforce negatively impacts technological innovation and advancement (8, 9) as well as research productivity (10–13). Concomitantly, who is included and supported in STEM is an issue of social justice, as participation by and integration of peoples in STEM is recursive to their larger social standing and progress. That is to say, STEM gatekeeping can impact groups' socioeconomic and political standing (14).

To address this underrepresentation in the academy and the workforce, it is necessary to develop strategies that will broaden participation in STEM at various education and career levels across STEM-relevant environments (e.g., classrooms, laboratories, events, etc.). Such strategies include efforts to make academic conference environments more inclusive, which is the topic of this article. Much discussion about the bias and discrimination at conferences occurs through avenues outside of discipline-based literature (i.e., webinars, workshops). Given that work-related contexts share many features with conferences, we can generalize that the kinds of bias that lead to exclusionary practice in other work-related contexts similarly plague conferences (15). Indeed, we posit that the traditional structures and organization of professional societies and conferences exacerbate inequality in STEM.

The critical examination of the non-content structure of conferences reveals the covert ways in which culture and inequalities within STEM are replicated at these venues. The ways in which women, people of color, individuals with disabilities, sexual and gender minorities, and additional minoritized groups are received and treated during these conferences convey messages of inclusion or exclusion. For instance, childcare and nursing station accommodations send messages about the accessibility of science to parents and nursing mothers. These patterns can occur at many levels, from structural/organizational (e.g., prohibitive meeting costs, location) to the micro-level (e.g., gender discrimination in the types and numbers of questions asked to and by women, assumptions that scholars of color are there as service people).

Codes of conduct and organizational policies are one way that the non-content structures of conferences may be addressed (16, 17). However, most conferences, at least in the biological fields, do not have these institutionalized (18). While statements on diversity, equity, and inclusion are a good start, without institutionalized policies and clear consequences, they alone cannot bring significant change.

In recent years, there has been increased attention to improving inclusion in STEM in kindergarten through undergraduate (K–16) classrooms (19), while efforts to improve inclusion in STEM professional organizations and events are

less pronounced (or at least are less often published), with some notable exceptions (e.g., [15, 20–22]). We borrow Dewsbury and Brame's operationalization of inclusivity, defining it as "the practice of including people across differences" that "implies an intentional practice of recognizing and working to mitigate biases that lead to marginalization or exclusion of some people" (19).

Promoting inclusion in scholarly meetings is vital given the pivotal role that professional academic and scientific organizations can play within broader disciplines, and their potential to disrupt inequality in STEM. The establishment of a culture of inclusion at professional events provides a unique opportunity to unsettle the status quo and broaden participation in STEM. First, these organizations hold meetings, conferences, and workshops that may improve the social capital of their members by offering attendees beneficial networking and exposure opportunities (9). At these events, professionals and academics, including early-career faculty, postdocs, and graduate and undergraduate students, can benefit from showcasing their research, receiving feedback from field-experts, identifying future collaborators/mentors, and so on. Thus, the social capital that is potentially gleaned through these meetings could help improve the representation of minoritized groups in STEM. Second, these organizations may contribute to practitioners' beliefs or cultural models about how their field works by making evident the expectations and values of their specific disciplines (23, 24). These understandings emerge and are reproduced at the micro and macro levels at these conferences through, for instance, the diversity of presenters, the research/discussion topics, and even conference themes. It is reasonable to argue that how these meetings unfold potentially affects participants' cultural models, including their feelings of belonging, which likely support or discourage their retention in STEM (23).

The Inclusive Environments and Metrics in Biology Education and Research (iEMBER) Network is an NSF-funded research collaboration network focused on fostering interdisciplinary research collaborations that study and address inclusion in biology (see [www.iember.org](http://www.iember.org)). A core component of this network is the offering of workshops and conferences that bring stakeholders from diverse backgrounds and fields together to develop novel research projects. In this article, we examine iEMBER's efforts to create intentionally inclusive conference sessions at the iEMBER 2019 meeting and NABT (National Association of Biology Teachers) 2019 iEMBER workshop to offer insight on what has and has not worked, as well as to suggest practices that can further foster inclusion within these types of events.

## THEORETICAL FRAMEWORK

The social sciences, including anthropology, sociology, and psychology, as well as the field of education studies, provide several theoretical frameworks that are pertinent

to the topic of inclusion in STEM. In this article, we highlight two frameworks in particular: participatory social capital and cultural models. We refer readers interested in additional complementary structural and/or behavioral theories of inclusion to scholarship on those topics (25, 26).

*Participatory social capital* refers to the people and resources to which an individual has access through their participation in organizations (9), such as professional biology organizations (e.g., NABT, an organization that promotes biology and life science education; <https://nabt.org>). This concept relates to our work in that we mobilize it to recognize the impact that iEMBER and other professional meetings can have on helping individuals become successful members of the biology community. Indeed, Skvoretz *et al.* (9) argue that participatory social capital, including the social capital gained through participation in the organizations and meetings that are the focus of this article, might play an important role in undergraduates' persistence and retention in their engineering degree programs.

It is likely that participatory social capital might similarly play an important role in the retention of undergraduate and graduate students, postdocs, and early-career faculty in biology and STEM more broadly, especially for those from minoritized groups. For instance, disciplinary conferences often offer an opportunity for minoritized scholars to network and be around people in their field who may share similar identities, an opportunity they may not have in their own department. National STEM diversity-focused conferences, such as those offered by the Society for Advancement of Chicanos and Native Americans in Science (SACNAS) and the Annual Biomedical Research Conference for Minority Students (ABRCMS), are perhaps a more focused source of such support and resources (27). Regardless of the specific targeted audience, all organizations have a responsibility to implement policies supporting members' equitable access to their resources, which we believe requires greater efforts toward developing and deploying inclusive policies and practices.

*Cultural models* refer to the shared, internalized cultural schemas upon which people within a culture draw to construct and organize what they believe, the meanings attributed to phenomena, and their practices (28). Smith *et al.* (23) apply cultural model theory to engineering undergraduates in their articulation of the Cultural Model of Engineering Success concept. This concept holds that beliefs about how to succeed in engineering are taught through a curriculum that is both overt as well as hidden. The authors propose that students who practice behaviors in accordance with these beliefs might be more likely to be successful in their degree programs. We extend D'Andrade (28) and Smith *et al.*'s (23) theorization by applying cultural model theory to biology and STEM professionals more broadly, specifying that professional biology education-related meetings are a source through which individuals at all levels of their career are socialized toward the norms of their field (including their feelings of belonging within that field). Conferences that nur-

ture cultural models more consistent with the identities and experiences of diverse individuals likely promote a greater sense of belonging for attendees within their disciplinary fields (23). This is important given that sense of belonging in STEM has been shown to be key to supporting and retaining undergraduate students (29), graduate students (30), and more advanced minoritized scientists in STEM (31).

## BACKGROUND AND RESOURCES INFORMING OUR APPROACH TO ORGANIZING INCLUSIVE EVENTS

In planning and executing iEMBER events generally and specifically, including the iEMBER 2019 meeting and NABT 2019 iEMBER workshop discussed here, we rely on multiple sources. These sources include structural, social, and behavioral theoretical frameworks on inclusion, as well as existing resources relevant to inclusion in STEM meetings and classrooms, on our own experiences at conferences and workshops, and on the feedback we receive from participants attending our events. iEMBER group discussion rooted in each of these sources drove us to create sets of guiding questions that we refer to when planning and running events. These guiding questions are presented and discussed in the next section, see especially Table 1 on planning events and Table 2 on executing events. For iEMBER, these two tables are continuously evolving documents. We provide them here as examples for other organizations to use to plan meetings or to develop their own guiding questions. The documents also illustrate the factors we take into consideration, which help us explicate the behind-the-scenes of efforts at making conferences inclusive.

A first important existing resource guide on running inclusive meetings is the American Society for Engineering Education (ASEE): Minorities in Engineering Division, and the Women in Engineering ProActive Network (WEPAN)'s webinar on how to organize and host inclusive events (21). This resource provides crucial insight on how to disrupt power differences in STEM meetings. Central in this resource is how to unsettle academic hierarchy and traditional meeting norms by, for example, beginning an event by articulating meeting norms/expectations, which seeks to level the playing field. The authors also recommend built-in time for networking and mini-poster sessions where participants introduce themselves. The authors additionally offer tips on how to facilitate meetings as a discussion between participants rather than at them. A second resource providing valuable insight into our efforts is the 500 Women Scientists' guide on inclusive scientific meetings (15). Here, the authors endorse including and recruiting a diverse organizing committee, advertising attendee funding opportunities, promoting inclusion in advertising and event materials, maintaining rigorous time limits and Q&A procedures to prevent particular members from monopolizing the meeting, and collecting feedback on inclusion to determine whether specific goals were met and to inform future meetings.

Two articles on practices to promote inclusion in the classroom are also core to our meeting organizing: Tanner's (32) teaching strategies to promote student engagement in the classroom and Dewsbury and Brame's (19) inclusive teaching handbook with complementary online, evidence-based guide. The main principles of these guides apply well to science meetings and include developing empathy and self-awareness, addressing climate, making intentional pedagogical choices, and fostering a sense of belonging, among others. Dewsbury and Brame note that warm climates nurture students' sense of belonging and foster in students a value for class tasks and feelings of competence or self-efficacy regarding those tasks (19). To apply these practices to the iEMBER 2019 meeting and NABT 2019 iEMBER workshop, we held explicit discussions on inclusion in which we shared our own reflective practices for self-awareness and empathy and discussed how to be intentional during the facilitation of activities to promote a welcoming climate and social belonging. The outcomes of these discussions are further elaborated upon in the discussion section of this article.

From our own experiences, we have seen examples of inclusive conference practices. Reflecting on these helped us consider how the advice given through the resources above might look in our context. Some of the examples from our experiences that we discussed as a group included, in terms of incorporating diverse perspectives into their leadership structures, that the American Society for Microbiology (ASM), the Genetics Society of America (GSA), and the American Society for Cell Biology (ASCB) all seek to foster leadership development of early-career researchers through support in organizing regional or local events. Similarly, NABT publishes leadership meeting times and locations with an open invitation for all conference participants to attend. In terms of dismantling silos, the Midwestern Psychological Association states that its annual meeting is open to psychologists, students, and members of the public, which helped one of the authors of this article feel welcome attending as a biology faculty member. Similar to the actions of other organizations, the American Chemical Society created "diversity-identified" committees (i.e., the Committee on Minority Affairs, the Committee on Chemists with Disabilities, the Women Chemists Committee) in an attempt to provide opportunities to increase inclusion in the chemical sciences. The ASCB Minority Affairs and Women in Cell Biology committees host networking events and table-talks to facilitate conversations and questions from junior scientists regarding specific steps and stages in career progression—many programs are open to all while others are focused on those underrepresented in the field. We have also observed micro-level practices promoting inclusion at sociological conferences, specifically the inclusion of self-identified pronouns on name tags. This making of space for participants to self-identify gender identity promotes the address of others in comfortable and non-judgmental terms. We have also observed meeting leaders and keynote speakers taking a moment to share their background, as

a first-generation student or veteran, or a piece of their culture, such as an introductory sentence in their first or native language, dialect, or accent.

Finally, we constantly re-evaluate our conference practices in response to feedback from our event participants. Specifically, feedback from the iEMBER 2017 (34) and 2019 meetings helped us identify which of the practices we used made attendees feel welcome and included. Those strategies were then prioritized in the planning of our NABT workshop later in 2019. Some of these practices that participants most appreciated included the use of first names and a lack of titles on nametags; changing seating often along with ice breakers to foster community and facilitate meeting new people; intentionally welcoming attitudes and behaviors of iEMBER facilitators; and explicitly stating the event's values/norms of expected behavior. Clearly, the recommendations made by the resources we reviewed earlier that we adapted to our context were valued by many of our attendees.

## DISCUSSION: PLANNING AND CARRYING OUT iEMBER MEETINGS

To articulate how iEMBER has addressed the challenges we experienced in attempting to conduct more inclusive conferences and meetings, we break down the conference stages into two categories: pre-event planning and the execution of the event. The practices listed below are not the only practices that promote inclusion, nor the only practices we used in our events, but they are the ones that we have repeatedly found to be effective in our contexts. In this discussion, we also provide examples of some of the accommodations and compromises iEMBER has made in line with our guiding concerns and balancing of needs with the resources available, as well as highlight some of our struggles and areas we have identified that could use improvement.

### Planning iEMBER meetings

When planning the iEMBER 2019 meeting and NABT 2019 iEMBER workshop, we considered logistical variables, such as scheduling, cost of lodging, session topics, and so on through the lens of inclusion. Table 1 provides a list of the main parameters we considered in the first column and the questions/approaches associated with each of them in the second column. This list of variables and questions is the result of combining the existing resources and articles described earlier (in particular 15), our own conference experiences, and our previous iEMBER conference feedback. The specific answers an organization may have to the questions in Table 1 (and Table 2) will vary depending on an event's size, audience, duration, etc. For example, since the iEMBER 2019 meeting was a small, two-day event that could be housed in a couple of conference rooms, we did not have to worry about finding locations/venues that could hold thousands of people.

TABLE I.  
Planning events: variables and questions iEMBER considers.

Factor	Guiding Questions
Scheduling	<ul style="list-style-type: none"> <li>• When are religious holidays and important cultural events scheduled? Are perspectives beyond those held by committee members represented on this list?</li> <li>• When are other conferences that might be of interest to possible attendees?</li> <li>• What time of the month/year might increase the likelihood that we could attract members from diverse institutions, such as community colleges, small/liberal arts schools, and research-intensive institutions?</li> <li>• Which dates might be less expensive for traveling?</li> </ul>
Location	<ul style="list-style-type: none"> <li>• Which locations are centralized, to balance the cost and time of travel for members?</li> <li>• What is the cost of hotel/available lodging at the possible location?</li> <li>• What is the average airfare to the possible location? (Choosing airline hubs can reduce the cost of flights significantly.)</li> <li>• How friendly is the selected location to diverse populations?</li> <li>• Are there cultural or historical events that should be considered?</li> </ul>
Event costs	<ul style="list-style-type: none"> <li>• What is the cost of registration and what can be done to lower it?</li> <li>• Can tiered registration levels be offered?</li> <li>• What fellowships can be offered to help offset costs for attendees with less available funding?</li> </ul>
Promotion	<ul style="list-style-type: none"> <li>• How can the event be promoted so that it reaches stakeholders?</li> <li>• To what extent is the language and art used in promotional materials inclusive and welcoming?</li> <li>• Is the information provided on event collateral accessible and clear?</li> </ul>
Accessibility	<ul style="list-style-type: none"> <li>• Does the venue offer lactation/breastfeeding rooms?</li> <li>• Are there accommodations/options for attendees who need childcare?</li> <li>• Are gender-neutral restrooms available?</li> <li>• What is the extent to which the needed rooms and spaces are accessible to individuals with various abilities?</li> </ul>
Program planning	<ul style="list-style-type: none"> <li>• Are the organizing committee members from diverse disciplines and backgrounds?</li> <li>• Is the group of keynote speakers diverse and reflective of the participants and professional fields?</li> <li>• Are the session topics reflective of the interests and research topics of attendees?</li> <li>• Are abstracts being selected from diverse institutions, career levels, and topics?</li> <li>• To what extent are the guidelines and selection criteria for abstracts transparent, available, and inclusive?</li> </ul>

A major concern for any conference organizer, scheduling events almost always requires compromises related to cost. In our case, we weighed several factors when selecting the specific dates for the iEMBER meetings. On one hand, one might consider that hosting a weekend meeting might be best for people employed in traditional work settings (e.g., high school biology teachers, chemists) as they might be off work and thus available for the meeting. On the other hand, holding conferences over the weekend might place additional burdens on individuals with dependents (i.e., childcare concerns). This latter concern could be offset if an event offers childcare, but such accommodation might be cost-prohibitive for smaller events that seek to attract local participants, such as iEMBER 2019. To mitigate scheduling conflicts, as well as travel- and cost-related concerns, organizers can consider alternative ways to support the participation of interested individuals at events, such as by hosting events that are free for participants or offering activities via videoconferencing.

At the NABT2019 iEMBER workshop we succeeded in utilizing both of these alternatives. Our event was free and held on the last day of the conference so participants did not have to register/pay for the NABT conference if they just wanted to attend our workshop. To accommodate participants who registered for our NABT workshop but were unable to attend, we subsequently reached out and invited them to join the open working groups formed during the workshop. A number of participants took us up

on the offer and are now active participants in new working groups emerging from the workshop. This type of follow-up helps the overall network grow in numbers, strength, and diversity.

Conference organizers deal with the fact that there may not always be an “ideal” solution when considering identified logistical concerns. For example, for the iEMBER 2019 meeting (as well as the iEMBER 2017 meeting), we were offered the opportunity to host the event at the university of one of the iEMBER steering committee members to reduce costs. The university is a Historically Black College and University (HBCU), so holding the meeting there would exemplify inclusion in terms of the type of university at which the conference was held. Likewise, the additional funds would allow us to offer more fellowships for participants interested in attending the meeting, reducing attendees’ cost barriers. Furthermore, the central location of the event in St. Louis would allow easier and less expensive travel from various states. However, the buildings available at the university did not have gender-neutral restrooms. We decided we would host the event at the university, but were intentional in communicating to the attendees that the policy was that they should feel free to use the restroom with which they felt the most comfortable. While we did not receive complaints from attendees about this, we would have much rather have had gender-neutral restrooms available to make participants more comfortable.

In this context, we find it valuable to recognize that inclusion must be a long-term, sustained effort. That is to say, we realize that our conferences are not our ideal right now, but that each experience helps us in the creation of an infrastructure of inclusion, which is improved at each of our conference iterations. For instance, at the NABT 2019 workshop, we offered funding for participants in order to help offset the cost of travel and to encourage non-discipline researchers to attend the event (with the goal of diversifying the fields and expertise present). However, because NABT was a late addition to our schedule, we did not have adequate time to promote these resources effectively and thus had no applicants for funding, unlike the case of our two previous iEMBER conferences. Now that we have the tag-along funding model more securely in place with a schedule to begin advertising travel funds to allow enough time for application and selection of awardees, we anticipate being able to better fund attendees of our future tag-along meetings. [iEMBER tag-along meetings occur as part of or in conjunction with another professional society's larger meeting (e.g., the NABT 2019 iEMBER Workshop was a tag-along meeting).]

### Executing iEMBER meetings

We believe that executing a more inclusive and equitable conference requires appropriate planning and proactively developing strategies for inclusion for every aspect of the event possible. Areas to which we devote much of our efforts include having presenters and facilitators from diverse backgrounds, fostering an inclusive atmosphere/environment, reducing hierarchical barriers, and using inclusive language.

For the 2019 NABT iEMBER workshop, we selected iEMBER facilitators who had backgrounds in K–16 education, discipline-based education research, policy, college biology instruction, anthropology, and industrial and organizational psychology. In the context of college instructors, we recruited organizers from various kinds of institutions, including Hispanic Serving Institutions, HBCUs, Research Focused Universities, liberal arts schools, community colleges, as well as institutions outside of academia. Having a diverse group of organizers helps increase the variety of personal and professional backgrounds present at the event. This approach incorporates expertise from many fields and is therefore more beneficial and welcoming to a wider range of participants.

Though these events in many ways offered diverse facilitators, ensuring that every workshop has a diverse organizing committee has not always been possible in other regards due to a variety of structural, scheduling, and financial constraints. For example, while the facilitators of the 2019 iEMBER meeting were a mix of individuals with identities including African American, Latina/o, LGBTQPIA+, seven of the eight iEMBER facilitators at the 2019 NABT iEMBER workshop were white. However, there were more women

facilitators than there were men facilitators at both events. The diversity of iEMBER committees, like many networks and organizations, could be improved. In the end, the work of making events and conferences more inclusive is collectively the organization's responsibility, and this requires policies, procedures, and actions, not just perspectives.

While we are committed to promoting leadership committees and groups of conference facilitators that are culturally, linguistically, and socioeconomically diverse, we also realize that this must be pragmatically balanced with considerations of service burdens. In particular, people of color are usually underrepresented in the ranks of faculty (often the go-to organizers for conference events) and frequently have more demands on their time and service efforts at their own institutions already (35–39). Though this may not be the story of every minority faculty member, such work takes both emotional and task-filled tolls while the tension to transform the existing school culture, the need to construct academic identities, and the cultural dissonance between existing backgrounds and the school culture create difficult issues to navigate. The constraints of employment in the academy, including the tenure-track journey and its accompanying requirements, are perennially overhead and factor into service and other decisions (38).

We believe individual members are in the best position to evaluate their own capacity for contribution, and we realize that fulfilling our own aspirations will require growing our network and representation within our fields. To achieve this goal, while also reducing hierarchical barriers, we invite all attendees of iEMBER events to consider partaking in the leadership of the network and in future events, regardless of their field, career level, and institution. We also promote our network at various scientific meetings, online, and via social media to try to reach more individuals, cultivating relationships with organizations serving various minoritized groups so that their members can access information about our meetings.

To foster a more inclusive atmosphere at our events to promote the free interaction and exchange of ideas, we employ a variety of practices spanning the whole duration of the event. These practices occur from the moment a participant arrives until they leave; we sometimes even use the periods before and after the meeting. These practices are deployed in response to three guiding questions: Are there designated event leaders who will moderate inclusion? Are there specific inclusive practices that will be used during the event with participants? Are there facilitated networking activities that encourage participants to interact with people they do not know? Table 2 shows these guiding questions as well as the strategies undertaken to address them.

Many of these practices are borrowed from those recommended for creating inclusive biology classroom environments (19, 32). For example, at the beginning of each session, iEMBER leaders explicitly share the session norms/values/expectations and make explicit the reasons behind these norms (21). Figure 1 shows the slide of session norms used at the 2019 NABT iEMBER workshop.

TABLE 2.  
Executing events: guiding questions and strategies iEMBER uses.

Guiding Questions	Specific Strategies
Are there designated event leaders who will moderate inclusion?	This moderation might include the identified event leaders using first names to welcome participants as they arrive, encouraging participants to sit together, facilitating discussions so they do not become dominated by majority perspectives, and monitoring time to ensure that activities are completed in a timely manner.
Are there specific inclusive practices that will be used during the event with participants?	Inclusive practices may include hand-written, first-name-only badges/nametags lacking title (e.g., Dr.) or status (e.g., Professor); mechanisms for selecting who will start discussions; modeling and articulation of expectations regarding the use of respectful language, non-verbal behaviors, and group behaviors/dynamics; advocacy for visual, hearing, physical, and additional accessibility; the use of a jargon/definitions board to facilitate communication between people across disciplines; explicit discussion of the value of engaging with multiple perspectives and respect for viewpoints.
Are there facilitated networking activities that encourage participants to interact with people they do not know?	Networking activities may include Lightning Talks open to all participants, group or table seating and activities (including ice breakers and meals) that encourage conversation, semi-structured breaks, and time for spontaneous conversations.

To reduce hierarchical barriers (i.e., professor/student, senior scholar/early-career) at both the 2019 iEMBER meeting and the 2019 NABT iEMBER workshop, we were purposeful in our use of nametags and terms of address. We asked participants to write their preferred names and pronouns on their name badges, while also discouraging the use of titles upon arrival. Another strategy to bridge barriers that we implemented at iEMBER 2019 was the use of “Lightning Talks,” mini poster sessions in which attendees briefly introduce themselves (21). The talks were received positively by attendees, who noted that the Lightning Talks were not only effective “ice-breakers” but were also empowering since they provided participants the freedom

to introduce themselves to their peers on their own terms. To avoid monopolization of dialogue, at the 2019 iEMBER meeting, we used strategies such as systematically giving every attendee a chance to talk, drawing sticks or cards with an individual’s name (which they wrote themselves), and waiting several seconds after we had asked a question to allow more tentative participants to share their thoughts (32). In addition, at both meetings, organizers shared their experiences with inclusion in their teaching and other contexts, and attendees were encouraged to share theirs, first in small groups and then as a whole. Feedback from attendees showed that such practices contributed to their feelings that they were being heard and included.

## Building Trust and Session Norms

Mutual respect and inclusion with sustained, ongoing positive interactions:

- Small considerations add up.
- Give others the benefit of the doubt.
- Reduce, recognize, and eliminate assumptions.
- Listen actively.
- Do not be afraid to respectfully challenge one another by asking questions, but refrain from personal attacks—focus on ideas.
- Participate to the fullest of your ability.
- The goal is not to agree—it is to gain a deeper understanding.
- Be conscious of body language and nonverbal responses.
- Speak from your own experience instead of generalizing.
- Be aware of turn-taking and interruptions, both in yourself and in others.

FIGURE 1. Session norm slide showed at 2019 NABT iEMBER workshop.



We were also purposeful in our use of language at our iEMBER events. Inclusive language is language that avoids -isms, shuns negative stereotypes and assumptions, uses examples relating to a wide diversity of experiences and people, and so on. Simple examples include referring to “humankind” instead of “mankind” and being sure to include representations and examples of scientists from diverse backgrounds. Recent studies on the non-content-related language used in biology classrooms have shown that even when discussing complex science topics, faculty will often interject non-content language that can be supportive or unsupportive of students (40–42). Since such language effects likely similarly exist at conferences, we promote the awareness and use of inclusive language at our events.

## CONCLUSION

Inclusion practices and advocacy work on the part of committees and members in a professional society are neither easy nor straightforward. We struggle at times. Considering the event schedule, location, and cost is a balancing act, and compromises are often made. Attempts to pack in content and structured discussion sometimes come at the expense of networking time. Event leaders who moderate inclusion can have distractions or moments when their best efforts are not the most effective. Discussions and individual projects, even within a group committed to looking at inclusion, can veer into deficit models/ways to help others improve. Pushback against such models can introduce group conflict. We recognize that conversations on diversity and inclusion can contain biases and microaggressions (i.e. intent versus impact), may lack collective efficacy, and can include behaviors that continue to infiltrate and negatively impact conferences, the scientific enterprise, and the academy.

Yet we highlight how critical it is for conference organizers and those throughout academia to make conscious efforts to identify, interrogate, and address biases, microaggressions, and isolating/exclusionary environments in professional societies and events. Such efforts can help improve underrepresentation in STEM, as they can help decrease environments which can negatively impact (especially minoritized) attendees’ participatory social capital, cultural models, and successes within STEM.

We hope that by offering a self-reflective narrative about iEMBER’s ongoing efforts to be inclusive, we can encourage and aid others as they work towards fostering inclusive practices in their scientific conferences and events. In offering this applied commentary, we likewise further the discussion and scholarship on STEM inclusion by highlighting the organizational processes behind scientific meetings and the many ways and levels at which inclusive practices can be incorporated.

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